US Army Corps of Engineers

# Donlin Gold Project EIS

## Comment Form

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SVE 2

I'm for alternative 1 (No Action/Plan) for the proposed project even though it would bring jobs to this economically depressed Region. Mining generally destroys and kills all living things including land, water, animals and species of small fish and Salmon. If the tailing holding area is breached it has the potential to kill all living things on the Yukon and Kuskokwim Rivers including those people residing below Donlin. Barges coming up and down the Kuskokwim may potentially have an impact on our salmon especially the Chinook that we have been trying to conserve within the last 3-4 years.

DAM 2

FISH 5

Village of Crooked Creek • Native Village of Napaimute • Native Village of Chuathbaluk • Native Village of Aniak • Knik Tribe • Akiak Native Community

## Layout of Proposed Mine Site

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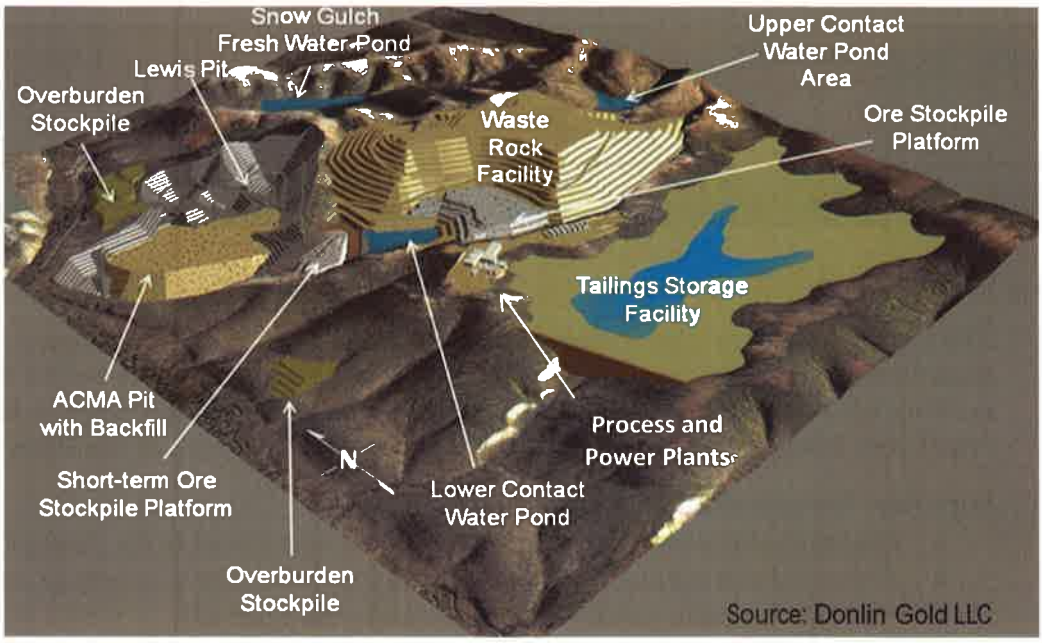
For more information, please visit:
www.DonlinGoldEIS.com




(fold here)

from:

US Army Corps of Engineers
Donlin Gold Project EIS

Keith Gordon
Regulatory Division
US Army Corps of Engineers
CEPOA-RD-Gordon, PO Box 6898
Joint Base Elmendorf Richardson, AK
99506-0898

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US Army Corps of Engineers

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1) 80+ mile Road from Birch tree to Donlin Creek Becomes 76 mile Road Howed the milage change

WAQ 26

2) Dry tailing Pile, what will happen when wind carries Dust off ~~to~~. Run off water will carry Dust + Contaminants Down to River

3) where will the water go from the tailing Pond ~~go~~ After treatment

The # of Jobs Keep changing 3000 to build down to 1600-1900 tonight

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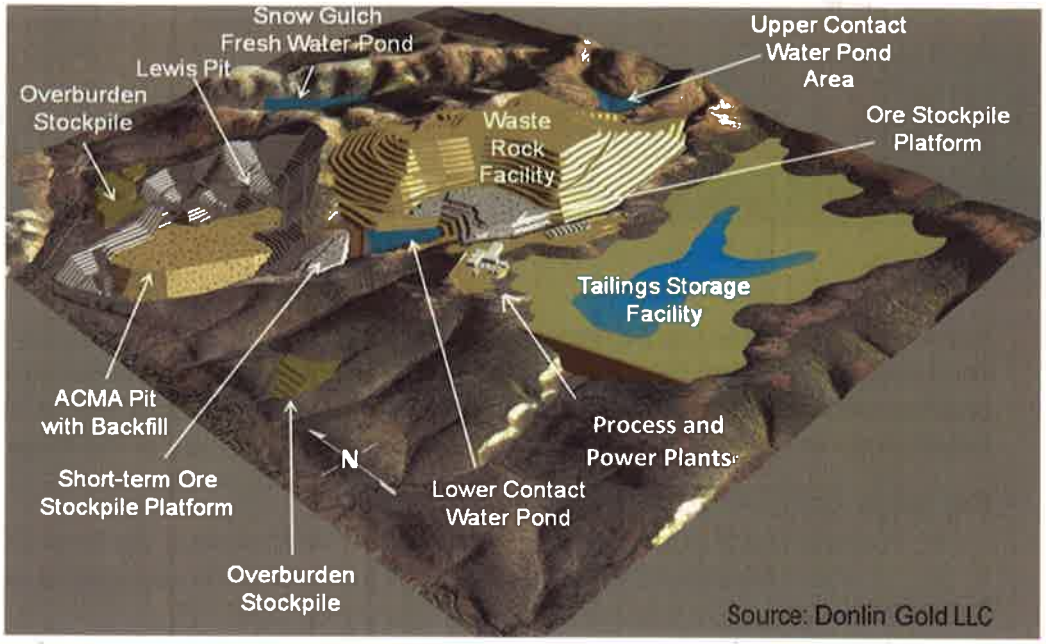


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PHL 3

if Cancer or other illness should ~~so~~happen thru DGP, will DGP Pay hospital visit Expences?

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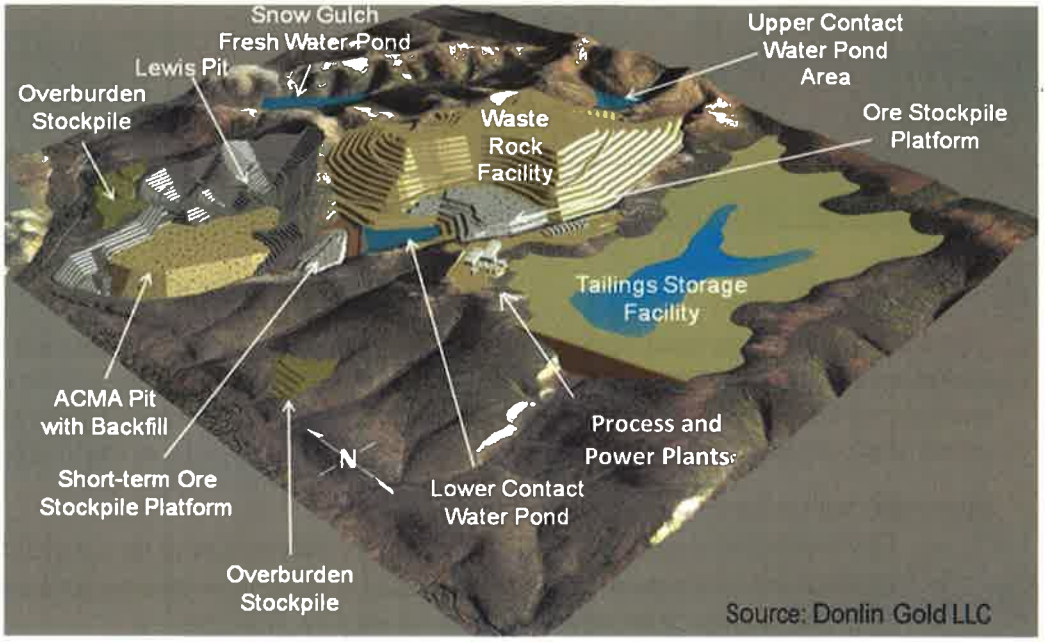


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NSB 1

What I think about Donlin gold about how you guys bulid it and make it up. and is it hard to bulid Donlin gold? How long does it to take to dig the hole and thats it all im asking and thank you. to let me do the coment.

Village of Crooked Creek • Native Village of Napaimute • Native Village of Chuathbaluk • Native Village of Aniak • Knik Tribe • Akiak Native Community

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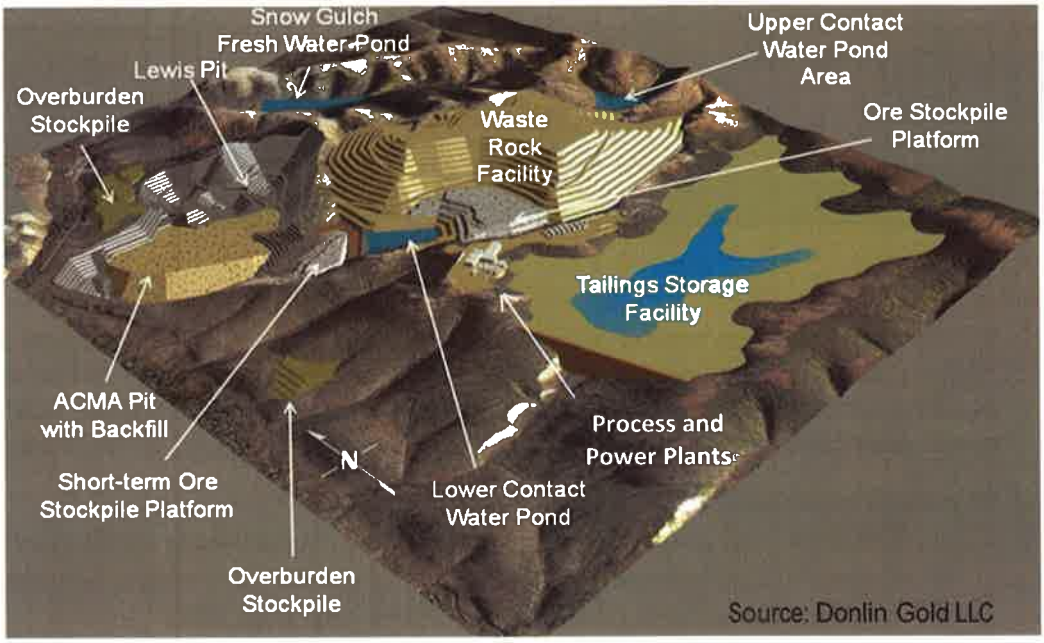


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NSB 1

1. I wan't it to go on because this is a cool thing to get gold from this site, what would it do to the enviorment; if it's good im in it.

2. And if i don't want it to go on that it might affect the enviroment and that's why.

3 The person who's doing this project or Dolin gold project EIS told me this can cost millions of dolleos of 5million.

4 what if the enviorment is bad to work in, and why is the project going on, what if the gold isn't ther

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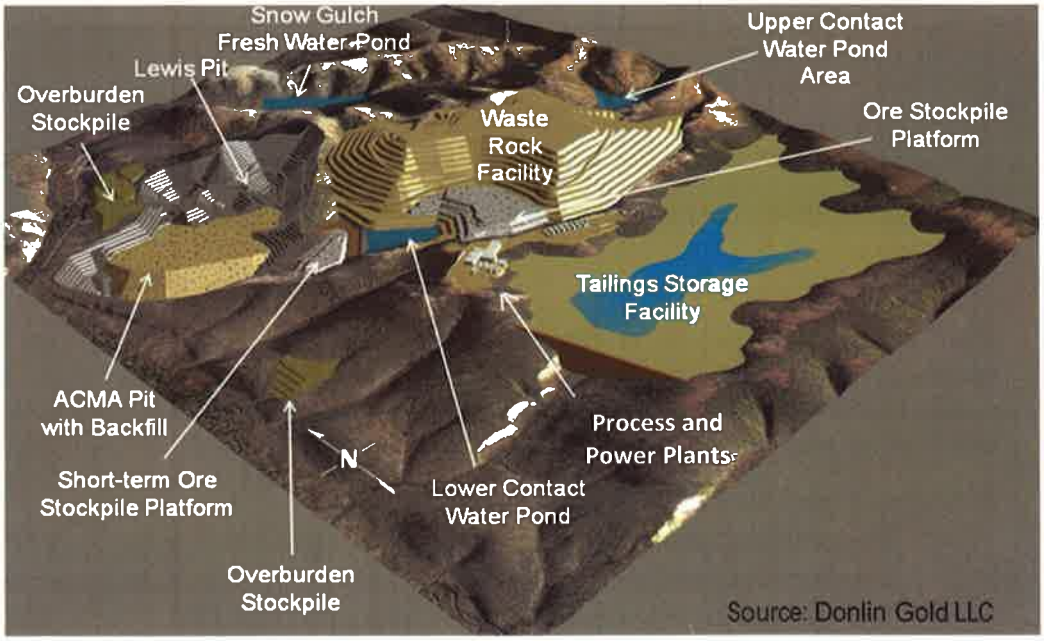


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NSB 1

1. Are or do you know if media comment concerning on Donlin Gold is extending information & discussion ✓ — already answered.

2. Traffic of Motorized vehicals produce waste; oil, emition, well they be recyled? (Cyanide) noise. ! ext Environmental

3.

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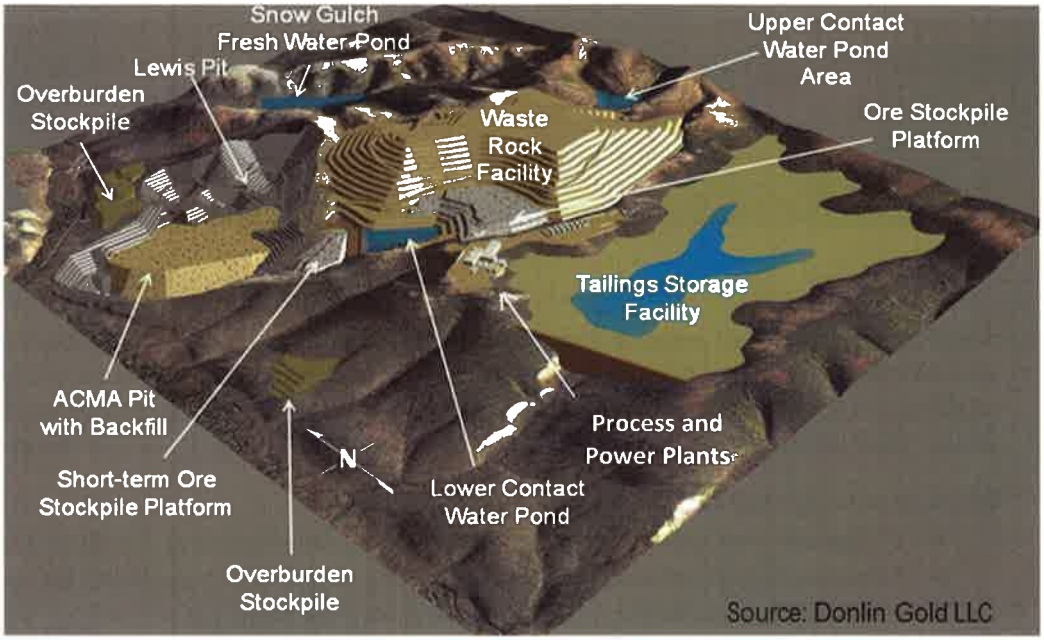


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FSR 2

Diesel: If there is a big diesel spill – it's cleaned up, but effects of it remains. Is there another solution or way to make absolutely sure no harm has been done to marine life or animals. Seeping diesel or gas into ground, no one for certain can clean this up.

HAB 1

Once a pit is in placed, it will always remain. This is a disturbance to natural wildlife, marine life, & may cause of reduction in either due to the stress of having someone, something come into their surroundings.

BARG 12

If waters remain low, no barges, boats can access the waters, then what?

- I oppose this Donlin Gold Project EIS!

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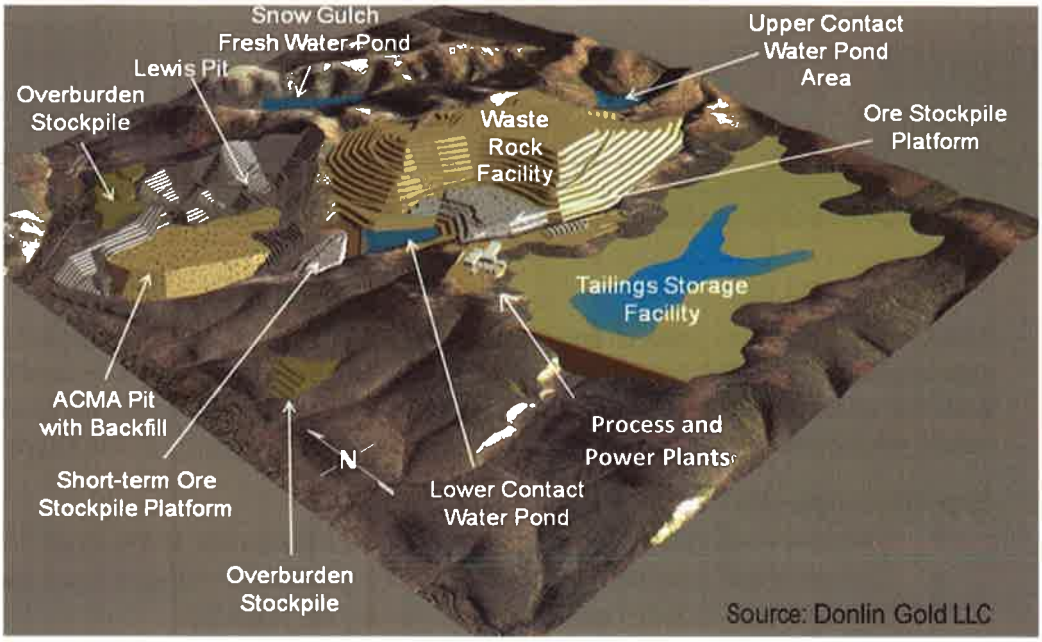


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BARG 12

Chap 3: Concern brought up on dredging of rivers: If water low for quite some time - will this (barge transport) process change, will it continue or is there another route?

FISH 4

Concern on fish habitat. I live a subsistence lifestyle. Our river is home to where our fish return, lay eggs, live & return to inlet, bays, ocean. Will you all continue to cross or use rivers that provide food for our community? How are you preventing decreasing the effects of fish habitat, life. If rivers are pathway to fish, but fish habitat is low - (numbers), are you still going to use rivers as roadways for the barges?

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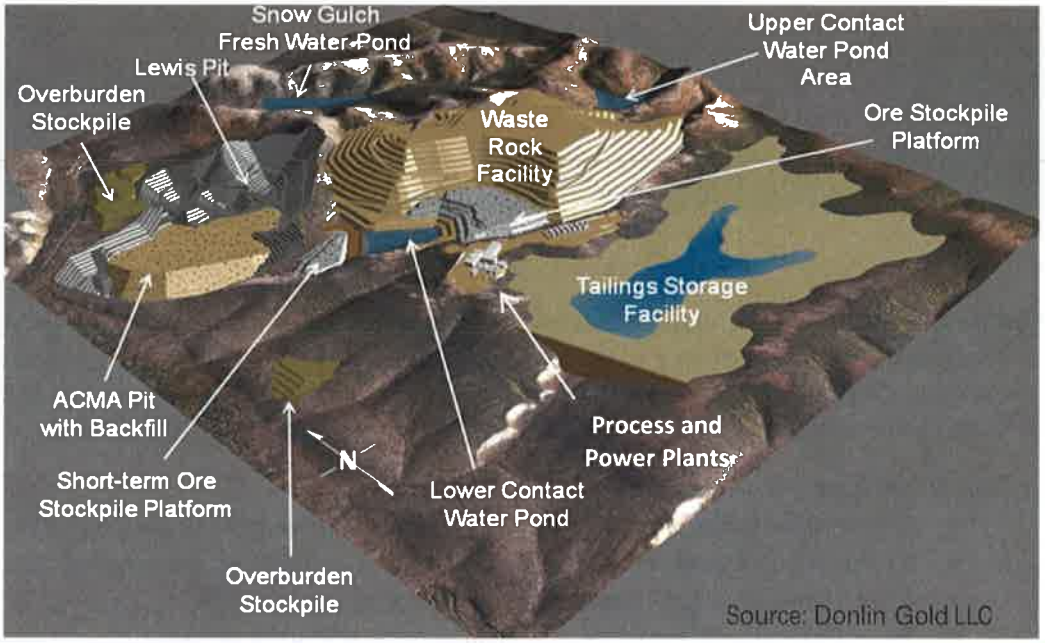


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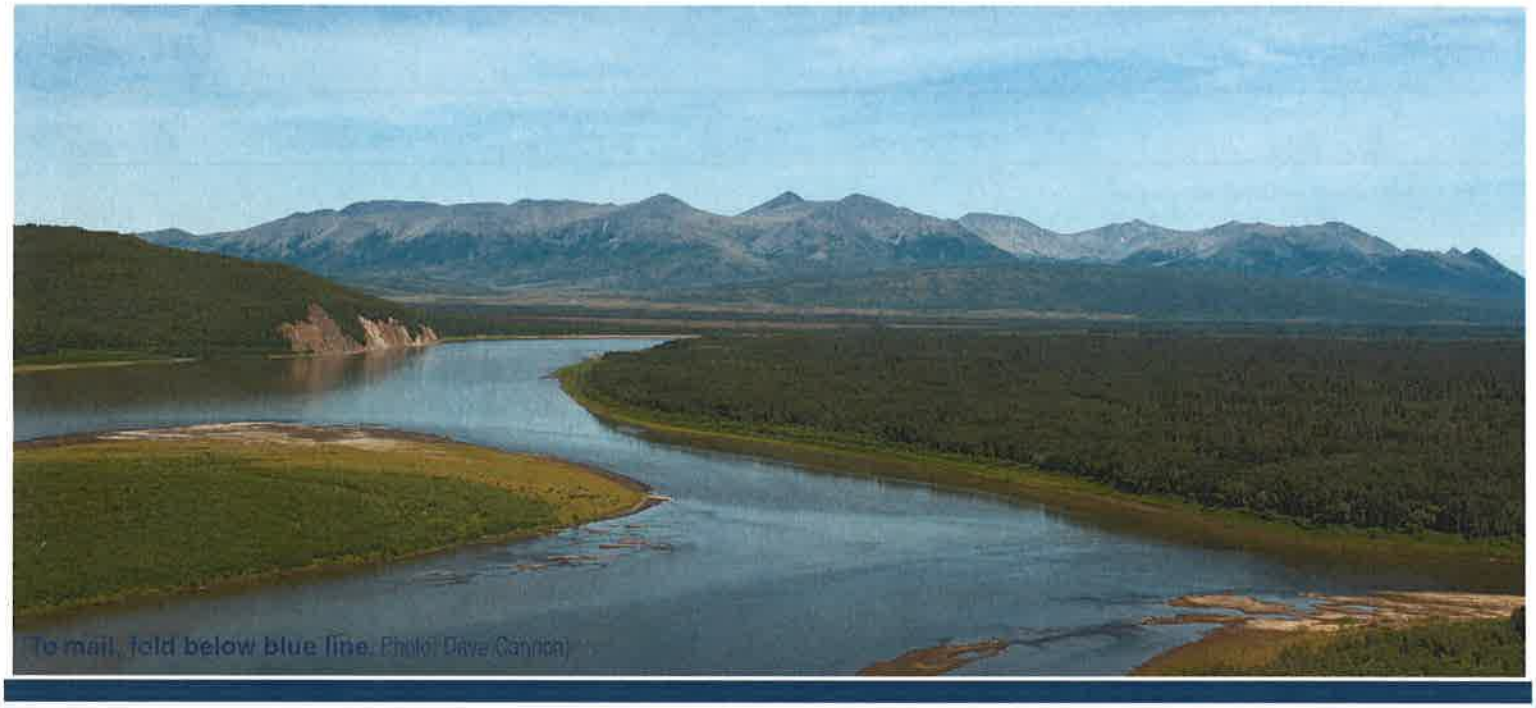


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US Army Corps of Engineers
Donlin Gold Project EIS

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MIT 9

I have heard a little about Dontin protecting local streams and have seen some news articles/opinion pieces expressing concern about stream pollution. It might be a good idea to talk more about how streams will be protected.

- Ideas: - go into more detail on liners
  - explain leachate collection from liner (?)
  - sediment run-off control

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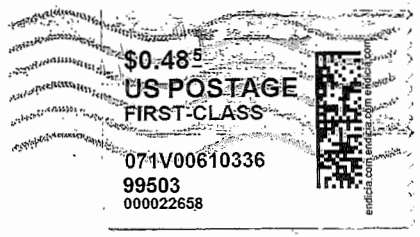
ANCHORAGE AK 995
14 MAR 2016 PM 1 T




Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska
District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline

MIT 27

If it hasn't occcured yet, I'd like to see policies & procedures on how hazardous materials are disposed & the written contingency plan if there was ever any emergency related to hazardous material leakage, spill, etc. One can never be too safe when potentially impacting subsistence & livelihood needs. Thank you.

ANCHORAGE AK 995
24 MAY 2016 PM 1 L

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Alaska District
CEPOA-RD-Gordon
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Who cares about damn gold? I understand folks are all looking at the job aspect of the whole idea, but c'mon, look, get some educated heads together & come up with a different avenue to supply jobs to the Alaskan people. There are disasters throughout not only America but the world where the greed of money cost a permanent change of life for an entire generation & even up to four generations as a result of tampering with wildlife & the ability to rely on your surroundings to give you the privilege of doing things in a traditional respect. I know people personally who cannot pack fresh water or the fish are gone. Having no fresh water for wildlife to drink, wildlife had to completely move. Sad. I don't support this greedy investment.

SVE 2

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
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JBER, AK 99506-0898

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Hurry Dig ! !

NSB 1

Make us

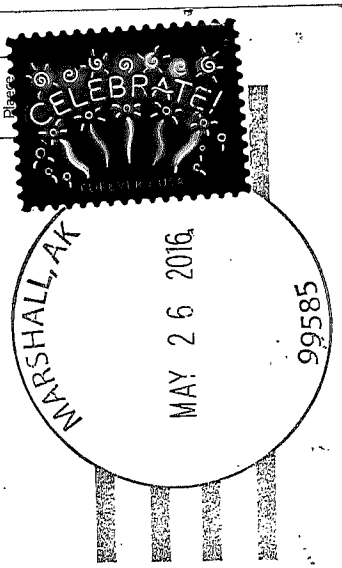
Rich —

$ $ $ $

$ $ $ $

$ $ $ $

$ $ $ $

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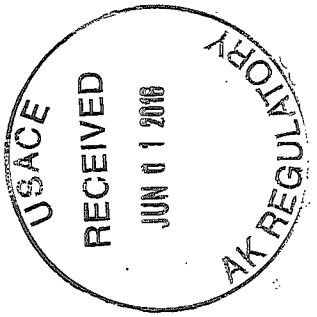

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I'm OPPOSED TO THE MINE BECAUSE OF MY SUBSISTANCE LIFESTYLE.
ALSO BECAUSE OF NOVA GOLD, & BARRICK THEY BOTH HAVE BAD PRACTICES. THEY BOTH HAVE BAD RECORDS. OF ENVIRONMENTAL ISSUES.
SO, I'm OPPOSED TO THE MINE. THE GENERATIONS BEFORE WILL BE GREATLY AFFECTED. ITS UNCERTAINTY WEIGHT FUTURE NEEDS.

Thank-You

SUB 1

Department of Corrections
Goose Creek Correctional Center
P.O. Box 877790
Wasilla, Alaska 99687-7790
2301 W. Alsop Rd
Wasilla, Alaska 99623-5102

FOREVER USA
PURPLE HEART

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

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I'm against the gold mine. I feel that No matter what tests are done and whatever modern equipment is used, there will be major pollution. It will kill our subsistance food. Our fish in our rivers, the berries on our land, the animals that roam the tundra. Too Often I see spills of toxic waste in other countries from gold mining. Our ancestors predicted famine/starvation in this or next generation of native peoples. I believe they predicted one that would be caused by spills of toxic waste from gold mining. We already experience Climate Change that's causing food chainge reduction. This year we experienced fewer geese and ducks returning for reproduction. Add a major spill and that would wipe out our subsistance way of life. Are the giant oil companies prepared to feed us when this happens? Will they provide us for generations to come? Or will they walk away with their bundle of money and leave us to die off?!? Stop gold mining!

SUB 15

MARSHALL, AK 99585
MAY 27 2016

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Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

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May 30, 2016

**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline.

I am vehemently opposed to the Donlin Gold mine operation near the Kuskokwim River. This pristine area is the heart of my people, providing sustenance for thousands of years. Our traditional way of life calls upon our people to tred lightly and take only what we need. All flora and fauna are considered sacred, in that they sustain us. TWL 1

I do not believe technology exists than can assure complete safety of either the enviroment nor the inhabitants as Donlin Gold has promised. SVE 2

While it is true that Donlin Gold might provide a few jobs for Native Alaskans, now it is also true that when all the gold has been stripped from earth, Donlin Gold will withdraw, leaving only a large, poisoned wound in our land, that no longer provides for our needs. SER 23

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JBER, AK 99506-0898

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JUN 08 2016
AK REGULATORY

| | |
|---|---|
| **From:** | Bellion, Tara |
| **To:** | Evans, Jessica |
| **Subject:** | FW: Donlin Gold Project |
| **Date:** | Tuesday, March 08, 2016 9:55:35 AM |
| **Attachments:** | Donlin Gold Project.pdf |

---

-----Original Message-----
From: CSR.Kipnuk [mailto:CSR.Kipnuk@coastalvillages.org]
Sent: Wednesday, March 02, 2016 2:55 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] FW: Donlin Gold Project

Please forward a copy to Vernon Chimegalria.

From: CSR.Kipnuk
Sent: Wednesday, March 02, 2016 2:30 PM
To: 'vernchimegalria@donlingold.com'
Subject: Donlin Gold Project

Attached is an anonymous letter from a Kipnuk resident.

Vern please send this to Donlin comments. Our computer could not recognize the site address you gave me. Sorry about the inconvenience.

Date: March 2, 2016

Regarding: The Donlin Gold Project

To whom it may concern:

The Donlin Gold Project , Environmental Impact Statement, Draft EIS meeting happened in Kipnuk on Februray 7, 2016 and I did not get a chance to comment during the meeting. So I thought I would share my comments in a letter of support of the project.

SER 5

First of all, our region of the state does not have many resources to fall back on when the number one resource, which is fish, is falling so fast. Our people don't have many opportunities to work and make money due to the fact most of us come from small communities that only provide few job opportunities. The cost of living has been rising so high that even having a minimum wage job could not get you by during the winter months. This project would give many people, young and old, a chance to work for a period of time. This also would give the younger generation something to focus on, job careers in this field once they graduate from high school.

SER 10

Jobs and careers will give hope to the generations that follow, and this is what we need for the future of our people.

SER 8

We need to make sure we clear the path for the generations that will be preparing their lives to fit the criteria of being from small communities with a degrees or certificates and be able to transport themselves from a family person to a job career that will be at a job site. This will give opportunity to live both the subsistence life to holding a job career in heavy equipment, research, or opportunities in this field. The job list can be enormous and a lot of people can be employed, having a chance to stay home in their small communities and be able to hold a good paying job.

There are always pros and cons in everything, but Donlin Gold takes the time to meet with the people of the region, and come up with solutions, and if, alternative solutions. I want to commend you on the on- going collection of information gathered at each meeting, and discussing with the people where the company stands. I look forward in seeing what direction Donlin Gold Project moves in. Thank you for giving me the chance to share my comments.

Sincerely,

Anonymous

A concerned Kipnuk resident

Mattfi Abruska # 738
Goose Creek Corr. Cntr.
P.O. Box 877790
Wasilla, Alaska 99687

ANCHORAGE, AK 995
26 JAN 2016 PM 1 L

Keith Gordon, Project Manager
Army Corps Of Engineers, AK District;
CEPOA-RD-Gordon,
P.O. Box 6898
JBER, Alaska 99506-0898

USACE
RECEIVED
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AK REGULATORY

99506+0898

12-22-15 / To T.K.C.

The Bethel City Council Has Directed Its City Manager Of Creating A Borough Government To Oversight To Collect Taxes And Other Payments From The Donlin Gold Mine Developers.

T.K.C. Is Already A for Profit Corporation Not Insulated To Taxation.

Land Held In Trust On Behalf Of American Indians And Alaska Native Tribes Is exempt From Taxation And It Is Not subject To Alaska State Governments Civil And Criminal Jurisdiction.

Land Held In Trust Secures Tribal Land, Advances Economic Development And Protects Tribal Culture And Traditional Way of Life To Federally Recognized Alaska Native Tribes.

State Government Laws Do Not Apply - Tribal Governments can Exert their Power To Regulate Their Natural Resources And Social Relations From outsiders that exert Alien Influences To Its Tribal members, Elders And Children. And Doubtful expressions Resolved In Favor of Alaska Native Tribes.

Land In Trust Status can not Be Taxed or regulated By the state Government Cities or Boroughs.

Tribes Will Regulate And Tax Corporations Created Under A.N.S.C.A. And State Chartered out of existence Unless Turned over To A Land Into Trust Tribe Thru Vote of Shareholders

Under The ISDEAA, The Secretary of the Interior Is Mandated To enter Into Contract With Federally Recognized Tribe For Law enforcement services. (This could be one of the reasons To Petition for Land Into Trust status).

A Federally Recognized Tribe Sues Secretary of The Interior And other Federal Agents for Law enforcement services on Land Into Trust Land.

The enforcement of Federal Law On Tribal Land Into Trust Land Is A Responsibility of the Bureau of Indian Affairs Under The Law enforcement Reform Act of 1990, (ILEFA) 25 U.S.C. § 2801 et. seq.

AKIACHAK NATIVE CMTY., V. Jewell, 995 F. Supp. 2d, 2014 - U.S. Dist. - Lexis 86931

Civil Action No.: 06-0969 (RC)

June 26, 2014, Decided

June 26, 2014, Filed

A.N.C.S.A. - Did Not Revoke The Interior Secretarys Authority To Take Land Into Trust On Behalf Of Alaska Native Tribes And Alaska Native Individuals.

There Is No Dispute That The Secretarys Publication And Withdrawal Constitute Final Agency Action.

The suit Was Filed Within Six (6) years Of The Final Action.

The A.N.C.S.A., 43 U.S.C. § 1601 et Seq., Falls Into That Category Of Statutes enacted For the Benefit Of Alaska Native Tribes.

Therefore, It Should Be Liberally Construed, And Doubtful Expressions Should Be Resolved In Favor Of The Alaska Native Tribes.

Alaska Native Tribes Or Alaska Native Individuals Are Not Subject To State Governments Criminal And Civil Jurisdictions.

McGann V. Cunningham, 315 F. Supp. 2d 150, 155 ("Any Continued Detention After The State Government Of Alaska Lost Its Lawful Authority To Hold Alaska Native, Deprive Them Of A Liberty Interest Protected From Unlawful State Deprivation By The Due Process Clause Of the 14th Amendment Of The U.S. Constitution.

AKIACHAK Native Cmty., V. D.O.I. 584 F. Supp. 2d 1 (In This Case, The Defendants, D.O.I. And Secretary Of the Interior, Have No Clear Interest In Protecting State Government Of Alaska's Sovereignty OR Interest As A Party To A.N.C.S.A. — (15pgs).

AKIACHAK V. Salazar, 935 F. Supp. 2d 195

25 C.F.R. - 1.4 = Land Held In Trust By the Federal Government on Behalf Of American Native Tribes Is exempt From State or Local Taxation. It Is Not Subjected To Alaska State Government Criminal And Civil Jurisdiction absent Consent of the Tribe. 25 U.S.C. §§ 1321-1322.

1. Land Acquisition = (9pgs.).
   § 25 C.F.R. 151.12 = Action On Request.
2. § 151.9 = Request For Approval of Acquisition = (10pgs).
3. 25 C.F.R. - 151.14 = Formalization of Acceptance of Land In Trust status shall Be Accomplished By the Issuance of conveyance Of An Instrument of conveyance By the Secretary of the Interior, As Is Appropriate In The circumstance.
4. 62 FR 19927 - 25 C.F.R. - Part: 151, Land Acquisition.
   Action: Notice Of Final Agency Determination To Take Land Into Trust. (4pgs).
   Only After The Secretary Of The Interior Has Issued A Decision Does She Actually Acquire The Land Into Trust. See; 25 C.F.R. §§ 151.10, 151.11(d), id § 151.12 (c)(2)(i-iii).

The Acquisition For Land In Trust Procedure differs Depending On Whether The Land Is An "OFF"

Reservation Or An ON-Reservation Acquisition. See; C.F.R. §§151.10, 151.11(d).

Sally Jewell, Interior Secretary
U.S. Department Of The Interior
1849 'C' Street, NW
Washington, DC 20240
Include The Number, 1076-AF23

Tribal Culture And Traditional Way Of Life To Federally Recognized Alaska Native Tribes Is secured

Each Treaty Has A Treaty Body That Monitors Whether The United States Is Complying With The Rules Set Out In The Treaty. Contact Human Rights Watch, And Request For Assistance By Sending A Letter To Human Rights Watch at:

U.S. Programs Association
Human Rights Watch
350 5th Avenue, 34th Floor
New York, NY 10118

The Disclaimer Provision In The Ariz. Enabling Act And Ariz. Constitution, As Is In Alaska's, Precluded State Jurisdiction Over Applicable Indian Tribe.

San Carlos Apache Tribe V. Ariz., 668 F.2d 1093 (13 pgs).

The Anglo-Europeans Have Made Numerous attempts To Take North America From its indigenous inhabitants Through, Deceat, encroachment, Warfare, Trickery, Treachery, Grant, Fraud, alliance, Theft, And case in point " Wrongfully excluding Alaskan Tribes And Individuals, From Land Into Trust Process When The Alaskan Exception Was Promulated In 1980.

Acquisition of Land Into Trust On Behalf of The Alaskan Tribes And Individuals, By The Interior Security, Secures Their Tribal Home-land, Protects Their Tribal Culture And Their Traditional Way of Life, To Federally Recognized Alaskan Tribes And Individuals.

This change Will And Is Having An affect Upon The Alaska State Government Sovereignty, In That State Government Land Is And Will Be Taken Into Trust And Transferred To Federal And Tribal Authority. (Exercise of Police Power And Regulations of Alaska's Resources Were Fundamental elements of the Alaska State Government).

The Alaska State Governments Interest In Main-taining Its Terms of A.N.C.S.A. Is Null And Void, In That The Interior Secretary's Authority To Take Land Into Trust On Behalf Of Alaska Tribes And Individuals, Survived A.N.C.S.A. - On April 30, 2014, B.I.A. Published A Proposed Rule (64 FR 17574), for The Acquisition of Land Into Trust On Behalf of Alaska Tribes And individuals (41 pgs)

Hopland V. Norton, 324 F. Supp. 2d 1064-
Traditionally, The Enforcement Of Federal Law On Indian Land (Land Into Trust), is A Responsibility of The Bureau Of Indian Affairs.

Under The Indian Law Enforcement Reform Act Of 1990, (ILEFA) 25 U.S.C. § 2801 et seq.

Title 25. Indians (5 pgs.)
Chapter 30. Indian Law Enforcement Reform.

A Federally Recognized Tribe Sued Secretary of The Interior And Other Federal Officials, alleging The Federal Government Violated The Indian Self-Determination And Education Assistance Act of 1990 (ILEFA), 25 U.S.C.S. § 2801 et seq.

Under The ISDEAA, The Secretary Of the Interior was (is) Mandated To Enter Into Contract With Tribal Governments For Law Enforcement services.

14.

1. U.S. V. Atlantic Richfield Co., 435 F. Supp. 1009, 1015 (D. Alaska 1977), aff'd 612 F.2d 1132 (9th Cir. 1980)(38 pgs).

The Townsite Act provided "Lots" within Native Townsites. Knowledge And The means TO Apply for land under this provision were not Notified or addresed TO Most Alaskan Natives.

2. Congress enacted Alaska Native Allotment Act, Pub. L. No. 59-171, 34 Stat. 197 (1906). This Act, Allowed Alaska Natives TO Acquire Title To As Much As 100 acres of Land that They've used And occupied.

3. Indian Child Welfare Act Of 1978: A response TO the Threat To Alaska Native Culture caused By Foster & Adoptive Placement of Alaska Native children Into Non Native environment. By: Manual P. Guerreo, American Indian L. Rev. Vol. 7.

4. Indian Child Welfare Act: Tribal Self-Determination Thru Participation In child custody Proceedings, 1979 Wis. L. Rev 1202-1212

Sat., JAN. 16, 2016 ADN

Red Dog mine sues Northwest borough over new severance tax.

Company says it pays PILT, uses no borough services, and adding $22 M tax is unfair

Red Dog Mine Is An Open Pit Mine, 82 miles North of Kotzebue, And 46 miles Inland From the Chukchi Sea.

The mine Has Operated Since 1989 On Land owned By An Alaskan Native Regional Corporation, NANA, representing The Inupiat People of Northwest Alaska

Teck shares Profits with NANA, which shares Income With Other Alaska Native Regional Corporations.

Through 2013, Teck paid NANA More than $1 Billion In Royalties.

1.20 = 8 pgs
2.40 = 16 pgs

espond that
These have
been Received.

Matfi Abruska # 738
Goose Creek Corr. Cntr.
P.O. Box 877790
Wasilla, Alaska 99687
JAN 25, 2016

Keith Gordon, Project Manager
Army Corps of engineers, AK District;
CEPOA-RD-Gordon,
P.O. Box 6898
JBER, Alaska 99506-0898

Mr. Keith Gorden,

LAND 1

Calista Corporation, The Kuskokwim Corporation and Donlin Gold Project And others connected to this project, Is In My Best interest or vice Versa.

Land Into Trust should be a priority to Isolate outsiders, Not In Our best interest. Copies enclosed speaks for themselves.

Under Trust status, Calista, T.K.C. And Donlin Project And developers would be insulated from outside predators

See, Mary Bishops Article, "Land In Trust status cannot be taxed or regulated by the State or its cities or "BOROUGHS".

Sincerely
Matfi Abruska

**Mary Bishop**

I urge Gov. Walker to appeal the lower court Akiachak decision and oppose Indian Country (reservation) lands in Alaska. I urge him to keep the broad interests of all Alaskans in mind.

I must rebut Richard Peterson's recent commentary (ADN, Aug. 12) condemning Suzanne Downing's earlier (ADN, Aug. 11), largely accurate portrayal of taxation and regulation in Indian Country under Alaska's Public Law 280 status. Lower 48 states have indeed survived Indian Country, but none have more than 200 tribes, more than 10,000 individual Native allotments, and a settlement like our 1971 Alaska Native Claims Settlement Act. ANCSA has proven to be an amazingly successful economic engine in the state and a great benefit to Native corporation shareholders.

It is important to recognize: Those who understand American Indian law best are those who passionately and patiently advocate for increased tribal authority and financial benefit available through judicious use of this complex body of law. These advocates do not necessarily have the broader interests of all Alaskans in mind. That responsibility lies with the state of Alaska.

Because of a lawsuit that the village of Akiachak won in a lower court, the Interior Department's Bureau of Indian Affairs is now accepting — but not acting upon — applications for tribally owned land to be placed in federal trust status. That status means the lands are similar to Lower 48 Indian reservations. BIA will act if the Walker administration decides to drop the state's appeal of the lower court decision.

When tribes apply to BIA for trust status of their land, the BIA regularly "rubber-stamps" these requests with little regard for opposition from the surrounding community. Sometimes the BIA puts the request on long-term hold and no one knows what will happen. That's hardly a recipe for a cordial relationship between the tribe and surrounding community.

The issue is often called "fee-to-trust" and refers to land owned in fee title by a tribe and moved to federal trust status. Land in trust status cannot be taxed or regulated by the state or its cities or boroughs. The tribe can tax and regulate. This trust land over which a tribe has governmental authority is known as "Indian Country."

In the six Public Law 280 states, including Alaska, the state and its municipalities do not have zoning, planning, fishing, hunting and other regulatory authority — think marijuana. Usually an activity the state allows through regulation can only be regulated and/or taxed by the tribe, not the state. The lands in trust status provides a "territorial base" for tribal judicial, taxation and regulation authority.

Alaska tribes now own at least 2 million acres of land — but it is not held in trust — except in one Southeast community, Metlakatla. For example, the Venetie tribe owns 1.8 million acres. Numerous individual Native allotment lands could easily be turned over to tribes; pieces of village or regional Native corporation land could be turned over to a tribe through a vote of the shareholders.

Significantly, tribes may receive other lands anywhere in the state through purchase or donation. As has been done in the Lower 48, tribes may be approached by investors willing to fund the acquisition of lands that could then be used for business activities that would otherwise be inconsistent with state or local regulations.

Several allotment lands are opportunely located within our boroughs and within the city limits of Alaska communities like Fairbanks and Dillingham. During the legislative budget hearings this year, Dillingham requested special project funding from the state. The city has little revenue; it cannot establish a property tax. Too much land within the city is held in trust as tax-exempt Native allotments. But even those lands are not held by a tribe, so they are not Indian Country and exempt from municipal regulation.

News reports indicate the U.S. Justice Department told Indian tribes they can grow and sell marijuana on their trust lands as long as they follow the same federal conditions laid out for states that have legalized the drug. The feds have recently raided bad actor marijuana tribes in California.

Tribal "immunity from suit" is a common problem of trust status not found associated with ANCSA corporations. The immunity generally extends to tribal officials in their official capacity and tribal businesses within and beyond the boundaries of Indian Country unless they have "clearly" signed a formal waiver of sovereign immunity.

Tribal residents of Indian Country are full voting state and municipal citizens and must receive all usual state benefits — roads, schools, PFDs, etc. They can vote on local bonding issues but cannot be taxed to support them — a situation of "representation without taxation."

The governor has recently met with tribal leaders in several Southwest Alaska communities in an attempt to get their views on this important subject. In addition he should receive candid viewpoints from readers and from:

- Municipal leaders — who can't tax or regulate on tribal trust lands;
- Businesses — which likely can't compete with tax- and regulation-free tribal neighbors;
- Environmental and fish/game interests — who recognize no state regulations apply on tribal trust lands;
- Access advocates — who recognize the possible loss of access on unresolved historic RS 2477 trails and other unresolved access routes;
- Native Regional and Village Corporations — who have been conspicuous by their silence on the issue, but would be competing with subsidized tribal businesses, and subject to tribal taxation and regulation when operating on tribal trust lands;
- Tax-paying Native and non-Native neighbors of tax-exempt tribal residents living on their trust land. Only members of the specific tribe are tax-exempt and more than 200 tribes exist in Alaska.

Judge Ferdinand Fernandez of the 9th Circuit Court, in spite of his 1997 decision to support the village of Venetie's effort to claim Indian Country status, astutely foresaw and expressed the potential of that decision in the following comment:

*We have been asked to blow up a blizzard of litigation throughout the State of Alaska as each and every tribe seeks to test the limits of its power over what it deems to be its Indian country. There are hundreds of tribes, and the litigation permutations are as vast as the capacity of fine human minds can make them. They can include claims to freedom from state taxation and regulation, claims to regulate and tax for tribal purposes, assertions of sovereignty over vast areas of Alaska, and even assertions that tribes can regulate and tax the various corporations created to hold ANCSA land. The latter assertion would give the tribes the power to control, regulate and tax those corporations out of existence and would provide a fruitful area for intertribal conflict. This is no imaginative parade of horribles.*

Dropping this Akiachak lawsuit because it's a waste of money most assuredly means the state will be in many more lawsuits as "every tribe tests the limits of its power." Indeed, dropping the Akiachak case could be the biggest waste of money.

Please let the governor know your point of view on this issue — Gov. Bill Walker at P. O. Box 110001, Juneau, 99811-0001, By fax: 1 907-465-3532 or by email: bill.walker@alaska.gov

For additional information see:

- "What Does Indian Country Really Mean for Alaska?" Alaska Legislature, Feb. 26, 1997, available from Legislative Information Offices;
- July 25, 2014 letter from Alaska Assistant Attorney General Ann Nelson to Stan Leaphart, CACFA;
- Akiachak Native Community, et.al. v. Jewell. Various documents;
- Justice Department memo regarding tribes and states that have legalized marijuana;
- And Law360, New York, Feb. 13, 2015, "DOI Rules Will Drastically Impact Alaska Land Management."

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For more than 50 years, Mary Bishop has lived in Fairbanks and Interior Alaska villages. During the 1980s and 1990s she edited the Alaska Outdoor Council's quarterly newsletter, and in that capacity became familiar with the issue of Indian Country in Alaska.

**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline.

NSB 1

My comments And The best Interest For Donlin Gold, T. K. C. And Calista In their best Interest Are Stil the same per my Comments Submitted.
T. K. C And Calista

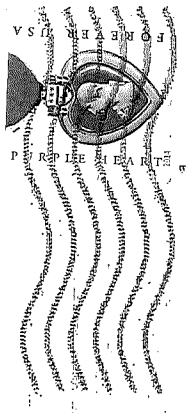
need legal ASSistant in requesting to B. I. A. for their land to become Land Into Trust status for its complete protection by the Federal Government

Martti Aluska

5-24-16

5 Am


Martti Aluska # 737
P.O. Box 87726 ANCHORAGE AK 995
Cruise Creek Cen.
Wasilla Ak 99687 2016 PM 1 L

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

USACE RECEIVED JUN 13 2016 AK REGULATORY

USACE
RECEIVED
MAY 11 2016
AK REGULATORY

April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15 Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

Donlin Gold has also demonstrated a notable commitment to the environment. Donlin has 16+ years of extensive studies focused on creating an environmentally and socially responsible project; and has purposefully designed its project to reduce the overall footprint of the mine and diminish any social impacts it may have on the YK region. Proposals such as building a natural gas pipeline have been developed in an effort to minimize barge traffic on the Kuskokwim River. Furthermore, a specific route for the pipeline has been selected to minimize disturbance to

IDIT 1 known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims

LAND 1 Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

David Adams
Signature

David Adams
Print Name

| | |
|---|---|
| **From:** | Kerry Adler |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS Comments |
| **Date:** | Tuesday, May 31, 2016 4:48:43 PM |
| **Attachments:** | Donlin_DraftEIS_commentsKerryAdler_2016.docx |

Dear Mr. Gordon,

Please find attached comments related to the Donlin Gold Draft EIS.

Thank You,

Kerry Adler

7060 Cheryl Street
Anchorage, Alaska 99518

Mr. Kieth Gordon, Project Manager
U.S. Army Corps. Of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

The following are my comments related to the Draft Donlin Gold Environmental Impact Statement:

PAA 3

Having reviewed the six alternatives proposed for the Donlin Gold Draft Environmental Impact Statement, Alternative #2 best meets the regulatory and operating parameters for this project to advance to the final draft and permitting phase. This Draft EIS is very thorough and provides the necessary details to advance this project. This extremely important project offers economic opportunity through an established culture of safety, respect for the community, environmental concern, and traditional values. Advancement will provide numerous benefits to the people and communities of this region and greater Alaska.

I was invited to join the Donlin Gold field team from 2006-2012 with the objective of delineating the prefeasibility mineral reserve to a feasible reserve status. My duties encompassed a wide range of responsibilities, including oversight of the field drilling, geologic data collection, and sample processing program, as well as coordinated support of safety, logistics, supplies, engineering studies, field communication, baseline studies, training programs, camp operations, and personnel management as needed. Contributions to the effort were made by a wide range of specialists from every field. Central to the effort was a diversely talented team comprised dominantly of citizens from the Kuskokwim and Yukon Region. I have worked in Alaska's minerals exploration and mining community throughout Alaska for over 30 years through my family services company. I am honored to have had the opportunity to make a positive contribution to this project and learn more about the community values, traditions, and priorities from co-workers residing in this region of Alaska.

It is important to contemplate that the alternatives set forth in the Donlin Gold Draft EIS are the feasible possibilities derived from exhaustive investigations, including those listed in chapter 2.4 (Alternatives Considered But Eliminated From Detailed Analysis). The outcome stems from extensive investigations and innovative studies limited by remote access, limited logistics, variable terrane, hydrologic and climatic conditions, local cultural considerations, and environmental concerns. A viable mine in this part of Alaska with no appreciable infrastructure requires a deposit of unusual size and grade. Deposits of this nature are rare and are not necessarily conveniently located. Had this deposit been in an area nearer a road system, or reliable power, or fuel, there may possibly have been other alternatives and efficiencies to consider such as decreased annual throughput, extended operating mine life, reduced potential fuel storage risks, reduced river traffic and reduced potential impacts to subsistence users. Remote site constraints limit a project to rigid planning conditions. The fact that this project has reached this level of consideration is a credit to the concern, dedication, ingenuity and contribution by those involved in the project, and by the careful review from citizens from the community.

**Subsistence**

Regional subsistence resource use is well addressed in section 3.21 and paints an interesting picture of community based harvest patterns. The information included in the Draft EIS conforms well to the area

proximal to the proposed mine area when compared to information relayed through visits with coworkers during the mineral resource evaluation.

SER 11 This project will offer several personal alternatives and choices to subsistence harvesting activities for one who benefits from employed at this project. The more obvious opportunity is the ability to invest in equipment and fuel to access harvest areas that otherwise might otherwise be financially limited. The benefits and impacts of such investment is entirely dependent on an individual's harvesting means, enthusiasm, and preferred harvest method. Harvesting may be dependent on employment scheduling and scheduling. In the event subsistence harvest limits are imposed due to low fish and game populations, reliable income becomes an important alternative until such limits or restrictions are lifted. This offers a benefit for local fish and game management as well as the employee.

**Barge Traffic**

BARG 5 Barge traffic and the associated infrastructure is well addressed and Alternative #2 best meets the projects needs by reducing overland impacts through reduced road construction and maintenance. I am not familiar of tangible interference or impacts to fisheries from previous barge traffic. There have been instances of barges stuck on river bars and local traffic and safety concerns by derelict craft, however barge construction and traffic procedures proposed in this Draft EIS would implement safeguards to potential hull breaches, improve river navigation, communication, and encourage safe travel habits to the public.

**Gas Line**

Fuel is a critical component to the advancement of the project. I recently had the opportunity to pass through South Fork of the Kuskokwim River and Farewell area. Over the years of incidental travel, I have noticed numerous trail additions, hunting platforms, camps and airstrips. The ATV trail system is fairly extensive and in some places the ruts are quite notable. The gas line as described in Alternative 2A takes into account detailed soils conditions and engineering practices that will minimize potential degradation to intermittent frozen areas. While this may offer another pathway for cross country travel, it may also provide soil stabilization in areas of uncontrolled public access thus reducing impacts by the public across wet or frozen areas. The addition of the gas pipeline access will not inhibit or detour access for the type of vehicles presently used to access this area.

**Planning and Permitting**

While the process of evaluating and determining the impacts from a project such as that proposed by the Donlin Gold Project are and important, the process itself has become cumbersome. Delays, policies, and inevitable litigation have inevitably crept into the process of mine construction and operation. This impacts the continuity, viability, and certainty of such projects. These projects take substantial time and capital to evaluate before they ever reach the stage for permitting. This project has taken nearly 30 years to assess potential viability. It may take ten or more years to complete the permitting and litigation process, and if successful, there is another 4-5 of construction before gold production begins. In the mean time, the work force that was established during the exploration and assessment phase of the project is now dispersed to other areas where their training at least may provide employment. I

would not expect most of this work force to be available if and when the mine reaches construction or mining phases. It is discouraging to see an economic bust in a reliable work force due to uncertainties related to permit acquisition. It would take a stream of several ongoing, overlapping projects to fill the employment gap created in the regulatory and permitting process. Unfortunately, with Alaska's infrastructure limitations and the scale of projects necessary to meet these criteria, this is not a practical solution.

This project continues to be, transparent in the way they operate and have always been receptive to the needs and concerns of their community. This philosophy of community and personal investment encourages substantive communication to gather information, assess potential impacts, address concerns, and provides ideas for future project guidelines. Alternative #2 best meets the regulatory and operating parameters for this project, and should be the primary consideration to advance this project to the Final EIS and permitting phase.

Sincerely,

Kerry Adler

7060 Cheryl Street
Anchorage Alaska
99516

## Smith, Neal

**From:** Akers, Randall <Randall.Akers@Pentair.com>
**Sent:** Tuesday, April 26, 2016 4:09 PM
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] re: Donlin Gold Mine / attn: Keith Gordon

To whom it may concern and Mr. Keith Gordon

I am writing this email in reference to the Donlin Gold Mine that is currently being reviewed by US Army Corps of Engineers.

As a lifelong Alaskan and a person committed to our State and it's well-being, I am respectfully asking that the Corps of Engineers give this project a favorable review and support it in it's entirety. We are a state in the middle of a disastrous economy and we as a state are in desperate need for projects like this to help revive and /or save our economy.

I have attended many of the meetings presented by Donlin and they have more than impressed and shown to me that they could and would operate this mine to the highest of standards and insure the safety or their personnel and the lands surrounding it.

SER 1

Additionally, as the Federal Government continues to remove the badly needed funding for Rural Alaskans this type of project would help offset and dramatically help those who desperately need work, and enable them to continue to have their subsistence lifestyle and activities. Which they should as they've earned it! If this project were to receive a "no" from your group, it would be disastrous for the region, the people, the state and our economy here in Alaska.

A "yes" would help with living costs, job opportunities, monies for schools, and cultural expansion for those in that region.
There are so many other positives that will result from this project which include but are not limited to:
New / additional mining opportunities
Lower gas costs (as the donlin pipeline will offer excess that could be sold / used by rural area(s)
Jobs, Jobs, Jobs that provide good / high pay that you rarely (if ever) see in these remote regions

I'm confident that the US Corps of Engineers can and will see that this is the RIGHT project for Alaska and for Alaskans. Please do us proud and do the right thing by approving and providing a favorable review of the Donlin Gold Project

Respectfully

**Randy Akers**
Technical Sales Representative
State of Alaska

**Pentair Valves & Controls**
7650 King Street
Anchorage, Alaska 99518
United States
+1.907.690.3402 Cell
+1.907.522.3410 Office
+1.907.522.7332 Fax
randy.akers@pentair.com

**Blockedwww.pentair.com/valves**

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ALASKA CHAMBER

February 18, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-898

Subject: Support of Alternative 2 for the proposed Donlin Gold Project

To Whom It May Concern:

The Alaska Chamber would like to express its support for Alternative 2 for the proposed Donlin Gold Project.

The mission of the Chamber is to promote a positive business environment in Alaska. The Chamber represents hundreds of businesses, manufacturers and local chambers from across Alaska. Our members support resource development that is both done in a responsible manner and brings economic opportunity to Alaska and its residents.

SER 12

The proposed project would be a boon to the economy of the region as well as the State. It is projected to provide 3,000 construction jobs in the first four years and up to 1,400 jobs during operation. These wouldn't be the only jobs created by the development of this proposed project. Indirect jobs related to logistics, transportation, training, education, and health care would all be created as a result of this project.

While the economic benefits are important, it is also important that the project be done responsibly. Donlin Gold is committed to developing and operating this project in an environmentally responsible manner. In looking through their alternative state-of-the-art technology will be employed and will bring in practices that in some cases have never been used on a large mine in Alaska.

Donlin Gold has a proven track record that should give the Corps of Engineers the confidence in selecting Alternative 2 and allowing Donlin Gold to move forward with the proposed project.

Sincerely,

Curtis W. Thayer
President and CEO

| | |
|---|---|
| **From:** | donlingoldeis, POA |
| **To:** | Craig, Bill |
| **Subject:** | FW: [EXTERNAL] Alaska Chamber Support for Donlin Mine |
| **Date:** | Thursday, February 25, 2016 7:01:02 AM |
| **Attachments:** | 2016.01.27 Alternative 2 for the proposed Donlin Gold Project Letter of Support.docx |

-----Original Message-----
From: Curtis Thayer [mailto:cthayer@alaskachamber.com]
Sent: Wednesday, February 17, 2016 1:39 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Alaska Chamber Support for Donlin Mine

Please see attached letter.

Warm Regards,

Curtis W. Thayer
President & CEO
Alaska Chamber
(907) 278-2739
(907) 223-8270 cell

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Evans, Jessica; Bellion, Tara |
| **Subject:** | FW: [EXTERNAL] Request for six-month extension on comment period for Donlin DEIS |
| **Date:** | Thursday, April 14, 2016 8:32:41 AM |
| **Attachments:** | image001.png<br>image002.png<br>Letter Requesting Extension Donlin DEIS 4-13-16.pdf |

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-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Thursday, April 14, 2016 5:50 AM
To: Craig, Bill
Cc: Newman, Sheila M POA
Subject: FW: [EXTERNAL] Request for six-month extension on comment period for Donlin DEIS

-----Original Message-----
From: Pamela Miller [mailto:pamela@akaction.org]
Sent: Wednesday, April 13, 2016 2:47 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Request for six-month extension on comment period for Donlin DEIS

Dear Mr. Gordon,

Please find our letter attached that requests a six-month extension on the comment period for the DEIS prepared by the U.S. Army Corps of Engineers for the proposed Donlin Gold Project.

Thank you for your consideration. Please confirm receipt and let me know when a decision about the extension will be made. I am aware that other communities and organizations have filed requests for extension as well.

Best regards,
Pam

Pamela Miller, Executive Director

Alaska Community Action on Toxics <Blockedhttp://www.akaction.org/>
505 West Northern Lights Boulevard, Suite 205, Anchorage, Alaska 99503

Phone (907) 222-7714; Fax (907) 222-7715

Website <Blockedhttp://www.akaction.org/> | Twitter @ak_action
<Blockedhttps://twitter.com/ak_action> | Facebook <Blockedhttps://www.facebook.com/akaction>

Blockedwww.akaction.org <Blockedhttp://www.akaction.org/>

Please donate <Blockedhttps://npo1.networkforgood.org/Donate/Donate.aspx?npoSubscriptionId=6846> to support environmental health and justice. Join in support of our work!

We believe that everyone has the right to clean air, clean water, and toxic-free food.

505 West Northern Lights Boulevard, Suite 205
Anchorage, Alaska 99503
www.akaction.org

April 13, 2016

Keith Gordon
Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898
Email address: Keith.q.gordon@usace.army.mil

Dear Mr. Gordon:

I am writing on behalf of Alaska Community Action on Toxics (ACAT) to respectfully request a six-month extension of the April 30, 2016 deadline to submit comments on the Draft Environmental Impact Statement (DEIS) prepared by the U.S. Army Corps of Engineers (Corps) for the Donlin Gold Project. ACAT is a statewide non-profit public interest environmental health research and advocacy organization dedicated to protecting public health. We have members in the region that would be directly affected by the proposed mine.

We fully support the requests of local communities (e.g. Native Village of Napaimute, City of Bethel) and organizations (e.g. Northern Alaska Environmental Center and Earthjustice) who have also submitted requests for a six-month extension on the public comment period for the DEIS. We believe that our requests are warranted in order to ensure full and meaningful public involvement, especially in light of the magnitude of the proposed project as well as the length and complexity of the DEIS. The proposed project will have significant effects on the environment and public health. Therefore, it is crucial to provide the public sufficient time to thoroughly review and develop informed opinions concerning the project.

NEP 1

Thank you for your consideration of this request. Please acknowledge receipt and indicate the timing for a decision about our request for an extension.

Sincerely,

Pamela K. Miller

Pamela Miller
Executive Director
Alaska Community Action on Toxics

| | |
|---|---|
| **From:** | Pamela Miller |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Comments on the Donlin Gold Project Draft Environmental Impact Statement |
| **Date:** | Tuesday, May 31, 2016 11:03:44 PM |
| **Attachments:** | Comment Letter on Proposed Donlin DEIS ACAT 5-31-16.pdf |

Please confirm receipt of these comments.
Thank you.

Pamela Miller, Executive Director
Alaska Community Action on Toxics
505 West Northern Lights Boulevard, Suite 205, Anchorage, Alaska 99503
Phone (907) 222-7714; Fax (907) 222-7715
Website | Twitter @ak_action | Facebook
Blockedwww.akaction.org
Please donate to support environmental health and justice. Join in support of our work!
*We believe that everyone has the right to clean air, clean water, and toxic-free food.*

**505 West Northern Lights Boulevard, Suite 205**
**Anchorage, Alaska 99503**
**(907) 222-7714 (Phone); (907) 222-7715 (fax)**
**www.akaction.org**

May 31, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA–RD–Gordon
P.O. Box 6898
JBER, AK, 99506–0898
E: POA.donlingoldeis@usace.army.mil

Dear Mr. Gordon,

Thank you for the opportunity to provide comments on the draft environmental impact statement (DEIS) prepared by the U.S. Army Corps of Engineers (Corps) for the proposed Donlin Gold Project. These comments are submitted on behalf of Alaska Community Action on Toxics (ACAT), a statewide non-profit public interest environmental health research and advocacy organization dedicated to protecting environmental and public health. ACAT includes members that live within the area that would be affected by the proposed Donlin Gold Project. Our members have expressed profound concerns about the significant and long-term harm that the proposed mine would have on water quality, fish and wildlife habitat, subsistence, culture, and community health. We conclude that the Corps should **select the No Action Alternative** and reject the proposed Donlin Gold Project on the basis that it represents an unacceptable long-term risk to the region that would inevitably and irrevocably damage traditional subsistence life, food sovereignty and security, environmental and community health.

PAA 1

ACAT is a signatory and supports the comment letter as submitted on our behalf by Earthjustice. In addition to the areas identified in the Earthjustice comment letter that warrant additional study (the pit lake, mine-site water management, the tailings dam, subsistence, wetlands, the Iditarod National Historic Trail, Scope, and climate change), ACAT notes that the DEIS lacks a rigorous assessment of the public health and environmental justice implications of the proposed development. In these comments, we address these and other areas of the DEIS that are deficient and merit consideration under the National Environmental Policy Act (NEPA) and other statutes. The communities along the Kuskokwim River have the right-to-know what hazardous materials are proposed for transport and use at the mine. Table ES-3 summarizes the Estimated Annual Consumption of Reagents Used at the Processing Facility in tons. It is unacceptable to use trade names of hazardous materials (e.g. "F-549," "UNR 829," as well as general categories such as flocculents, anti-scalants, and water softening agents) without disclosing the chemical composition of these substances. This information is necessary for the affected communities to fully evaluate the risks associated with the mine facility. We find that the risks from fuel and chemical spills and releases are grossly understated in the DEIS.

PHL 21

HZM 7

HZM 5 ACAT is particularly concerned about the significant sources of mercury that will be released to air, water, soil, and sediments through mill and stack emissions, waste rock and fugitive emissions, contaminated dust, and water discharges. Even if capture efforts are effective as estimated by Donlin Gold and their contractors (and this is yet unproven in an environment similar to this region), a significant quantity of mercury (at least 130-200 pounds per year) will be released to the environment of the Kuskokwim watershed. By comparison and according to the EPA's Toxics Release Inventory,[1] about 44 pounds of mercury are released from all industries in the entire state. Thus, the releases from this single mine represent a substantial source to the region and will have serious adverse effects on subsistence fish, wildlife, and human health. The DEIS fails to account for fugitive emissions from the pit lake and that volatilization and release of mercury will likely increase from waste rock and tailings/pond with climate warming. Due to these and other unaccounted sources and the fact that capture efficiencies are likely to be overestimated, we believe that estimates for mercury releases may be grossly understated. We find that the DEIS relies on a spurious modelling exercise conducted by a vested-interest contractor for Donlin Gold that determined that "the increase in mercury concentrations would be a maximum of 2.5 percent over existing background levels, and would not exceed regulatory guidelines." This is an unsupportable conclusion based on incomplete analyses of mercury releases, atmospheric conditions, and deposition zones where the methylation of mercury will occur. Impacts are likely not to be confined to the Crooked Creek watershed and may result in elevated levels in the fish of the broader Kuskokwim watershed. Certain species of fish in the Kuskokwim River (including pike and burbot) already have elevated levels of mercury that necessitate fish consumption advisories. Any additional input of mercury to the system may warrant further fish consumption restrictions. It is necessary for a scientifically credible, independent third party to conduct a thorough analysis of the quantities, sources, distribution, areas of deposition and methylation of mercury, increases in volatilization with climate warming, and effects of mercury on subsistence fish, wildlife, and human health.

PHL 18 AIQ 3 CLIM 12 AIQ 3 AIQ 6 FISH 10

PHL 16 Section 3.22 of the DEIS, the Human Health Section, fails to fully analyze the health implications associated with mercury releases from the proposed mine and consequences of human exposures. Any increase of mercury concentrations in the fish and other traditional foods may result in higher human exposures and have significant adverse effects on the neurodevelopment of children. Mercury has long been known to be a potent neurotoxicant, especially in vulnerable populations such as developing infants and children. Data from recent studies "add to the growing body of evidence indicating that prenatal methylmercury exposure from environmental sources is teratogenic, and indicate that it is associated with clinically meaningful impairment in overall cognitive function at levels of exposure within the range found in the general U.S. population."[2] Early-life exposure to mercury is associated with neurodevelopmental deficits, including reduced newborn cerebellum size, adverse behavioral outcomes, central nervous system damage, poor psychomotor development, cognitive developmental delays, and later-life effects, including increased diabetes susceptibility. Mercury crosses the placenta and also accumulates within the placenta, where methylmercury concentrations can be double those of

[1] https://iaspub.epa.gov/triexplorer/release_fac?p_view=USFA&trilib=TRIQ1&sort=_VIEW_&sort_fmt=1&state=02&county=All+counties&zipcode=&epa_region=&chemical=007439976&industry=ALL&YEAR=2014&tab_rpt=1&FLD=RELLBY&FLD=TSFDSP

[2] Jacobson et al. 2015. Relation of Prenatal Methylmercury Exposure from Environmental Sources to Childhood IQ. Environmental Health Perspectives 123(8):827-833.

maternal blood.[3] The DEIS also fails to consider the health effects of mercury exposure to mine workers.

PHL 16 Generally, we find the analysis of impacts to human health to be highly subjective and incomplete with inadequate baseline measures. It is significant that the Yukon-Kuskokwim Health Corporation, the entity that provides health services to the people of the region, opposes the development and operation of the Donlin Creek Gold Mine "due to the extreme hazards and excessive risks it would pose to the health and welfare of the people of the Yukon-Kuskokwim Delta Region (Resolution 16-04-04, 2016)." Their opposition is based in part on concerns about releases of hazardous chemicals such as cyanide and mercury, as well as the potential for failures of safety measures that would "devastate the fisheries along the Kuskokwim River and its tributaries, thus negatively impacting the health of the people of the region."

PHL 12 The DEIS shows a poor understanding of the meaning of food security for the Alaska Native people of the region. A more comprehensive definition and analysis is necessary because of the significant threat to the health and safety of traditional foods. The Inuit Circumpolar Council defines food security as follows: "*Alaskan Inuit food security is the natural right of all Inuit to be part of the ecosystem, to access food and to care-take, protect and respect all of life, land, water and air. It allows for all Inuit to obtain, process, store and consume sufficient amounts of healthy and nutritious preferred food – foods physically and spiritually craved and needed from the land, air and water, which provide for families and future generations through the practice of Inuit customs and spirituality, languages, knowledge, policies, management practices and self-governance. It includes the responsibility and ability to pass on knowledge to younger generations, the taste of traditional foods rooted in place and season, knowledge of how to safely obtain and prepare traditional foods for medicinal use, clothing, housing, nutrients and, overall, how to be within one's environment. It means understanding that food is a lifeline and a connection between the past and today's self and cultural identity. Inuit food security is characterized by environmental health and is made up of six interconnecting dimensions: 1) Availability, 2) Inuit Culture, 3) Decision-Making Power and Management, 4) Health and Wellness, 5) Stability and 6) Accessibility. This definition holds the understanding that without food sovereignty, food security will not exist.*"

Based on the concerns expressed in this letter as well as those detailed in the Earthjustice comment letter,

PAA 1 we reiterate our opposition to the proposed project and conclude that the Corps should **select the No Action Alternative** and reject the proposed Donlin Gold Project on the basis that it represents an unacceptable long-term risk to the region that would inevitably and irrevocably damage traditional subsistence life, food sovereignty and security, environmental and community health.

Sincerely,

Pamela Miller
Executive Director
Alaska Community Action on Toxics

[3] Maccani et al. 2015. Placental DNA Methylation Related to Both Infant Toenail Mercury and Adverse Neurobehavioral Outcomes. Environmental Health Perspectives 123(7):723-729.

# Alaska Maritime Agencies

4341 B Street, Suite 202, Anchorage, AK 99503
Tel: (907) 562-8808 Fax: (907) 782-4110 Email: ancoffice@alaskamaritime.com



USACE
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AK REGULATORY


U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

April 29, 2016

Subject: Comments in support of the DEIS for the responsible development of the Donlin Creek Gold Mine.

Review Team,

Alaska Maritime Agencies is the premiere vessel agency operating in Alaska since the 1950's. As such, we have been involved in projects that have included the startup and maturation of the cruise/visitor industry throughout the state, the TAPS trade in Valdez and the fisheries industry in Dutch Harbor/Western Alaska. We have also been involved in the arctic activity spearheaded by Shell. With the later now off the table for the foreseeable future, we strongly recommend that you support the Donlin Creek Gold Mine project.

We feel that there are ample studies that this project will be operated in a responsible manner and they will adopt the best practices for this industry.

SER 12 At a time when our state is under serious financial stress, the Donlin Gold Mine will stimulate job creation – not only the mining project itself, but also the maritime industry, transportation and many other industries.

Sincerely,

Robert J. Arts
Vice President
Bob.arts@alaskamaritime.com

| | |
|---|---|
| **From:** | Deantha Crockett |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Comments from AMA on Donlin DEIS |
| **Date:** | Tuesday, May 31, 2016 4:05:49 PM |
| **Attachments:** | AMA Comments Donlin draft EIS.pdf<br>ATT00001.htm |

---

Dear Mr. Gordon:

Attached are comments by the Alaska Miners Association on the Donlin Gold Draft EIS. Thank you for the opportunity to submit comments.

Deantha Crockett
Executive Director
Alaska Miners Association
(907) 270-9234 direct
(907) 563-9229 main
(907) 317-6323 mobile
deantha@alaskaminers.org
121 W. Fireweed Lane, Suite 120
Anchorage, AK 99503

This email has been sent from a computer made of the mined minerals we depend on for everyday life. As we communicate together, please be thankful mining makes it possible.

ALASKA MINERS ASSOCIATION

121 W. Fireweed Suite 120 | Anchorage, Alaska | 99503 | 907.563.9229 | alaskaminers.org

May 31, 2016

Mr. Keith Gordon
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898
*Submitted via email at POA.donlingoldeis@usace.army.mil*

RE: Donlin Gold Draft Environmental Impact Statement

Dear Mr. Gordon:

The Alaska Miners Association (AMA) appreciates the opportunity to submit comments on the U.S. Army Corps of Engineers (Corps) Draft Environmental Impact Statement (DEIS) for the Donlin Gold Project.

AMA is a non-profit membership organization established in 1939 to represent the mining industry in Alaska. We are composed of more than 1,800 members that come from seven statewide branches: Anchorage, Denali, Fairbanks, Juneau, Kenai, Ketchikan/Prince of Wales, and Nome. Our members include individual prospectors, geologists, engineers, vendors, suction dredge miners, small family mines, junior mining companies, and major mining companies. We look for and produce gold, silver, platinum, molybdenum, lead, zinc, copper, coal, limestone, sand and gravel, crushed stone, armor rock, and other materials.

Alaska's mining industry has a history of rigorous project design to be able to complete the stringent permitting process that authorizes mining projects. This is a robust process that ensures environmental protection, and AMA members have long contended and indeed, insisted, on its scientific integrity to meet the goals of public agencies and the standards in which our members operate. The Donlin Gold DEIS, at this point, has taken four years and more than $500 million to complete. An assertion that this process is long or stringent enough is misguided, and a trend of extreme delay and cost is not a sustainable model for Alaska. It does not result in a better project or even more comprehensive description of potential environmental impacts. It is simply inefficient. It is imperative for the Donlin Gold Project, and for future projects whom are watching Donlin navigate the National Environmental Act (NEPA) process, that the process be finished in an expedient manner. Otherwise, it signals the federal process is unworkable. AMA encourages you to move the Donlin EIS process forward in the manner described in NEPA and not delay the document any further.

**AMA Supports Alternative 2: Proposed Project**

AMA strongly supports Alternative 2 in the DEIS; the proposed project. Donlin Gold has submitted a robust, environmentally-sound project that will generate significant economic benefits to the region, State, and nation while maintaining environmental protection. Donlin Gold has spent over 20 years, and nearly $500 million studying the environmental, geological, and engineering aspects of the project in order to complete a design of environmental excellence. In addition, Donlin has had decades of consultation with the region's communities and stakeholders to incorporate concerns and suggestions into the ultimate design. Such a carefully contemplated, vigorously designed project has resulted in one that has mitigated risk and will transform the economy of the region. Alternative 2 is the correct choice for the Donlin Gold EIS.

AMA provides the following comments on Alternatives included in the DEIS outside of Alternative 2:

**AMA Opposes Alternative 1: Denial of Economic Prosperity**

AMA is strongly opposed to Alternative 1. A No-Action decision is irresponsible, as it will without doubt result in a missed opportunity for the Southwest Alaska region, as well as the state and nation. The proposed project would bring 3,000 construction jobs for the four-year timeline, and between 600-1,200 jobs from mining operations through its estimated 27-year mine life. The most recent economic impact study commissioned by AMA and completed by the McDowell Group, *Economic Benefits from Alaska's Mining Industry* (2015), revealed that jobs in Alaska's mining industry carry an average annual wage of $108,000; these are mostly full-time, year-round jobs often located in rural areas of the State. Jobs at Donlin would be no exception: several hundred to one thousand or more jobs would bring enormous opportunity to a region with one of the highest unemployment rates in the nation. Through its exploration stages, Donlin demonstrated a strong commitment to local hire and would continue to do so during operation. Donlin Gold addressed local employment barriers at its exploration camp, reducing staff turnover rate from 300% to 5% during the exploration stage for an ultimate 90% local hire rate.

In addition to providing stable, high-paying jobs, Donlin has shown a major commitment to workforce development and training to ensure local residents are prepared and trained to work at the project. Donlin has conducted its own workforce programs as well as supported other education and training organizations in the State. The job skills and training received while studying for and working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine.

In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care.

The most important economic benefit any project can provide is a job that enables an individual to produce a supportable income for their households. Donlin is poised to bring significant other economic impacts as well.

An important benefit to focus on is revenues to Alaska Native Corporations. Donlin is located on surface land owned by The Kuskokwim Corporation (TKC), an Alaska Village Corporation; and Calista Corporation, an Alaska Regional Corporation, owns the subsurface (mineral) estate. These lands were selected under the Alaska Native Claims Settlement Act (ANCSA) specifically for their mineral development potential in order to bring revenues to Corporations and benefits to their shareholders. Royalties paid to Calista by Donlin revenues will in part be redistributed to other regional and village corporations, pursuant to the 7(i) and 7(j) revenue sharing provisions of ANCSA. Donlin Gold is proposing to develop this land in partnership with

Calista Corporation and TKC, resulting in a project that benefits the landowners and its stakeholders immensely.

The State of Alaska has a government significantly dependent on revenues from resource development to fund its services, and is currently in the midst of a staggering budget crisis due to low commodity prices. In times of revenue decline, the responsible action is to look for ways to diversify revenue streams. Donlin Gold is an important factor in this diversification: not only will the project employ Alaskans, but it will pay millions in taxes to the State of Alaska. Donlin Gold is exactly the kind of new development and economic diversification our state, and in fact our country, needs.

Mining operations require support from a multitude of contractors and vendor businesses, for everything from fuel delivery to goods, flight services, and much more. Alaska's "support sector" is home to hundreds of Alaskan-owned and family run businesses that support successful mining operations. *Economic Benefits from Alaska's Mining Industry* (2011) estimates that Alaska's mines spend $500 million annually with over 600 Alaskan businesses. These support businesses employ Alaskans and pay local, state, and federal taxes, and are an important part of the economy. Donlin will increase the demand for these goods and services and continue to grow the economy of the State.

Finally, the Donlin project can significantly lower the cost that Alaskan households, especially in the Southwest Alaska region, pay for their essential needs. Improved transportation and communications infrastructure that will support the mine, including port and pipeline facilities, can provide better services and lower cost of energy, goods, and services to local residents. Infrastructure in Alaska is prohibitively expensive and requires a large consumer base to justify their development. Mining operations require stable energy sources, access roads, airstrips, and other costly projects needed in remote Alaska that, without an industrial-sized consumer, would likely not be built. Donlin demonstrates this through its proposed 315-mile natural gas pipeline from Cook Inlet to the project site. Construction of the pipeline is a gigantic undertaking – really, an entire "megaproject" on its own, that Donlin proposes to build to support the mine's energy needs. The pipeline will have excess capacity should there be interest in accessing natural gas to address the energy needs of the region and bring more affordable power closer to these rural communities.

SER 18

The economic benefits outlined in this comment letter cannot be overstated. Selection of Alternative 1 of the DEIS would constitute a missed opportunity at best, but in fact a denial of opportunity, for Alaskans and the nation. AMA urges the Corps to ***not*** select Alternative 1.

**Alternative 3: Concepts to reduce barging, alter equipment fuel and pipeline plans**

AMA finds the concepts in Alternative 3 to be unnecessary and urges the Corps to decline this alternative. The practice of barging, the use of LNG-fueled equipment, and a potential for a diesel pipeline have already been evaluated by the Donlin Gold project team and determined to be less viable options. The proposed project outlined in Alternative 2 was not done hastily: extensive time and money was spent by Donlin to fully understand all aspects of the project and arrive at its proposed conclusions. Project concepts suggested in Alternative 3A are not the best practices and designs for the project and the region.

The practice of barging outlined in Alternative 2's proposed project has thoroughly examined impacts and outlined best management practices for barging required by Donlin Gold operations.

First, the increase in barge traffic is unreasonably characterized in the DEIS. The document focuses on a percentage increase of barge traffic associated with the Donlin Project while placing little context on the rest of the boat activity on the Kuskokwim River. The level of existing barge traffic (less than 1 per day)

BARG 5

would increase to less than two per day during operations. The DEIS does little to put this in context with the 100 to 200+ boats that could be encountered on any given summer day on the Kuskokwim River. Barging has occurred on the river for decades with little impact. Most erosion or scouring is a natural occurrence that takes place during spring break-up in Alaska, and high water events. Any additional impact from less than two barges per day seems inconsequential in comparison. These statements are misleading, and have likely caused the public and affected stakeholders to be unnecessarily concerned because of this information provided by a government agency.

On a similar note, the inclusion of Dutch Harbor, Alaska, in the impact assessment in relation to fuel barging is unnecessary and speculative. Whether or not a third-party may require additional diesel storage simply extends the area of project influence beyond that required by the National Environmental Policy Act (NEPA). TRAN 6

What can be accurately and appropriately described about barging activity from Donlin operations is that the mine would implement guidelines for barge operations to minimize the potential for impacts. This includes practices like adjusting loads based on water levels of the river to avoid risk of grounding, establishment of navigational aids and procedures for operating in narrow channels, and use of state-of-the-art navigation and communication equipment to operate safely and responsibly. In addition, Donlin has said it will implement a communication program to keep local communities informed of barge schedules and status.

Alternative 3A outlines some initiatives to decrease barging and fuel storage needs that, in theory, are reasonable for an EIS to evaluate. Initiatives to reduce emissions and lower fuel costs are always worth exploring, however, in the case of the Donlin project, review of a mining project utilizing equipment fueled by Liquid Natural Gas (LNG) poses some challenges. Large industrial equipment like haul trucks sees improvements to technology throughout time, however, the technology explored in this Alternative isn't yet available, proven, or shown to be backed by consumer protections and warranties. To review the use of hypothetical LNG fueled equipment at the Donlin Gold Project, at this time, is inappropriate and should be discarded until the potential for use becomes more feasible. PAA 5

Alternative 3B suggests that construction of a diesel pipeline rather than natural gas could reduce river barging, and while that would be the case, it is the only "upside" to this alternative. Doing so would bring many negative impacts to not only the project economics, but also the environment. Exclusive use of diesel at the project would result in increased greenhouse gas emissions and require approximately 120 million gallons of diesel annually. An amount of this magnitude would create many associated impacts, such as a large increase in dock and tanker traffic in west Cook Inlet, new infrastructure and associated footprint for spill response, and a new potential risk for spills. The need for new infrastructure would include an access road traversing much of the pipeline corridor, which could increase competition for subsistence resources in the vicinity of the pipeline. Finally, a diesel pipeline ensures a commitment to diesel fuel use for the life of the mine that would eliminate the potential for LNG fuel migration for equipment at the site as well as the option for local communities to access lower-cost energy brought in by a natural gas pipeline. PAA 7

Donlin Gold's proposed project in Alternative 2 outlines what are the best practices for barging to mitigate impacts from barge traffic associated with the project. Alternative 3's concepts are not necessary and should be withdrawn from Corps consideration.

**Alternative 4: Alternate, Upriver Port Location**

As in the case with Alternative 3, AMA finds the concepts in Alternative 4 to be unnecessary, and urges the Corps to decline this alternative. Again, Donlin undertook significant study to understand the region and is proposing a port location based on the best, most feasible option. Through detailed evaluation, the Jungjuk site was determined to be the best port location for Donlin.

The Birch Tree Crossing port location proposed in Alternative 4 is not a requirement for barging and brings longer road impacts, including a larger wetlands disturbance, more stream crossings, impacts to subsistence hunters, and increased truck traffic and associated dust and spill risk. The Corps should discard its concept of an alternative port location as outlined in Alternative 4.

**Alternative 5: Mine Site Alternatives, Use of Dry Stack Tailings**

PAA 46

Alternative 5A fails to consider the results of a significant environmental and engineering study commissioned by Donlin Gold to determine the best project design for the conditions in which it will operate. From a social perception standpoint, a common misconception is that dry stack tailings are the only safe tailings storage facilities (TSFs) that mines can use. This is highly inaccurate and is an unfortunate viewpoint, as a broad application of a mining method ignores the use of best available science to provide the highest environmental protections. Mining project designs must always consider individual project specifics, like the scale of a project, climate in which it will operate, potential for dust migration, and thousands of additional technical details. Tailings storage is a site-specific determination and it is crucial that the ultimate design consider the truly best design for the specific site conditions, not what the perception may be.

PAA 46

In its exhaustive study, Donlin Gold determined that use of a dry stack TSF could increase fugitive dust and would increase energy consumption and associated greenhouse gas emissions. A dry stack ultimately does not address a core concern of water management at the Donlin site. Instead, Donlin has addressed this concern with a detailed water management plan which includes proposal of a dry closure for the TSF, an engineered rock fill and downstream-style construction tailings dam designed to withstand seismic activity, and an innovative synthetic liner that will be the first of its kind used in Alaska.

PAA 46

Use of a dry stack TSF at the Donlin site poses significant operational challenges, is a departure from the science and engineering study conclusions, and should not be considered to be the best option. The TSF designed outlined in the proposed project in Alternative 2 is the best option. The Corps should disregard the dry stack tailings concept in Alternative 5A from the Donlin EIS.

**Alternative 6: Pipeline route alternatives**

In its proposed project, Donlin Gold has outlined the construction of a 315-mile buried pipeline to supply the mine with natural gas for its energy needs. This proposal ultimately arose from consultation with area residents who voiced concerns about excess traffic from diesel barge deliveries on the Kuskokwim River. Upon arriving at a decision to construct a pipeline, Donlin explored several potential routes, including the Dalzell Gorge route outlined in Alternative 6 upon arriving at a decision to construct a pipeline. After extensive consultation with the area residents and recreational users, Donlin chose the route proposed in Alternative 2, and determined ways to ensure construction does not interfere with recreational events and the hunting seasons.

ALASKA MINERS ASSOCIATION

The Dalzell Gorge route is an inappropriate choice for the pipeline to Donlin. The route results in a greater environmental footprint, including wetlands, and would be built through a narrow canyon with challenging terrain. The route would pose geotechnical challenges during construction and risk to the long-term stability of the pipeline. The Dalzell Gorge route would also significantly overlap with the Iditarod National Historic Trail and the annual Iditarod Trail dog mushing and Iron Dog snowmachine races. The route proposed by Donlin in Alternative 2 does not conflict with the races, does not pose the same challenges, and would result in a smaller environmental footprint; therefore, the Corps should decline the proposed route in Alternative 6.

PAA 36

In summary, AMA strongly supports the extremely detailed concepts proposed in Alternative 2 of the DEIS. The Donlin Gold project is located in an area with a long history of mining, beginning with the discovery of placer gold in 1909. The mineral richness of the region brings enormous potential, and opportunities to tap that potential. Donlin Gold has proposed a modern, rigorous project that has reviewed and analyzed all potential impacts to ensure an operation with the highest environmental standards. For these reasons, AMA submits that it is the responsibility of the Corps to approve Alternative 2, Donlin's proposed project.

The Alaska Miners Association thanks you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Donlin Gold Project.

Sincerely,

Deantha Crockett
Executive Director

| | |
|---|---|
| **From:** | Jana DaSilva Lage |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Monday, April 25, 2016 11:49:42 AM |
| **Attachments:** | USACE Donlin Gold DEIS_ APICC Comments.pdf |

Dear Mr. Gordon,

A robust workforce and associated economic benefits provided by the Donlin Gold project is clearly in the public interest. APICC strongly urges the U.S. Army Corps of Engineers to consider the economic benefits that Alternative 2 will have on the Yukon-Kuskokwim region and Alaska as a whole.

A letter of support for the Donlin Gold project is attached to this email.

Please contact me with any questions.

Sincerely,

Jana DaSilva Lage

Deputy Director

Alaska Process Industry Careers Consortium (APICC)

2600 Cordova Street, Suite 105

Anchorage AK, 99503

Direct: 907-743-6804 Mobile: 907-980-9368

2600 Cordova Street. Suite 105
Anchorage. AK 99503
P 907.770.5250
F 907.770.5251
www.APICC.org

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Fred Millen
Alyeska Pipeline Service Company

Luke Saugier
Hilcorp Alaska

Kevin Snow
ConocoPhillips

Fred Villa
University of Alaska

Gilbert Wong
ExxonMobil

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Dave Rees, Chair Emeritus

Chris Tuck, Director Emeritus

April 22, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers
Alaska District CEPOA-RD-Richard Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Draft Environmental Impact Statement Donlin Gold Project

Dear Mr. Gordon:

The Alaska Process Industry Careers Consortium (APICC) is writing to support Alternative 2 in the Draft Environmental Impact Statement (DEIS) for the Donlin Gold Project. APICC is a statewide workforce development organization comprised of individuals and companies within Alaska's Oil and Gas, Mining, Construction, Maritime, and Health Care sectors. This includes Alaska Native Corporations, private companies, organized labor, and educational institutions. APICC works with industry and educational institutions to prepare Alaskan's to work in living-wage jobs in Alaska.

With the State of Alaska having a budgetary crisis due to the low price of oil and gas, coupled with a decrease in the amount of oil passing through the Trans Alaska Pipeline, it is important that alternative industries, such as mining, develop in Alaska. Donlin Gold proposes to develop land in partnership with the surface owner, the Kuskokwim Corporation and the subsurface owner, Calista Corporation. The proposed mining project will provide an economic benefit to the communities within the mine area, other regional and village corporations via royalty distribution pursuant to the 7(i) and 7(j) provisions of ANCSA, and the State of Alaska.

SER 2

Donlin Gold has committed to supporting Alaskan workers, contractors, and service providers with priority given to qualified Calista shareholders, their family members, and other residents of the Yukon-Kuskokwim region. In recent years, nearly 90 percent of employees at the Donlin Gold Camp have been regional shareholders and decedents.

Should the Donlin Gold project advance to a mine, potential operations would likely include 3,000 jobs during the four year construction period and between 600 and 1,200 direct long-term jobs including: miners, heavy and light duty equipment operators and mechanics, engineers, geologists, metallurgists, lab technicians, environmental scientists, and drillers, electricians, carpenters, office managers, accountants, health and safety specialists, medics, warehouse staff, janitors, truck drivers, and cooks over the minimum 27 year life of the mine. If this long-term project moves forward, it is essential to begin talking to students today to ensure an available, well-trained Alaskan workforce.

A robust workforce and associated economic benefits provided by the Donlin Gold project are clearly in the public interest. APICC strongly urges the U.S. Army Corps of Engineers to consider the economic benefit that Alternative 2 will have on the Yukon-Kuskokwim region and Alaska as a whole.

Sincerely

Cari-Ann Carty
Executive Director

| | |
|---|---|
| **From:** | Carl Wassilie |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] ABVN Comments on Donlin Gold Project Final EIS |
| **Date:** | Tuesday, May 31, 2016 10:46:51 PM |

Alaska's Big Village Network

May 31, 2016

Sheila Newman
US Army Corps of Engineers Alaska District
Regulatory Division (1145)
CEPOA-RD-SS
Post Office Box 6898
JBER, Alaska 99506-0898

POA.donlingoldeis@usace.army.mil

re: Donlin Gold Project Final EIS

Alaska's Big Village Network (ABVN) submits these comments on behalf of hundreds of members. ABVN is the free association of people to create communities of inclusion of indigenous peoples and non-indigenous peoples for community well-being for future generations.

Thank you for the opportunity to comment on concerns of the inadequacies of the proposed project. ABVN requests Alternative 1: No Action.

EJ 6 ABVN requests the No Action Alternative due to the nature of permanent and irreversible negative impacts to subsistence ways of life, cultural survival and basic human rights of many indigenous peoples. Most directly impacted with long term impacts over multiple generations are Yup'ik people with the immediate mine footprint; yet many other peoples around the world are also impacted negatively with the toxic contaminants being released into waterways, airways and food systems regionally amd globally.

PHL 16 The impacts and effects of the full cradle-to-grave contaminant pathways of many chemicals have not be fully, nor adequately studied to understand the the full range of impacts and effects to food, water and human health in the Y-K Region, Bering Sea and other areas not listed in the project proposal.

HZM 4 The project proposal has little to no information for contaminant storage and infrastructure to address safety and security of the toxic materials and chemicals beyond Alaska.

WILD 3 The proposed Donlin Gold Project has little information of the long-term cumulative effects of many of the dozens of toxic chemicals associated with mining activities in fresh water habitats, as well as salt water habitats. These habitats provide nurseries for many migratory species that account for basic supplemental human nutritional needs and cultural vitality for millions of people. The Donlin Mine project has human rights implications in many phases of the proposal. A single catostophic event on water can forever destroy multiple species of fish, birds, plants, mammals.

LEG 1 The enormity of the proposed Donlin Gold megamine project is well beyond the

LEG 1 capacity of the State of Alaska to adminster laws and regulations; in particular all Alaska communities along the proposal have extremely low capacity for emergency response and security. The mining associated activities puts enormous strain on hundreds of Alaskan Tribal Governments; as well as significant burdens on dozens of other jurisdictions not mentioned in the cradle-to-grave footprint of the toxic materials, energy developments and infrastructure needed under this proposal.

Furthermore, I would like to add the comments of EarthJustice dated May 31, 2016. The EarthJustice comments highlight more indepth inadequacies with the mine proposal.

Once again, ABVN request that the Army Corps of Engineers choose Alternative 1: No Action to be taken on the Donlin Gold mine project.

Sincerely,

Carl G. Wassilie
Yupik Biologist
Alaska's Big Village Network

| | |
|---|---|
| **From:** | Peter Heisler |
| **To:** | donlingoldeis, POA; Newman, Sheila M POA |
| **Cc:** | Tom Waldo; Sarah Saunders |
| **Subject:** | [EXTERNAL] Earthjustice Comments on Donlin Gold Project Draft EIS |
| **Date:** | Tuesday, May 31, 2016 6:18:22 PM |
| **Attachments:** | Earthjustice Comments on Donlin Gold Project Draft EIS.pdf |

Dear Ms. Newman,

Please find attached Earthjustice's comments on the Donlin Gold Project Draft Environmental Impact Statement, submitted on behalf of Northern Alaska Environmental Center, Alaska Community Action on Toxics, Earthworks, Center for Biological Diversity, Cook Inletkeeper, Friends of Alaska National Wildlife Refuges, Kachemak Bay Conservation Society, and Sierra Club. We previously submitted a DVD containing sources in support of these comments.

Please let me know if you have any difficulty accessing the attached letter or the supporting documents.

Thank you,

Peter Heisler
Associate Attorney
Earthjustice Alaska Office
441 West 5th Avenue, Suite 301
Anchorage, Alaska 99501
T: 907-792-7104
F: 907-277-1390
earthjustice.org

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EARTHJUSTICE

May 31, 2016

**VIA ELECTRONIC MAIL**

Sheila Newman
U.S. Army Corps of Engineers, Alaska District
CEPOA–RD–SA
P.O. Box 6898
JBER, AK, 99506–0898
E: POA.donlingoldeis@usace.army.mil

Dear Ms. Newman,

Earthjustice submits these comments on behalf of Northern Alaska Environmental Center (Northern Center), Alaska Community Action on Toxics, Earthworks, Center for Biological Diversity, Cook Inletkeeper, Friends of Alaska National Wildlife Refuges, Kachemak Bay Conservation Society, and Sierra Club. The Northern Center is a grassroots environmental organization that promotes conservation of the environment and sustainable resource stewardship in Interior and Arctic Alaska through advocacy and education. Alaska Community Action on Toxics is a statewide nonprofit public interest environmental health and justice research and advocacy organization dedicated to protecting environmental and community health. Earthworks is a nonprofit organization dedicated to protecting communities and the environment against the adverse effects of hard rock mining. The Center for Biological Diversity is a national, nonprofit conservation organization with more than one million members and online activists dedicated to the protection of endangered species and wild places. Cook Inletkeeper is a community-based nonprofit working to protect the Cook Inlet watershed and the life it sustains. The Friends of Alaska National Wildlife Refuges promote the conservation of all Alaska National Wildlife Refuges through understanding and appreciation, assisting the U.S. Fish and Wildlife Service, and through outreach to decision makers. Kachemak Bay Conservation Society seeks to protect the environment of the Kachemak Bay region and greater Alaska by encouraging sustainable use and stewardship of natural resources through advocacy, education, information, and collaboration. The Sierra Club is a national nonprofit organization with 64 chapters and over 625,000 members, including nearly 1,500 members in Alaska, dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. This letter is in addition to any separate comment letters these groups may submit.

We appreciate the opportunity to comment on the draft environmental impact statement (DEIS) prepared by the U.S. Army Corps of Engineers (Corps) for the Donlin Gold Project. The comments also pertain to Donlin Gold, LLC's (Donlin Gold) application for a permit under

Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (included as Appendix J to the DEIS) and the Bureau of Land Management's (BLM) preliminary analysis of subsistence impacts under Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) (included as Appendix N to the DEIS).

The proposed action is an open-pit, hard rock gold mine of a scale rarely seen in Alaska, or indeed the world.[1] It involves an eventual two-square-mile open pit that would fill with water requiring treatment in perpetuity,[2] a 2,240-acre waste rock pile and 2,351-acre tailings impoundment,[3] 122 barge trips on the Kuskokwim River every summer during operations,[4] and a 315-mile-long natural gas pipeline requiring nine new air strips and numerous roads during construction.[5] Significant environmental consequences could include the contamination of streams and rivers,[6] destruction of wetlands and fish and wildlife habitat,[7] interference with subsistence harvests by local communities,[8] and impairment of a substantial segment of the Iditarod National Historic Trail (INHT, or "the Trail").[9]

In these comments, we address several areas of the proposal that warrant additional study and discussion under the National Environmental Policy Act (NEPA) and other statutes. These issues include:

- ***The pit lake.*** The Corps must fully and accurately disclose the ecological risks posed by the pit lake, the changes in mine-site hydrology that result from it, and the details of Donlin Gold's financial assurances for perpetual water treatment.

NEP 6

- ***Mine-site water management.*** The Corps should explain how the proposed action comports with New Source Performance Standards for mining waste discharges into streams and wetlands under the Clean Water Act.

- ***The tailings dam.*** The Corps must completely analyze the risk of a tailings dam failure and account for the findings of an expert panel on the recent, catastrophic tailings dam breach at the Mount Polley mine in British Columbia, Canada.

[1] *See Donlin Gold Project*, Northern Alaska Environmental Center, http://northern.org/programs/clean-water-mines/hardrock-mines-in-interior-and-arctic-alaska/donlin-creek-project (last visited Apr. 22, 2016); *Donlin Gold Project*, Gound Truth Trekking, http://www.groundtruthtrekking.org/About/ (last visited Apr. 22, 2016).
[2] U.S. Army Corps of Engineers, Donlin Gold Project Draft Environmental Impact Statement at 2-11, 2-40, 2-141 (Nov. 2015) (DEIS).
[3] *Id.* at 2-30.
[4] *Id.* at 2-45, Tbl. 2.3-8.
[5] *Id.* at 2-58, 2-76, 2-98 to 2-99.
[6] *Id.* at 2-173.
[7] *Id.* at 2-175, 2-177 to 2-179.
[8] *Id.* at 2-184, Tbl. 2.3-44.
[9] *Id.* at 3.20-44 to 3.20-46.

- ***Subsistence.*** The Corps should objectively describe potential impacts to subsistence and address the apparent discrepancy between its own conclusions and the findings of BLM under Section 810(a) of ANILCA.

- ***Wetlands.*** The Corps must present a more definite picture of the effects of the proposed action—as well as other alternatives—on wetlands and explain how those impacts would comport with regulations established under the Clean Water Act.

- ***The Iditarod National Historic Trail.*** The Corps should canvass the entire range of the pipeline's impacts on the INHT, thoroughly study alternatives that would avoid impacts to the Trail, explain how granting a right-of-way would be consistent with the State of Alaska's agreements with the federal government and the state's land-management plans, and complete the process prescribed by Section 106 of the National Historic Preservation Act (NHPA) before rendering a permitting decision.

NEP 6

- ***Scope.*** The Corps must thoroughly address the potential effects of the construction of a cargo terminal in Bethel and the possible future expansion of the mine.

- ***Climate change.*** The Corps should fully and fairly discuss all of the alternatives' contributions to climate change and explain how climate change could alter the project's environmental impacts.

Each of these topics requires additional analysis before the Corps signs a record of decision. Consistently with NEPA's purpose and commands, we urge the agency to prepare a supplemental environmental impact statement (SEIS), allow public comment on the SEIS, and fully disclose the environmental consequences of all reasonable alternatives in a final environmental impact statement (FEIS).

PIT LAKE

Upon mine closure, the open pit is predicted to fill with water from groundwater recharge, surface runoff, and pumping from the tailings storage facility, creating a "pit lake."[10] The surface water of the lake would not meet applicable water quality standards and would require treatment in perpetuity.[11] Pumping would also be required to prevent the lake from overflowing.[12] Given the scale and permanence of this feature, the Corps must thoroughly discuss its potential impacts in the FEIS and seriously consider the risks before rendering a permitting decision.

[10] DEIS at 2-40.
[11] *Id.*; *id.* at 2-141.
[12] *Id.*

I. THE DEIS DOES NOT FULLY DISCLOSE THE ECOLOGICAL RISKS POSED BY THE PIT LAKE.

The DEIS does not adequately address the possible effects of exposure to pit-lake contaminants. In lieu of discussing such impacts on terrestrial mammals, the DEIS quotes extensively from an ecological risk assessment (ERA) prepared by a consultant and included as an appendix.[13] The analysis of impacts on birds is similarly cursory: "The magnitude of impact of environmental contamination from birds coming into contact with the . . . pit lake is low because the exposure is expected to be low."[14] NEPA demands more.[15]

WILD 5

Even if the DEIS thoroughly discussed the pit lake's possible effects on birds and other wildlife, it would nonetheless rely on flawed analysis. The ERA evaluates the effects of several chemicals of potential concern in the pit lake individually, but not in combination.[16] This approach underestimates the risks of contamination. To capture cumulative effects of multiple stressors, the Environmental Protection Agency (EPA) recommends constructing response relationships for each stressor and combining them, or analyzing responses to the entire set of stressors.[17] Whatever approach is ultimately selected, however, NEPA requires that an EIS contain high-quality, accurate scientific analysis, and that any shortcomings in the data or models it relies on be disclosed at the outset.[18] The ERA for the pit lake does not meet this standard,[19] and the DEIS fails to acknowledge its limitations.

The DEIS also understates ecological risks by incompletely analyzing the possibility of pit-lake overturn. When the water in a mine pit lake mixes partially or completely, fish kills and other catastrophic events may result.[20] The typical cause of such mixing is extreme weather,[21] but other factors such as the temperature of inputs to the lake may also influence the stability of

WAQ 9

[13] *See id.* at 3.12-38 to 3.12-39; *see also id.* at 3.12-7 to 3.12-9.
[14] *Id.* at 3.12-154.
[15] *Cf. Sierra Club, Inc. v. Austin*, 82 F. App'x 570, 572 (9th Cir. 2003) (NEPA requires a "'hard look'" at environmental impacts of proposed major federal actions).
[16] *See* DEIS App. S at 27 (PDF 387) ("Lower and upper bound [toxicity reference values] were derived for each individual receptor and chemical combination.").
[17] *See* Environmental Protection Agency (EPA), Guidelines for Ecological Risk Assessment at 85 (Apr. 1998).
[18] *See Lands Council v. Powell*, 395 F.3d 1019, 1031-32 (9th Cir. 2004) (citing 40 C.F.R. §§ 1500.1(b), 1502.22).
[19] The ERA does not assess the risks to fish because "persistent fish populations are not proposed to be added, nor expected to be present in the pit lake given the proposed barriers to fish entry into the pit lake." DEIS App. S at 30 (PDF 390). This assumption ignores the potential for fish dispersal from other water bodies, as well as the fact that runoff from the American Creek watershed would flow into the pit lake, *see* DEIS at 3.5-87.
[20] *See* B. Boehrer & M. Schultze, *On the Relevance of Meromixis in Mine Pit Lakes*, 7th Int'l Conference on Acid Rock Drainage 200 (2006).
[21] *See id.* at 207.

stratification.[22] The DEIS notes that a modeling run in which the pit lake mixed completely produced severely degraded surface water quality in which virtually all contaminants exceeded applicable standards even 99 years after mine closure.[23] It thus observes that "maintaining a permanently stratified pit lake" would be "importan[t] to treatment costs."[24] Although a simulation in which the lake was subjected to 125-mile-per-hour winds over two days did not show overturn, the DEIS admits that wind is only "one possibility" of the physical forcing that could cause complete mixing.[25] The DEIS does not discuss other potential causes or indicate how Donlin Gold intends to maintain pit-lake stratification. Furthermore, the ERA does not evaluate impacts to wildlife from complete mixing.[26] The Corps should remedy these deficiencies in the FEIS.

WAQ 9

WILD 5

## II. THE DEIS DOES NOT ADEQUATELY DISCUSS CHANGES TO MINE-SITE HYDROLOGY DUE TO THE MINE PIT AND PIT LAKE.

Agencies must "insure the professional integrity, including scientific integrity, of the discussions and analyses in [EISs]."[27] An agency contravenes this requirement by using a model that produces obviously inaccurate results or that incorporates unreasonable assumptions.[28] Ultimately, in relying on a flawed scientific analysis, an agency fails to provide a "full and fair" discussion of the proposed action's environmental effects.[29]

GRD 6

The DEIS does not adequately discuss the effects of pit dewatering or the formation of the eventual pit lake on surface water. The DEIS's modeling of groundwater flows during pit dewatering artificially limits the reach of drawdown by treating the surrounding bedrock as undifferentiated and relatively non-conductive.[30] It also improperly isolates Crooked Creek from the impacts of dewatering by assuming that the alluvium there is highly conductive and does not store much groundwater.[31] Furthermore, the effects of dewatering could extend well beyond the predicted drawdown zone if thrust faults that intersect the pit have long-scale permeability damage zones[32]; that data is not present in the DEIS or supporting documents.[33] The DEIS also

GRD 4

GRD 1

GRD 3

GRD 1

[22] *See generally* D. N. Castendyk & J. G. Webster-Brown, *Sensitivity Analyses in Pit Lake Prediction, Martha Mine, New Zealand 1: Relationship Between Turnover and Input Water Density*, 244 Chemical Geology 42, 50 (2007).
[23] *See* DEIS at 3.7-127 to 3.7-128 & Tbl. 3.7-35.
[24] *Id.* at 3.7-127.
[25] *Id.* App. H at H-41.
[26] *See generally id.* App. S.
[27] 40 C.F.R. § 1502.24.
[28] *See Earth Island Inst. v. U.S. Forest Serv.*, 351 F.3d 1291, 1300-02 (9th Cir. 2003).
[29] *See Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964-65 (9th Cir. 2005) (quoting 40 C.F.R. § 1502.1).
[30] *See* T. Myers, Technical Memorandum: Review of the Draft Environmental Impact Statement for the Donlin Gold Project at 5 (May 11, 2016) (Myers Memo).
[31] *See id.*; *see also id.* at 30, 33-34.
[32] *See id.* at 11-12; *see also id.* at 41.

GRD 1 potentially understates the pit lake's effects on stream flow post-closure by assuming that backfill is already saturated.[34] In light of these potential impacts, we support one expert's recommendation that the Corps consider an alternative in which the pit would not extend into a several-hundred-foot buffer along Crooked Creek.[35]

PAA 27

GRD 16 We hereby incorporate by reference the May 11, 2016, technical memorandum prepared by Tom Myers ("Myers Memo")[36] and ask that the Corps and cooperating agencies respond fully to those comments as if set out in its entirety in this letter.

## III. THE DEIS FAILS TO EXPLAIN HOW DONLIN GOLD'S PROPOSED FINANCIAL ASSURANCES WOULD ENSURE FUNDING FOR THE PERPETUAL TREATMENT OF PIT-LAKE WATER.

The DEIS states that Donlin Gold would establish a "Post-Reclamation and Closure Maintenance Trust Fund" to provide adequate funding for perpetual treatment and post-closure monitoring of pit-lake water.[37] It does not discuss this issue further, instead appending a memorandum by Donlin Gold regarding the company's proposed financial assurances.[38] Because the avoidance of long-term environmental effects depends on a perpetual source of funding, the FEIS must disclose the methodology for calculating the final amount to be contributed to the trust fund.

BER 7

An EIS that entirely omits information about reclamation and water treatment plans may be held invalid.[39] According to Donlin Gold's memo, the Alaska Department of Environmental Conservation (ADEC) sometimes considers a draft integrated waste management plan (IWMP), which may include a range of cost estimates for long-term post-closure water treatment, at the draft EIS stage[40]—although that does not appear to be the case here.[41] The memorandum also points out that the public will have an opportunity to comment on the draft IWMP during

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[33] Where information relevant to reasonably foreseeable significant adverse impacts is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," agencies must include that information in the EIS. 40 C.F.R. § 1502.22(a). If the information cannot be obtained, agencies must note that the information is incomplete or unavailable, explain its relevance, summarize existing credible scientific evidence, and evaluate impacts based on theoretical approaches or research methods generally accepted in the scientific community. *Id.* § 1502.22(b).

[34] *See* Myers Memo at 38-39.

[35] *See id.* at 8. An EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a).

[36] *See supra* note 30.

[37] DEIS at 2-40.

[38] *See generally id.* App. A.

[39] *Cf. Cady v. Morton*, 527 F.2d 786, 796 (9th Cir. 1975) (concluding that an EIS's discussion of proposed reclamation plans was adequate because it included sufficient data and analysis).

[40] DEIS App. A at 2, 3.

[41] The most recent draft IWMP was prepared in 2012 and does not address financial assurances. *See* Donlin Gold, Integrated Waste Management Plan (July 2012).

ADEC's review of the document.[42] Regardless, if the DEIS does not present this relevant information, the public will not have an opportunity to evaluate and comment on potential long-term impacts of the proposed action before the Corps renders its decision, defeating NEPA's purposes.[43]

Donlin Gold's memorandum offers no accounting of the amount of funding needed to guarantee perpetual water treatment at the pit lake. It states that, "[t]o make the trust fund self-sustaining and able to cover annual post-closure costs, a total of approximately $73 million dollars [*sic*] is required to be in place at the time of mine closure."[44] The memorandum provides no breakdown of costs or any other explanation as to how it arrived at that amount.[45] This omission is particularly concerning because, as the memorandum acknowledges, regulations or guidelines implementing Alaska's statutory trust fund language have not been developed.[46] Additionally, estimating future replacement and operating costs can be difficult.[47] Without knowing the basis for Donlin Gold's cost estimate, it is impossible for the public to evaluate the possible long-term environmental consequences of the project.

Donlin Gold's memorandum does mention a few assumptions underlying the amount of initial funding required for the trust fund at mine closure, but these assumptions only heighten the need to disclose detailed cost calculations. For example, it states that "[c]osts for long-term post closure activities were estimated out to 200 years after closure," a time period "sufficient to demonstrate that the post-closure trust fund can be self-sustaining in perpetuity."[48] This assumption is plainly invalid because the DEIS predicts that water treatment will be required in perpetuity. The memorandum also indicates that the trust fund's post-closure growth was calculated using targeted returns for the Alaska Permanent Fund, and that annual cost inflation was calculated using a five-year average of the Anchorage consumer price index.[49] It is unclear how those metrics will be directly relevant to the growth of the trust fund and the costs of operating a water treatment plant in southwest Alaska. Indeed, "changing either the inflation rate or the rate for return-on-investment by a single percentage point will cause a huge change on the required" amount of initial funding.[50] A buffer for steep economic declines, dramatic changes in energy costs, unexpected impacts from climate change or weather events, lake overturn, and other unforeseen challenges inherent in a large, complex system should also be built into the estimate. In sum, the public needs a more detailed explanation of the calculations and

BER 7

[42] DEIS App. A at 4.
[43] *See* 40 C.F.R. § 1502.1 (requiring that EISs "provide full and fair discussion of significant environmental impacts" of the proposed action).
[44] DEIS App. A at 7.
[45] *See id.*
[46] *See id.* App. A at 3.
[47] *See* D. M. Chambers, A Position Paper on Perpetual Water Treatment for Mines at 1 (June 2007) (Chambers Position Paper).
[48] DEIS App. A at 7.
[49] *Id.*
[50] Chambers Position Paper at 1.

BER 7 assumptions underlying Donlin Gold's proposed financial assurances before it can meaningfully comment on the project's potential effects.

WATER MANAGEMENT

The mine as proposed in all alternatives fails to comply with the Clean Water Act. As a new project, the mine will be required to comply with New Source Performance Standards, which set strict limits on discharges of any mine drainage to waters of the United States[51] and prohibit any discharges of process wastewater except for excess precipitation.[52]

The mine site is interlaced with streams and wetlands that are "waters of the United States" subject to the Clean Water Act.[53] Within these waters, Donlin Gold proposes to construct or create, among other things, two ore pits, numerous pit dewatering wells, a waste rock pile, two contact water ponds, a tailings pond, a seepage recovery system, numerous freshwater diversions, a freshwater impoundment, and ultimately a pit lake that will never meet
CWA 3 water quality standards and will require treatment in perpetuity.[54] All would be on an enormous scale in a complex geologic and hydrologic system.[55]

Even if everything runs perfectly as planned, the project envisions extensive runoff and seepage. For example, there would be two contact water dams to collect runoff from the waste rock piles, but they would be unlined and may be expected to seep into the pit and mingle with other mine drainage.[56] Even the lined tailings storage facility is expected to require a seepage collection pond, diversion ditches, and wells.[57] Upon closure, the wastewater from the mine will be permanently stored in an unlined, two-mile-long contaminated pit lake, fed by groundwater and surface water runoff, where American Creek and other waters are currently located.[58]

Given the size and complexity of the project and its hydrology, there are significant risks that the mine's systems will not function as planned. For example, the water treatment facilities
WAQ 10 could be overwhelmed during pit dewatering if surrounding bedrock is more conductive than expected, or post-closure if a large storm inundates the pit lake.[59] Water in the pit lake could
GRD 6 also flow through deep bedrock and contaminate surface water.[60] Regarding waste rock storage, PAA 14

[51] 40 C.F.R. § 440.104(a).
[52] *Id.* § 440.104(d).
[53] *See id.* § 122.2 (defining "*Waters of the United States or waters of the U.S.*").
[54] DEIS at 2-8 to 2-9, 2-27, 2-40, 2-141.
[55] *See supra* p. 2; *see generally* Myers Memo.
[56] DEIS at 2-26.
[57] *Id.* at 2-30.
[58] *Id.* at 2-11, 2-30, 2-40, 2-141.
[59] *See* Myers Memo at 4, 18-19, 22, 23; *see also id.* at 35 (noting that, if deep bedrock is more permeable than assumed, required pit dewatering could be doubled). The Corps should provide more information on bedrock conductivity if it is not exorbitantly costly to obtain. *See* 40 C.F.R. § 1502.22(a).
[60] *See* Myers Memo at 17.

PAA 14

there is a "significant probability" that a shallow aquifer will "short circuit seepage from the waste rock dump to Crooked Creek,"[61] an eventuality the model used in the DEIS cannot simulate.[62] As the Myers Memo asserts, the "only effective mitigation would be to avoid [waste rock facility] seepage by having a liner under the waste rock."[63] We urge the Corps to give greater consideration to such an option, which it rejected simply because "[t]here is no environmental benefit from installing a liner under the [waste rock facility]."[64]

CWA 5

The DEIS raises serious questions about the project's compliance with the Clean Water Act and does not adequately disclose how this complex system would do so. It includes this sweeping statement: "Although the water within the mine facilities would not be considered waters of the State of Alaska or waters of the U.S., and are not subject to regulation under the Clean Water Act or the [Alaska Pollutant Discharge Elimination System] permitting program, potential receiving waters downstream of the mine are subject to Clean Water Act regulations."[65]

There is no basis for the assertion that water within the mine facilities is not "waters of the United States" and is exempt from the Clean Water Act. Nothing in the statute, the regulations, or any agency policies exempts mines from the Act.

The only exception that could be applicable to some mine components is one for "waste treatment systems."[66] While, for example, the Corps and EPA might make a determination that a properly designed tailings storage facility would qualify as a "waste treatment system" under the rule defining "waters of the United States," the entire mine plainly would not.

As a general rule, it should not be permissible to deem an existing jurisdictional water to be a waste treatment system. To do so defeats the point of the Clean Water Act. The legislative history of the Act observes that "[t]he use of any river, lake, stream or ocean as a waste treatment system is unacceptable."[67] The exemption for waste treatment systems in the current definition of "waters of the United States" is not consistent with the Clean Water Act and was not properly adopted.[68]

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[61] *Id.* at 4, 5, 24-26.
[62] *See id.* at 5-6.
[63] *Id.* at 26. In comments on the DEIS, EPA also recommended that "all [waste rock facilities] containing acid-generating rock be lined to prevent infiltration into groundwater." U.S. Army Corps of Engineers, Donlin PDEIS – Agency and Applicant Comments Elevated to the Corps at 3, 4 (July 30, 2015) (Agency & Applicant Comments); *see also id.* at 26, 27.
[64] *See* DEIS App. C at C-51, Tbl. C-10. An EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a).
[65] DEIS at 3.7-146.
[66] 40 C.F.R. § 122.2, *Waters of the United States or Waters of the U.S.*, (2)(i).
[67] S. Rep. No. 92-414, at 7 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3674.
[68] *See Puget Soundkeeper All., et al. v. McCarthy, et al.*, No. 2:15-cv-01342 (W.D. Wash., filed Aug. 20, 2015).

The original exclusion for waste treatment systems made clear, appropriately, that this exception applied only to manmade systems not originally created in or from impoundment of waters of the United States.[69] Shortly thereafter, in 1980, EPA temporarily suspended this sentence due to concerns about its effect on existing systems, but explained:

> EPA intends promptly to develop a revised definition and to publish it as a proposed rule for public comment. At the conclusion of that rulemaking, EPA will amend the rule, or terminate the suspension.[70]

That was 36 years ago, but neither EPA nor the Corps has completed the promised rulemaking. Even when revising the definition of "waters of the United States" last year, EPA and the Corps continued the suspension and refused to address comments on it as beyond the scope of the
CWA 5 proposed rule.[71] The time to correct this omission has long passed.

Neither EPA nor the Corps has adopted any clear or consistent position as to the proper criteria for defining a waste treatment system.[72] They have applied the concept on an ad hoc basis, often without acknowledging it.

That approach is unacceptable, particularly for a project as big and with as many threats to aquatic resources as the Donlin mine. Before deeming any portion of the project to be an exempt "waste treatment system," EPA and the Corps should undertake the rulemaking promised in 1980, adopting clear guidelines specifying the appropriate criteria for a waste treatment system. They should further document exactly how any portion of the Donlin project would qualify as a waste treatment system under those guidelines and how the rest of the project would comply with New Source Performance Standards, water quality standards, and other requirements of the Clean Water Act. All of this should be disclosed in an SEIS subject to public comment.

TAILINGS DAM

I. THE DEIS'S ANALYSIS OF A TAILINGS DAM FAILURE IS INCOMPLETE AND INSUFFICIENT.

DAM 3

The DEIS offers a very limited assessment of a tailings dam failure, as it only evaluates a spill scenario caused by a partial tailings dam failure that releases 2.6 million cubic yards of

[69] *See* 45 Fed. Reg. 33,290, 33,424 (May 19, 1980); *see also* 40 C.F.R. § 122.2, *Waters of the United States or Water of the U.S.*, (2)(i).
[70] 45 Fed. Reg. 48,620 (July 21, 1980).
[71] 80 Fed. Reg. 37,054, 37,097, 37,114 (June 29, 2015).
[72] *See*, *e.g.*, Letter from R. Hanmer, EPA, to P. Kelly, U.S. Army Corps of Engineers (May 8, 1989); Memorandum from L. Wilcher, EPA, to C. Findley, EPA (Oct. 2, 1992); Memorandum from D. Regas, EPA, to R. Smith, EPA (May 17, 2004); Letter from B. Grumbles, EPA, to J. Woodley, U.S. Army Corps of Engineers (March 1, 2006).

water or a mixture of water and tailings into Anaconda Creek.[73] A failure of the tailings dam would likely be much larger and could have catastrophic effects on people and natural resources, but the Corps did not assess those effects in the DEIS. The Corps contends that the spill scenarios in the DEIS reflect "a representative example of the types of spills that could occur, and do not represent the 'worst case' possibilities."[74] As explained below, however, a much larger spill is reasonably foreseeable and, therefore, NEPA requires the Corps to examine the effects of such a spill in the FEIS.

NEPA requires a "hard look" analysis of the environmental impacts of low-probability high-consequence events[75] unless the probability of the event is "infinitesimal."[76] Stated differently, NEPA requires an agency to disclose the environmental consequences of a potential harmful event unless the chance of its occurrence is "remote and speculative," even if there is a "reasonable assurance" that the event will not occur.[77] "Only if the harm in question is so 'remote and speculative' as to reduce the effective probability of its occurrence to zero may the agency dispense with the consequences portion of the analysis."[78] Here, the harm from a much larger tailings dam failure is reasonably foreseeable and must be analyzed.[79]

"Among the world's estimated 3,500 tailings dams the failure rate is roughly 10 times greater than the water dam failure rate, with an 'average' tailings dam having an estimated

DAM 3

[73] DEIS at 3.24-3.
[74] *Id.* at 3.24-1.
[75] *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Comm'n*, 449 F.3d 1016, 1030-32 (9th Cir. 2006) (concluding risk of terrorist attack was not so "remote and highly speculative" as to evade NEPA's obligation to consider the potential environmental effects).
[76] *Ground Zero Ctr. for Non-Violent Action v. U.S. Dep't of the Navy*, 383 F.3d 1082, 1090 (9th Cir. 2004) (finding NEPA analysis not required where risk is "between one and 100 million and one in one trillion").
[77] *New York v. Nuclear Regulatory Comm'n*, 681 F.3d 471, 478-79, 482 (D.C. Cir. 2012).
[78] *Id*. at 482; *cf. Ground Zero Ctr. for Non-Violent Action*, 383 F.3d at 1090 (holding NEPA did not require analysis of consequences of an event where probability of event was "infinitesimal," between a one in one million or one in one trillion chance only if a one in 100 million threshold event occurred).
[79] By way of illustration, prior to the *Deepwater Horizon* exploration drilling disaster, the Bureau of Ocean Energy Management consistently refused to conduct catastrophic oil spill risk and impacts analyses during its NEPA review processes, claiming such an event was not reasonably foreseeable. *See* Council on Environmental Quality, Report Regarding the Mineral Management Service's National Environmental Policy Act Policies, Practices, and Procedures As They Relate to Outer Continental Shelf Oil and Gas Exploration and Development at 27 (Aug. 16, 2010) ("The agency did not [formerly] deem a catastrophic spill . . . to be a reasonably foreseeable impact."). Following that disaster, the agency was widely criticized and is now conducting that review when analyzing proposed projects. *Id.* ("Since [the Deepwater Horizon spill on] April 20, 2010, that assumption will be revised, and BOEM will take steps to incorporate catastrophic risk analysis going forward.")

failure chance of ~0.1% every year."[80] In 2001, the International Commission of Large Dams and the United Nations Environmental Program concluded that, "on average, one major tailings dam incident occurs each year, although that figure doubled between 1995 to 2001."[81] In the ten years following that report, the failure rate of tailings dams remained at roughly one failure every eight months, or about three failures every two years.[82] In fact, failure rates increased dramatically in the early 2000s, matched only by statistics from the early to mid-1930s.[83] Historically, most tailings dam failures worldwide have occurred at operating mines and 39 percent of such failures have occurred in the United States.[84] More recently, experts have concluded that despite a recent decline in the total number of failures, "the 100 years of [tailing storage facilities] failures shows an emerging and pronounced trend since 1960 toward a higher incidence of 'Serious' and 'Very Serious' failures. That is, the consequence of loss is becoming increasingly greater."[85]

When tailings dams fail, they typically release on average between 20 and 40 percent of the tailings.[86] Not surprisingly, there appears to be a direct, if not linear relationship between the tailings outflow from a tailings dam as compared to the volume of tailings stored at the dam at the time of the failure.[87] One study found that for a significant portion of tailings dam failures, "29% for pre-2000 cases and 40% for post-2000 cases . . . dam failures released up to 0.5 x $10^6$ $m^3$of tailings into the environment."[88] The study concluded that:

> [U]sually about one-fifth of the contained volume is released. Even such volumes are sufficient to cause extensive damage to life, property, and health. For example, 0.5 x 106 $m^3$ of released tailings

DAM 3

[80] A. Mattox *et al*., *Understanding Dam Failure*, Ground Truth Trekking (Feb. 22, 2016), http://groundtruthtrekking.org/Issues/OtherIssues/understanding-dam-failure.html.
[81] G. Gavett, *Tailings Dams: Where Mining Waste Is Stored Forever*, Frontline (July 30, 2012), http://www.pbs.org/wgbh/frontline/article/tailings-dams-where-mining-waste-is-stored-forever/; *see also* International Commission of Large Dams, Tailings Dams: Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences, Bulletin 121, 19-20, 68, Fig. 2 (2001).
[82] D. M. Chambers, Long-term Risk of Tailings Dam Failure, 13 Alaska Park Science - 2 at 4-5 (Chambers Tailings Dam Failure Analysis).
[83] M. Davies, *Tailings Impoundment Failures: Are Geotechnical Engineers Listening?*, Geotechnical News at 32 (Sept. 2002); *see also* WISE Uranium Project, Chronology of Major Tailings Dam Failures (Mar. 18, 2016), (WISE Uranium Project providing a list of major failures from 1960-2016).
[84] Chambers Tailings Dam Failure Analysis at 5.
[85] L. N. Bowker & D. M. Chambers, The Risk, Public Liability, & Economics of Tailings Storage Facility Failures at 1 (Jul. 21, 2015).
[86] A. Dalpatram, Estimation of Tailings Dam Break Discharges, Workshop on Dam Break Analysis at PDF 7 (Aug. 24-26, 2011) (volume of tailings released).
[87] *Id.* at 8, Fig. 4.
[88] S. Azam & Q. Li, *Tailings Dam Failures: A Review of the Last One Hundred Years*, Geotechnical News at 52 (Dec. 2010).

> are enough to drown about 1200 North American style single-family homes.[89]

Here, the Corps' analysis of a tailings dam failure is grossly insufficient. The proposed tailings storage facility for the Donlin mine would have the capacity to store 568 million tons of tailings,[90] which is approximately 355 million cubic yards.[91] Thus, under the "usual" failure scenario, 71 million cubic yards of tailings (20 percent of 355 million) would be released. A more severe failure could mean 142 million cubic yards would be released (40 percent of 355 million). Yet the DEIS fails to examine any of these scenarios.

DAM 3

The consequences of this failure are stark. The DEIS examines the impacts from a release of 2.6 million cubic yards of water and tailings that covers approximately 1,700 acres.[92] As an initial matter, the DEIS offers no explanation for the agency's decision to examine a failure that only releases 0.73 percent of the tailings. Indeed, as explained above, contemporary research reveals that the typical volume of material released from tailings dam failings is increasing, not decreasing. If that release was, by way of illustration, 71 million cubic yards, then, based on the spill-coverage ratio outlined in the DEIS, the area affected would be more than 46,000 acres, resulting in substantial harm to nearby communities and widespread environmental damage, including, but not limited to, erosion, deposition of tailings, long-term water quality degradation and habitat loss, and adverse impacts of fish and aquatic resources. By grossly understating the size of a realistic tailings dam failure, the DEIS presents an inaccurate and incomplete assessment of the impacts, necessary alternatives, and mitigation measures. These failings must be addressed in the FEIS.

## II. THE PROJECT AND THE FEIS MUST ACCOUNT FOR THE FINDINGS FROM THE MOUNT POLLEY EXPERT PANEL.

"[O]ne important ingredient of an EIS is the discussion of steps that can be taken to mitigate adverse environmental consequences."[93] "An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective."[94]

MIT 29

Here, the DEIS's treatment of the mitigation measures associated with the best practices for the performance of the tailings dam ranges from paltry to non-existent. Most notably, the DEIS provides virtually no discussion of the findings in the Independent Expert Engineering Investigation and Review Panel's (Mount Polley Expert Panel) Report on Mount Polley Tailings

[89] *Id.*
[90] DEIS at 2-30.
[91] This is based on a conservative assumption of 1.6 metric tons per cubic meter for tailings at closure (based on 100 pounds per cubic foot).
[92] *Id.* at 3.24-49, 3.24-88.
[93] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989).
[94] *S. Fork Band Council of W. Shoshone of Nev. v. U.S. Dep't of the Interior*, 588 F.3d 718, 727 (9th Cir. 2009).

Storage Facility Breach.[95] The Corps should require the Donlin tailings facility to be modified to reflect these findings and, at a minimum, must account for these findings in assessing the impacts of tailings storage by reducing the risk of a dam failure.

The Mount Polley Expert Panel identified practices that reflect best available technology regarding tailings management,[96] including:

> 1. Elimination of surface water from the impoundment.
>
> 2. Promotion of unsaturated conditions in the tailings with drainage provisions.
>
> 3. Achievement of dilatant conditions throughout the tailings deposit by compaction.[97]

The Panel specifically concluded that "Mount Polley has shown the intrinsic hazards associated with dual-purpose impoundments storing both water and tailings."[98]

The report states pointedly, "The Panel firmly rejects any notion that business as usual can continue."[99] Unfortunately, the Donlin Gold Project as proposed in the DEIS is a business-as-usual mine, employing the very same longstanding technologies and practices that the Panel found unacceptable.

MIT 29

In light of these findings, the Corps should modify the project to eliminate, or at least minimize, water and saturation conditions at the tailings storage facility.[100] The FEIS also needs

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[95] *See generally* Independent Expert Engineering Investigation and Review Panel, Report on Mount Polley Tailings Storage Facility Breach (Jan. 30, 2015) (Mount Polley Report).

[96] In comments on the DEIS, EPA noted that "[t]he independent engineering evaluation for the Mount Polley mine incident highlighted the importance of using Best Available Technology (BAT) in designing tailing storage facilities," and recommended "a rigorous evaluation of the [tailings storage facility] options to ensure that BAT is considered in the EIS, which could minimize the environmental effects from a catastrophic tailings dam failure." Agency & Applicant Comments at 122-23. The Corps should have addressed this issue in the DEIS, *see* DEIS at 3.24-31 (observing merely that the tailings dam design was "evaluated in comparison to the Mount Polley Tailings dam" and "is considered a relatively robust dam design"), and it must do so before permitting the mine.

[97] Mount Polley Report at 121.

[98] *Id*.

[99] *Id.* at 118.

[100] EPA commented that, "[i]n light of the recent Mount Polley Mine Independent Review Panel Recommendations, the DEIS should also consider an alternative [tailings storage facility] and Dam design that is different from Donlin's proposed action." Agency & Applicant Comments at 12-13.

MIT 29 to evaluate the impacts caused by any tailings dam failure to adhere to the Mount Polley expert recommendations.

SUBSISTENCE

Subsistence is among the most important concerns for the communities that would be affected by the mine. It is therefore essential that the FEIS fully disclose potential impacts to subsistence in a straightforward way and explain how the information presented is consistent with the conclusions of other federal agencies. For the reasons discussed below, the DEIS fails to do so.

I. THE DEIS FAILS TO EXPLAIN THE APPARENT DISCREPANCY BETWEEN ITS ASSESSMENT OF SUBSISTENCE IMPACTS AND BLM'S FINDINGS UNDER ANILCA SECTION 810(A).

SUB 21 NEPA regulations require that agencies "make every effort to disclose and discuss at appropriate points in the [DEIS] all major points of view on the environmental impacts of the alternatives."[101] They further instruct that agencies "shall discuss at appropriate points in the [FEIS] any responsible opposing view which was not adequately discussed in the [DEIS] and shall indicate the agency's response to the issues raised."[102] If an FEIS fails to disclose and respond to expert opinions contradicting its conclusions, it may be held invalid.[103]

Confusingly, the Corps presents two separate subsistence analyses—its own, in the body of the DEIS, and BLM's, in an appendix—without explaining their relationship to each other and without synthesizing their conclusions. The DEIS lays out the three types of impacts BLM considers when ascertaining whether a project may significantly restrict subsistence uses under Section 810(a) of ANILCA,[104] and the DEIS follows this scheme in assessing potential impacts.[105] Yet it fails to anticipate BLM's conclusions or reconcile its rating of impacts as mostly minor[106] with BLM's finding of significant restriction. The FEIS should acknowledge this apparent discrepancy and explain how the Corps and BLM can reach seemingly inconsistent conclusions as to subsistence impacts.

[101] 40 C.F.R. § 1502.9(a).
[102] *Id.* § 1502.9(b).
[103] *See, e.g.*, *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1167-68 (9th Cir. 2003).
[104] *See* DEIS at 3.21-127.
[105] *See, e.g.*, *id.* at 3.21-138 to 3.21-148 (using headings reflecting the types of impacts BLM considers).
[106] *See id.* at 3.21-183 to 3.21-185, Tbl. 3.21-23.

## II. THE DEIS DOES NOT ADEQUATELY DISCUSS THE PROJECT'S IMPACTS ON SUBSISTENCE.

The DEIS's discussion of the project's impacts on subsistence is inadequate for at least three reasons. First, it omits information relevant to current subsistence activities in the Kuskokwim River watershed without satisfactorily explaining those omissions. Second, it gives short shrift to potential consequences for subsistence of the transportation and pipeline components of the project. Third, it skews the analysis of potential subsistence impacts by overemphasizing the potential benefits of the project.

### A. The DEIS omits information about current subsistence activities without a satisfactory explanation.

NEPA requires that agencies "succinctly describe the environment of the area(s) to be affected . . . by the alternatives under consideration."[107] The descriptions should be long enough to allow the reader to understand the effects of the alternatives.[108]

SUB 4

In discussing areas that may experience subsistence impacts, the Corps has chosen to use profiles of selected communities in the region,[109] but it also presents harvest data from other, non-representative communities.[110] The DEIS acknowledges that no community harvest data are available for Telida or Medfra[111]; it omits similar data for Georgetown and Napaimute even though those communities were apparently surveyed[112]; and it states that data on the subsistence practices of Atmautluak and Kasigluk are unavailable.[113] It also relies on studies that used different methodologies to estimate community harvest levels without fully explaining what those differences are or why they exist.[114] The lack of this baseline data, as well as undisclosed

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[107] 40 C.F.R. § 1502.15.
[108] *See id.*
[109] *See* DEIS at 3.21-15. Such an approach may be permissible when describing aspects of the environment within a particular area. *See W. Watersheds Project v. BLM*, 552 F. Supp. 2d 1113, 1128 (D. Nev. 2008) (concluding that the agency could use a representative species when describing a land-management district). It is questionable, however, whether the Corps may limit its description to only some areas, as the regulations specifically contemplate that agencies may need to describe multiple affected areas. *See* 40 C.F.R. § 1502.15.
[110] *See* DEIS at 3.21-18 to 3.21-20, Tbl. 3.21-1 (upper Kuskokwim subregion); *id.* at 3.21-29 to 3.21-31, Tbl. 3.21-3 (central Kuskokwim subregion); *id.* at 3.21-67 to 3.21-69, Tbl. 3.21-9 (lower-middle Kuskokwim subregion); *id.* at 3.21-80 to 3.21-82, Tbl. 3.21-12 (lower Kuskokwim subregion).
[111] *See id.* at 3.21-18.
[112] *See id.* at 3.21-28.
[113] *Id.* at 3.21-66.
[114] *See id.* at 3.21-16.

SUB 4 inconsistencies in collection methods,[115] raises questions about the completeness of the DEIS's discussion of potential impacts on subsistence.[116]

B. The DEIS omits information essential to a reasoned choice among the alternatives.

Once agencies have described the environment affected, they must thoroughly discuss the potential consequences of the proposed action and alternatives.[117] Where information relevant to reasonably foreseeable significant adverse impacts is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," agencies must include that information in the EIS.[118] If the information cannot be obtained, agencies must note that the information is incomplete or unavailable, explain its relevance, summarize existing credible scientific evidence, and evaluate impacts based on theoretical approaches or research methods
SUB 4 generally accepted in the scientific community.[119]

Essential information about the potential subsistence impacts of the project's transportation and pipeline components is missing from the DEIS. It notes that "there is no formal scientific research for the Kuskokwim River" on disturbance of terrestrial mammals by barge traffic,[120] instead relying on conflicting anecdotal evidence[121] to conclude that impacts would be of low intensity "with the effect that subsistence hunters may not see animals for some time following a barge passage, and may be displaced to alternative portions of their use area."[122] The DEIS similarly does not discuss the potential behavioral disturbance in fish that may result from increased barge traffic.[123] It fails to note potential disruptions to subsistence activities[124] from pipeline-construction activities such as airplane and helicopter traffic.[125] Given that moose,

[115] Agencies are required to "identify any methodologies used" in preparing an EIS. 40 C.F.R. § 1502.24. The Corps has not fully satisfied this requirement here.
[116] *Cf. Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 866 (9th Cir. 2004) (opining that an assessment of adverse impacts, based in part on a faulty assumption about existing operating conditions, "does not inspire any confidence that the Corps took the hard look that [courts] require").
[117] *See* 40 C.F.R. § 1502.16.
[118] *Id.* § 1502.22(a).
[119] *Id.* § 1502.22(b).
[120] DEIS at 3.21-155.
[121] *Id.*
[122] *Id.* at 3.21-157; *see also id.* at 3.21-166 ("Local residents have expressed differing opinions about the effect of increased barge traffic on moose in the riparian environment, and therefore on potential displacement of their moose hunting in this zone as they have done historically.").
[123] *See id.* at 3.21-156 (noting that behavioral disturbance as a potential subsistence impacts but not discussing); *see also id.* at 3.13-130 to 3.13-153 (discussing behavioral disturbance such as avoidance behavior only from elevated turbidity levels).
[124] *See id.* at 3.21-169.
[125] *See id.* at 3.12-44.

other large terrestrial mammals, and Chinook salmon are important subsistence resources,[126] information about these animals' responses to disturbance is essential to a reasoned choice among the alternatives. The Corps must either include this information in the FEIS or make the unobtainability findings NEPA requires.[127]

The DEIS also relies heavily on anecdotal evidence of potential socio-cultural impacts on subsistence.[128] While the use of such evidence may be permissible in certain situations, the information must be "sufficient to sharply define the issues and provide a clear basis for choice among options."[129] Furthermore, agencies should "make explicit reference . . . to the scientific and other sources relied upon for conclusions in [an EIS]."[130] The Corps assessed potential socio-cultural issues partly based on unidentified "Alaska studies of subsistence" and "international studies of mine impacts on indigenous people (especially in Canada)."[131] Other sources include workshops and interviews of local residents.[132] The result is a collection of widely divergent views on topics such as changes in population, cultural composition of communities, and employment and income.[133] These predictions about the socio-cultural effects of the project on subsistence are not grounded in social science and do not provide a clear basis for a choice among alternatives.

SUB 4

C. The DEIS fails to present an accurate picture of subsistence impacts because it overemphasizes the potential benefits of the project and minimizes harmful effects.

"Under NEPA, agencies must disclose both positive and negative anticipated impacts of a proposed action."[134] An EIS may be held invalid, however, if it improperly skews the analysis in favor of beneficial effects.[135] Here, the Corps places too much weight on the ways in which the project could improve subsistence, while minimizing or ignoring potential harms.

SUB 12

The DEIS frequently highlights the expected benefits of the project for subsistence, simultaneously downplaying serious concerns about possible harms. For example, it notes that:

[126] *Id.* at 3.12-46, 3.21-156, 3.21-157, 3.21-166.
[127] *See* 40 C.F.R. § 1502.22.
[128] *See* DEIS at 3.21-128.
[129] *Citizens' Comm. to Save Our Canyons v. Krueger*, 513 F.3d 1169, 1180 (10th Cir. 2008).
[130] 40 C.F.R. § 1502.24; *see also Nat'l Audubon Soc'y v. Dep't of the Navy*, 422 F.3d 174, (4th Cir. 2005) (citing this provision for the proposition that "NEPA demands more than 'anecdotal evidence.'").
[131] DEIS at 3.21-128.
[132] *See id.*
[133] *See id.* at 3.21-128 to 3.21-134.
[134] *W. Watersheds Project v. BLM*, 971 F. Supp. 2d 957, 974 (E.D. Cal. 2013).
[135] *Cf. Laguna Greenbelt, Inc. v. U.S. Dep't of Transp.*, 42 F.3d 517, 528-29 (9th Cir. 1994) (holding that an EIS that presented both positive and negative effects in a consistent way did not violate NEPA).

- Although dust emissions from construction and operation of the mine could be deposited on berries, most berry picking takes place elsewhere.[136] BLM, however, notes that "[a]reas important to Crooked Creek for berry picking would be directly affected by the mine, and adjacent areas would potentially be contaminated with dust emissions containing various particulate materials from ore processing, maintaining haul roads and access roads."[137]

- The mine site could have major effects on fish and aquatic resources in the Crooked Creek drainage, but "Getmuna Creek and Bell Creek and the lower reaches of Crooked Creek, where most salmon escapement and production in the drainage occurs, would experience negligible impacts."[138] While direct impacts on fish in larger water bodies might be unnoticeable, discharges from the mine could alter aquatic food webs there and "affect salmon and resident fish populations important to subsistence."[139]

- Closure and reclamation of the mine site would have *positive* effects on habitat and wildlife because previously disturbed areas would return to their natural states and the contaminated pit lake "would become a new area of standing water that could attract wildlife and migratory birds."[140] BLM's analysis presents a more sobering picture: "After mine closure, the pit lake would fill with untreated water (containing mine site reagents, traces of sodium cyanide, traces of mercury suppressant and insoluble sulfide-mercury particles, autoclave discharge, and human waste) that could be toxic to fish and wildlife."[141]

SUB 12

- Although out-migration due to employment at the mine was "of considerable concern" to interview respondents and "generated a wide variety of responses," some respondents thought that good jobs would lead residents to stay, others said the outcome would depend on the person and the situation, and "fewer respondents were willing to predict that people would simply leave." Only a positive response is quoted, skewing the discussion of this vital issue.[142]

- The habitat and subsistence areas affected by the mine access road, airstrip, and port site would be relatively small.[143] Regardless of the relative proportions of subsistence areas affected, however, BLM observes that many villages could face consequences, from Crooked Creek to the mouth of the Kuskokwim River.[144]

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[136] DEIS at 3.21-139.
[137] *Id.* App. N at 10-11.
[138] *Id.* at 3.21-140.
[139] *Id.* App. N at 11.
[140] *Id.* at 3.21-141.
[141] *Id.* App. N at 11.
[142] *See id.* at 3.21-150.
[143] *Id.* at 3.21-155; *id.* at 3.21-156.
[144] *Id.* App. N at 11.

- The parts of subsistence areas affected by the pipeline would also be relatively small, and wintertime construction would allow access to subsistence resources.[145] Again, however, BLM notes that construction and operation of the pipeline could affect subsistence in numerous villages.[146] It concludes that construction activities "would cause a redistribution of moose, caribou and furbearers, and affect access to subsistence use areas and availability of subsistence resources."[147]

SUB 12 The one-sidedness of the discussion of subsistence impacts in the DEIS—in stark contrast to BLM's analysis under ANILCA Section 810(a)—does not serve NEPA's purpose of facilitating a reasoned choice among alternatives, including the no-action alternative.

The DEIS also completely ignores the potential long-term effects of the mine access road on competition for scarce subsistence resources. It characterizes the effect of transportation facilities on competition for subsistence resources as low-intensity because most of the construction workforce would be local residents, and non-local workers would likely move out of the region once facilities are constructed.[148] Yet it does not discuss how the mine access road, which is expected to remain in place post-closure for reclamation and monitoring,[149] could increase competition. This is a key omission, as local residents in the vicinity of the *pipeline* expressed "major concern" that construction-related infrastructure would "enhance[] opportunities for non-locals to access the area."[150] The Corps should address the same potential increase in competition from the mine access road.

## III. BLM'S CONCLUSIONS UNDER ANILCA SECTION 810(A) ARE JUSTIFIED AND WOULD NOT WARRANT GRANTING A RIGHT-OF-WAY WITHOUT FURTHER ANALYSIS.

SUB 21 In its preliminary analysis of subsistence impacts under Section 810(a) of ANILCA,[151] BLM found that each of the alternatives discussed in the DEIS could significantly restrict subsistence.[152] Through ANILCA, Congress intended to "provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so."[153] BLM's preliminary analysis largely comports with that purpose. Given the subsistence impacts disclosed in the DEIS, however, further assessment of subsistence impacts would be needed to make the determinations necessary before granting a right-of-way.

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[145] *See id.* at 3.21-179.
[146] *See id.* App. N at 11.
[147] *Id.*
[148] *See id.* at 3.21-167 to 3.21-168.
[149] *See* DEIS at 3.21-157; *see also id.* at 3.21-167 (noting a potential positive effect on access to subsistence resources from local use of the mine access road).
[150] *Id.* at 3.21-179.
[151] 16 U.S.C. § 3120(a).
[152] *See* DEIS App. N at 14 (Alternative 2), 16-17 (Alternative 3A), 19 (Alternative 3B), 21 (Alternative 4), 22 (Alternative 5A), 23 (Alternative 6A), 24 (the cumulative case).
[153] 16 U.S.C. § 3101(c).

A. BLM's evaluations and findings under ANILCA Section 810(a) are legally sound and well supported.

*1. Evaluations*

ANILCA requires that federal agencies, before permitting any use, occupancy, or disposition of public lands, evaluate (1) its effect on subsistence uses and needs; (2) the availability of other lands for the purposes sought to be achieved; and (3) other alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes.[154] Evaluations (2) and (3) are especially important because, unlike evaluation (1), they are not reflected in other findings. "ANILCA require[s] [agencies] to consider reasonable alternatives to a proposed action."[155] BLM's preliminary analysis likely satisfies the statute in these respects, but it would benefit from additional information in the FEIS.

Regarding the availability of other lands, approximately 31 percent of the proposed pipeline right-of-way would be located on BLM-managed lands, in discontinuous segments from milepost (MP) 168 to MP 310.[156] BLM notes that the right-of-way was selected to optimize economic and environmental considerations such as length and avoidance of hazards, wetlands, the INHT, and Alaska Native allotments.[157] Yet "[n]o detailed analysis of alternative routes to avoid BLM-management lands is available."[158] Along these lines, the agency observes that non-BLM-managed lands are potentially available within 5 miles of the pipeline from MP 169 to MP 204, but that geotechnical and wetlands analyses for these areas are lacking.[159] Additional information about the feasibility and environmental consequences of routes through these non-federal lands in the FEIS could bolster BLM's analysis under ANILCA Section 810(a). Ultimately, however, the pipeline will likely have to cross at least some BLM-managed lands.[160]

PAA 15

The third evaluation calls for an analysis of alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes.[161] BLM does not specifically discuss any such alternatives, instead generally referring to the section of the DEIS that lists alternatives not carried forward for analysis.[162] Whether or not this treatment is adequate under ANILCA, its brevity is understandable given the dearth of analysis of non-pipeline alternatives in the DEIS. For example, the DEIS lists an option in which the mine's ore throughput would be reduced to

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[154] *Id.* § 3120(a).
[155] *Alaska Wilderness Recreation Tourism Ass'n v. Morrison*, 67 F.3d 723, 731 (9th Cir. 1995) (citation omitted).
[156] DEIS App. N at 13.
[157] *Id.* App. N at 14.
[158] *Id.*
[159] *Id.*
[160] *See id.*
[161] 16 U.S.C. § 3120(a).
[162] *See* DEIS App. N at 14.

30,000 tons per day, making construction of the pipeline uneconomic.[163] Despite the additional benefits of a longer, more-constant period of employment in the region, the DEIS eliminates the
PAA 15 alternative due to increased diesel barging.[164] Without a more detailed discussion of impacts of this and other non-pipeline options, it is unclear why the Corps rejected them.[165] To satisfy NEPA and facilitate the ANILCA evaluations, the Corps should provide a more detailed discussion of non-pipeline options in the FEIS and fully explain the reasons for not carrying them forward as alternatives.

*2. Findings*

ANILCA also prohibits agencies from permitting any use of public lands that would "significantly restrict subsistence uses" without first following certain procedures and making
SUB 21 specific determinations.[166] To ascertain whether a significant restriction would result from a use of public lands, BLM considers (1) reduction in the availability of subsistence resources caused by a decline in the population or abundance of harvestable resources; (2) reduction in the availability of subsistence resources caused by alteration of their distribution, migration patterns,

[163] *Id.* App. C at C-43, Tbl. C-7.

[164] *Id.* Similarly, the DEIS rejects an option generally to eliminate the pipeline because the resultant higher level of barging "is considered infeasible." *Id.* App. C at C-79, Tbl. C-22. A memorandum by URS dated January 6, 2014 concludes that a reduced-throughput alternative without a pipeline would be logistically feasible, although it "does not appear to present opportunities for impact reduction." Memorandum from T. Brelsford & B. Craig, URS, to D. Kuhle & K. Gordon, U.S. Army Corps of Engineers at 4 (Jan. 6, 2014). A responding memorandum by Northern Economics states that "the reduced mill throughput option without a natural gas pipeline would not justify a decision to construct the mine," based on experience at other mines. Memorandum from P. Burden, Northern Economics, to T. Brelsford & B. Craig, URS at 3 (Feb. 3, 2014). The Corps should acknowledge and resolve these differences of opinion if it insists on not carrying forward a reduced-throughput option in the FEIS.

[165] *Cf. 'Ilio'ulaokalani Coal. v. Rumsfeld*, 464 F.3d 1083, 1095, 1098 (9th Cir. 2006) (noting that "[t]he existence of reasonable but unexamined alternatives renders an EIS inadequate," and that the Army's decision not to consider conducting activities outside Hawaii "was never explained or justified and foreclosed alternatives that could have been consistent with the Army's stated mission"). In an October 30, 2013 letter, Donlin Gold urged the Corps to reverse its initial decision to analyze the reduced-throughput option as an alternative in the DEIS. *See* Letter from R. Enos, Environmental and Permitting Manager, Donlin Gold, to D. Kuhle, U.S. Army Corps of Engineers at 1 (Oct. 30, 2013). The letter points out that a lower-throughput option would not provide maximum economic benefits to the landowners and mineral rights owners, consistently with the purpose and need of the proposal. *Id.* at 2. The Corps has since acknowledged that the purpose and need statement, *see* DEIS at 1-9, should not have included private economic benefits to Donlin Gold and Native Corporation shareholders. Furthermore, the Corps' decision whether to carry forward an alternative for analysis should not depend on the degree of profitability for the project proponent.

[166] 16 U.S.C. § 3120(a).

or location; and (3) limitations on access to subsistence resources.[167] BLM's use of these three considerations is legally permissible, and the agency may reserve a "no significance" finding for situations where there would be no reductions or only slight reductions of resources or access.[168] Furthermore, BLM correctly relied on information in the DEIS in conducting its analysis under ANILCA Section 810(a).[169] It properly considered cumulative impacts[170] from other activities in the region and does not limit its analysis to pipeline impacts.[171]

BLM concludes in its preliminary analysis that the proposed action could significantly restrict subsistence near the mine site, along the Kuskokwim River, and adjacent to the pipeline right-of-way.[172] The following effects contributed to that finding, and, as noted, each is supported by information in the DEIS:

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- Mine activities, including ore trucks in the mine, trucks on the port road, drilling, blasting, power generation, and port-site activity, would likely change the distribution of wildlife species important to subsistence, such as moose, caribou, and furbearers.[173]

- Areas important to Crooked Creek for berry picking would be affected by the mine, with adjacent areas potentially being contaminated by dust emissions.[174]

- Water released from the mine during operations could affect salmon and resident fish populations important to subsistence and alter the aquatic food web in Crooked Creek and the Kuskokwim River.[175]

- Post-closure, runoff from the tailings storage facility and the pit lake could contaminate fish resources important to subsistence in Crooked Creek and the Kuskokwim River.[176]

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[167] DEIS App. N at 2.
[168] *See Kunaknana v. Clark*, 742 F.2d 1145, 1151-52 (9th Cir. 1984).
[169] *Cf. Alaska Wilderness Recreation & Tourism Ass'n*, 67 F.3d at 731 (faulting agency for failing to reconsider alternatives in an EIS in order to satisfy both NEPA and ANILCA).
[170] *Cf. Te-Moak Tribe of W. Shoshone of Nev. v. U.S. Dep't of the Interior*, 608 F.3d 592, 602 (9th Cir. 2010) ("NEPA requires that where several actions have a cumulative environmental effect, this consequence must be considered in an EIS." (internal quotation marks and citations omitted)).
[171] *Cf. Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 895 (9th Cir. 2002) (concluding that the agency had not impermissibly segmented NEPA review of an action so as to minimize environmental consequences).
[172] *See* DEIS App. N at 14.
[173] *Id.* App. N at 10; *see also id.* at 3.21-138 to 3.21-139.
[174] *Id.* App. N at 10; *see also id.* at 3.21-139.
[175] *Id.* App. N at 11; *see also id.* at 3.13-89.
[176] *Id.* App. N at 11; *see also id.* at 3.7-156 to 3.7-160; *id.* at 3.13-90.

- During pipeline construction, clearing of the right-of-way, trenching, drilling, and other disturbances would cause a redistribution of moose, caribou, and furbearers and limit access to and availability of subsistence resources.[177]

- During operations, the Farewell airstrip could increase competition for subsistence resources.[178]

- Barging on the Kuskokwim River would interfere with subsistence fishing and harm salmon and resident fish populations.[179]

- A release of diesel fuel from a barge would affect fish and water birds on the Kuskokwim River—including Chinook salmon and migratory birds—and would have major impacts on subsistence resources.[180]

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- A release of cyanide from a barge would kill all organisms used for subsistence at very low concentrations and could have major effects on the aquatic ecosystem.[181]

- A release of mercury from a barge would increase the chronic exposure of fish and other aquatic organisms.[182]

- A partial tailings dam failure would reduce access to subsistence resources and contaminate fish and wildlife habitat.[183]

Both individually and collectively, these impacts support a finding that the project "may significantly affect" subsistence uses.[184]

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[177] *Id.* App. N at 11; *see also id.* at 3.21-169 to 3.21-179.
[178] *Id.* App. N at 11; *see also id.* at 3.21-179 to 3.21-180.
[179] *Id.* App. N at 11; *see also id.* 3.21-155 to 3.21-157; *id.* at 3.21-159 to 3.21-167.
[180] *Id.* App. N at 12; *see also id.* at 3.24-195.
[181] *Id.* App. N at 13; *see also id.* at 3.24-195 to 3.24-196.
[182] *Id.* App. N at 13; *see also id.* at 3.24-196.
[183] *Id.* App. N at 13; *see also id.* at 3.24-197.
[184] The findings for the other action alternatives are also based on information in the DEIS. *Compare id.* App. N at 16 (discussing liquefied natural gas release under Alternative 3A), *id.* App. N at 17-18 (discussing diesel releases from the pipeline and barges under Alternative 3B), *id.* App. N at 20 (discussing the extended mine access road under Alternative 4), *id.* App. N at 23 (discussing cumulative effects), *with id.* at 3.24-198 (discussing liquefied natural gas release under Alternative 3A), *id.* at 3.24-198 to 3.24-199 (discussing diesel releases from the pipeline and barges under Alternative 3B), *id.* at 3.21-190 (discussing the extended mine access road under Alternative 4), *id.* at 4-51 to 4-52 (discussing cumulative effects).

B. The DEIS does not support the determinations that BLM must make under ANILCA Section 810(a) in order to grant a right-of-way.

Once BLM finds that a right-of-way over public lands could significantly restrict subsistence uses, the right-of-way may be granted only if the agency determines that: (a) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands; (b) the right-of-way will involve the minimal amount of public lands necessary to accomplish the purposes of the right-of-way; and (c) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from the right-of-way.[185] For the reasons discussed below, the information presented in the DEIS does not support any of these findings.

*1. Necessary*

When deciding whether a particular use of public lands is "necessary, consistent with sound management principles for the utilization of public lands,"[186] agencies must follow policy directives established in their organic statutes.[187] The Federal Land Policy and Management Act requires BLM to "manage the public lands under principles of multiple use and sustained yield, in accordance with . . . land use plans."[188] Land use plans, in turn, must "use and observe the principles of multiple use and sustained yield" and "give priority to the designation and protection of areas of critical environmental concern."[189] These principles will therefore govern BLM's determination whether a right-of-way over public lands for the pipeline is "necessary" under ANILCA.

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The pipeline would traverse BLM's Ring of Fire and Southwest planning areas.[190] The agency's management plan for the Ring of Fire planning area allows rights-of-way for gas pipelines, with stipulations for "[c]ontrol or prevention of damage to the environment" and "[p]rotection of subsistence resources and the user's access to those resources."[191] It identifies an overall goal of "[p]rovid[ing] a balance between land use (Rights-of-Way, permits, leases and sales) and resource protection which best serves the public at large."[192] The management plan for the Southwest planning area allows rights-of-way "on a case-by-case basis."[193]

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[185] *See* 16 U.S.C. § 3120(a)(3).
[186] *Id.* § 3120(a)(3)(A).
[187] *See Hoonah Indian Ass'n v. Morrison*, 170 F.3d 1223, 1227 (9th Cir. 1999).
[188] 43 U.S.C. § 1732(a).
[189] *Id.* § 1712(c)(1), (3).
[190] *See* DEIS at 1-11 to 1-12.
[191] *See id.* at 1-11; *see also* Bureau of Land Management (BLM), Ring of Fire Approved Plan at 12 (Mar. 2008) (Ring of Fire RMP).
[192] Ring of Fire RMP at 7.
[193] *See* DEIS at 1-12; *see also* BLM, Management Framework Plan: Southwest Planning Area at 19 (Nov. 1981) (Southwest MFP).

The management plan for the Southwest planning area designates the Kuskokwim River area as an area of critical environmental concern because of its importance as nesting habitat for bald eagles, golden eagles, osprey, and gyrfalcons.[194] The DEIS notes that bald and golden eagle nests were found along the proposed pipeline corridor, and that power lines pose a threat of electrocution, but it does not discuss other impacts on these species, or osprey and gyrfalcons.[195] BLM is also considering designating an area of critical concern in lands currently managed under the Southwest plan where sheefish spawn.[196] Sheefish are an important subsistence resource for several communities in the region, and some have reported that they are already becoming scarce.[197] BLM notes that "[s]heefish spawning grounds have very specific needs and occur in small numbers on the Kuskokwim River. . . . Because of this, the habitat in and around the existing spawning grounds needs to be protected, to allow for future productivity of the species."[198] It concludes that "[a]ny disturbance of this area could impact the sheefish population on the entire Kuskokwim River,"[199] and that "[a]n impact to this spawning habitat could severely affect sheefish spawning leading to a decline in sheefish spawning success and survival throughout the Kuskokwim River."[200] The DEIS suggests that wintertime construction of the pipeline could harm sheefish eggs but does not describe the potential effects in any depth.[201] Nor does it depict whitefish harvest locations for McGrath, Nikolai, and Takotna, presenting only salmon harvest locations.[202] These data might be relevant to BLM's determination whether the use of public lands for the pipeline is consistent with sound management principles.

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In sum, a number of environmental considerations will factor into BLM's determination whether a right-of-way is "necessary, consistent with sound management principles" under ANCILA. The DEIS does not provide sufficient information for BLM to conclude that it is.

*2. Minimal amount of public lands*

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BLM also cannot grant a right-of-way unless it determines that that use will involve the minimal amount of public lands necessary to accomplish its purposes.[203] The focus is on minimizing the area of public lands needed to achieve the goals of the use, rather than

[194] Southwest MFP at 2.
[195] *See* DEIS at 3.12-159 to 3.12-160.
[196] *See* BLM, Bering Sea – Western Interior Resource Management Plan: Areas of Critical Environmental Concern: Report on the Application of the Relevance and Importance Criteria at 33-38 (Apr. 2015) (BSWI ACEC Report).
[197] *See* J. M. Van Lanen, D. Runfola & D. Koster, Whitefish Trends on the Upper Kuskokwim River: Ethnographic Overview and 2012-2013 Nonsalmon Fish Harvests, Nikolai and Lime Village, Alaska at 34, Fig. 3-4, 47, 49, 103, Fig. 4-5, 109, Fig. 4-7, 131, Fig. 4-15 (2015).
[198] BSWI ACEC Report at 33.
[199] *Id.* at 34.
[200] *Id.* at 37.
[201] *See* DEIS at 3.13-161.
[202] *See id.* at 3.21-173, Fig. 3.21-61.
[203] *See* 16 U.S.C. § 3120(a)(3)(B).

minimizing impacts on subsistence.[204] Although it is not apparent from the face of the statute, agencies must balance land-management objectives when making this determination; they need not reject all but the smallest use.[205]

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The DEIS does not evaluate in detail alternative pipeline routes that would avoid public lands, although BLM has identified a few possibilities.[206] Without additional analysis of alternative routes, BLM cannot reasonably determine that the proposed pipeline uses the minimum amount of public lands necessary to accomplish its purposes.

*3. Reasonable steps to minimize adverse impacts*

ANILCA requires that BLM deny rights-of-way across public lands unless reasonable steps will be taken to minimize subsistence impacts that result from that use.[207] The DEIS lists several measures that would reduce the project's adverse effects on subsistence, including a no-

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hunting policy for employees at work sites, public communication programs about construction activities and barge traffic, and design features such as double-hulled barges.[208] It also notes standard permit conditions and best management practices that could reduce impacts to subsistence, though such plans have yet to be developed.[209] The Corps, together with BLM, should develop a much more rigorous set of requirements to minimize subsistence impacts before BLM makes the determinations necessary for a right-of-way to be granted.

WETLANDS

Wetlands provide a number of important ecological functions and values.[210] These functions and values include fish and wildlife habitat, water quality improvement, flood storage, and many other benefits.[211] It is therefore critical that the DEIS present a full picture of the project's potential impacts on wetlands and related aquatic ecosystems, one which will enable the Corps to fulfill its obligations under Section 404 of the Clean Water Act. For the reasons discussed below, the DEIS fails to do so.

[204] *See Hoonah Indian Ass'n*, 170 F.3d at 1229-30.
[205] *See id.* at 1229.
[206] *See* DEIS App. N at 14.
[207] *See* 16 U.S.C. § 3120(a)(3)(C).
[208] DEIS at 3.21-182.
[209] *See id.*
[210] *See generally* EPA, Wetland Functions and Values, https://www.epa.gov/sites/production/files/2016-02/documents/wetlandfunctionsvalues.pdf.
[211] *Id.* at 2.

I. THE DEIS DOES NOT ADEQUATELY DISCUSS THE PROJECT'S IMPACTS ON WETLANDS.

NEPA requires that environmental impact statements (EISs) discuss, in detail, the environmental impacts of both the proposed action and alternatives.[212] The description of environmental consequences "forms the scientific and analytic basis for the comparisons" of alternatives,[213] and a decision may be ruled invalid where the EIS supporting it does not present a sufficiently detailed statement of environmental impacts and alternatives.[214] The DEIS's discussion of the project's impacts on wetlands falls short in several regards.

CWA 5

The Corps relies on Donlin Gold's assessment of wetlands functions, putting off its own assessment until the FEIS has been published.[215] This reliance is misplaced, given that the Corps has recognized that Donlin Gold's methodology is not intended for use in Alaska.[216] The Corps has also deferred functional assessment of wetlands for Alternative 4, which will be performed "if the alternative is carried forward for analysis in the Final EIS."[217] Presenting key information about an alternative for the first time in the FEIS does not serve the purposes of NEPA.[218]

The DEIS also ignores certain wetlands impacts because of a lack of data. For example, under Alternative 3B, the DEIS depicts as unknown wetland classifications in much of the area adjacent to the diesel pipeline segment near Tyonek.[219] That information could be important to assessing the pipeline's effects on estuaries there.[220] Similarly, the DEIS does not attempt to quantify the indirect wetlands impacts of Alternative 5A, which includes the dry-stack tailings facility; instead, it simply lists the impacts as greater than those of the preferred alternative.[221] Wetland mapping of the Dalzell Gorge pipeline route under Alternative 6A did not include camps, access roads, airstrips, and material sites used during construction because siting information is unavailable.[222] And, for all alternatives, the DEIS omits the long-term effects on wetlands of a lower equilibrium groundwater level at the mine site post-closure due to a lack of detail in the model.[223] If incomplete information relevant to reasonably foreseeable significant

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[212] 42 C.F.R. § 4332(2)(C)(i), (iii); 40 C.F.R. § 1502.16(d).
[213] 40 C.F.R. § 1502.16(d).
[214] *See Lands Council v. Powell*, 395 F.3d 1019, 1027 (9th Cir. 2004).
[215] *See* DEIS at 3.11-7.
[216] *See id.* App. M at 5.
[217] *Id.* at 3.11-5.
[218] *See Lands Council*, 395 F.3d at 1027 ("Congress wanted each federal agency spearheading a major federal project to put on the table, for the deciding agency's and for the public's view, a sufficiently detailed statement of environmental impacts and alternatives so as to permit informed decision making.").
[219] *See* DEIS at 3.11-51, Fig. 3.11-13H.
[220] *See id.* at 3.11-124.
[221] *See id.* at 3.11-147, Tbl. 3.11-58; *see also id.* at 3.11-138 (noting simply that "[p]otential indirect effects from fugitive dust could be increased during operations under Alternative 5A").
[222] *See id.* at 3.11-141.
[223] *See id.* at 3.11-73.

adverse impacts is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the Corps must include that information in the EIS.[224] The omissions identified above are significant, and the Corps has not adequately evaluated such impacts using alternative methods.[225]

CWA 5 It is also unclear from the DEIS how many acres of wetlands will be affected. The Corps acknowledges that it has required Donlin Gold to use a different methodology than the company originally used to determine the extent of the project's impacts on wetlands and other waters of the United States.[226] Thus, the acreage is "expected to drop" from about 10,000 acres to about 7,000 acres.[227] Although the text of the DEIS appears to use the lower number,[228] Donlin Gold's proposed compensatory mitigation plan in Appendix M confusingly assumes wetlands impacts are still closer to 10,000 acres.[229] Depending on the number of acres and the significance of the projected impacts under the new methodology, the additional analysis may be necessary before the Corps renders a permitting decision.[230]

## II. THE DEIS DOES NOT EXPLAIN HOW THE PROPOSED FILLING OF WETLANDS WOULD BE CONSISTENT WITH GUIDELINES ESTABLISHED UNDER THE CLEAN WATER ACT.

The Clean Water Act limits the Corps' authority to issue permits for the discharge of fill material into wetlands.[231] Specifically, Section 404(b)(1) of the Clean Water Act requires the

CWA 4 Corps to apply guidelines established by EPA to restore and maintain the integrity of aquatic ecosystems.[232] The Corps' regulations state that a permit will be denied if the proposed discharge would not comply with the 404(b)(1) guidelines.[233]

Under these guidelines, "degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts."[234] Discharging fill material in wetlands often destroys habitat and vegetation, degrades water

[224] 40 C.F.R. § 1502.22(a).
[225] *See id.* § 1502.22(b).
[226] *See* DEIS App. J, Reader Letter; *see also id.* App. M at 5.
[227] *See id.* App. J, Reader Letter.
[228] *See id.* at 3.11-58, Tbl. 3.11-14 (indicating a wetlands impact area of 6,966.7 acres).
[229] *See id.* App. M. at 9, Tbl. 3-3 (listing wetlands impacts as 9,757.9 acres).
[230] *See* 40 C.F.R. § 1502.9(c)(1)(ii) (requiring a supplemental EIS if there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts").
[231] *See* 33 U.S.C. § 1344(a), (b), (d); *see also id.* § 1362(7) (defining "navigable waters" as "waters of the United States"); 33 C.F.R. § 328.3(a)(1), (5), (6) (defining "waters of the United States" to include waters that may be used in interstate commerce, tributaries of such waters, and wetlands adjacent to those tributaries and waters).
[232] *See* 33 U.S.C. § 1344(b)(1); 40 C.F.R. § 230.1(a).
[233] 33 C.F.R. § 323.6(a).
[234] 40 C.F.R. § 230.1(d).

quality, and diminishes wetlands' capacity to store floodwater and shield upland areas from erosion.[235] "Fundamental to [the 404(b)(1)] Guidelines is the precept that . . . fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact."[236]

CWA 4 Discharging fill material into wetlands violates the 404(b)(1) guidelines when (1) there is a practicable alternative that would have less adverse effect on wetlands; (2) the proposed filling would significantly degrade the aquatic ecosystem; or (3) the proposed filling does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem.[237] In applying these criteria, the Corps must make detailed factual determinations as to the potential environmental effects of the proposed filling,[238] and it must indicate whether the project complies with the 404(b)(1) guidelines in the record of decision based on the FEIS.[239] For the reasons discussed below, the analysis contained in the DEIS fails to demonstrate that the proposed filling would comply with the 404(b)(1) guidelines.

A. <u>The DEIS does not indicate whether or how the proposed action is the least environmentally damaging practicable alternative (LEDPA).</u>

The 404(b)(1) guidelines prohibit filling of wetlands and other aquatic ecosystems "if there is a practicable alternative to the proposed discharge which would have less adverse impact."[240] An alternative is practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."[241]

CWA 4 Where the activity in question does not require access or proximity to special aquatic sites such as wetlands, practicable alternatives that would not affect such sites—and therefore would be less harmful—are presumed to be available unless clearly demonstrated otherwise.[242] Under standard operating procedures, the Corps analyzes alternatives under the 404(b)(1) guidelines as part of its discussion of alternatives in an EIS.[243]

The Corps has not explicitly proposed a finding that Alternative 2 would be the least environmentally damaging practicable alternative (LEDPA). On the contrary, it has determined

[235] *Id.* § 230.41(b).
[236] *Id.* § 230.1(c).
[237] *See id.* § 230.12(a)(3)(i)-(iii).
[238] *See id.* §§ 230.11, 230.12(b).
[239] *See* 33 C.F.R. § 325.2(a)(6); *see also* DEIS at 1-13. Although the DEIS suggests that its analysis of compliance with the 404(b)(1) guidelines will be "in addition to the Final EIS," DEIS at 1-13, it elsewhere notes that the alternatives discussed in the DEIS were developed in part to "assure compliance with the requirements of the 404(b)(1) Guidelines," *id.* at 2-1.
[240] 40 C.F.R. § 230.10(a).
[241] *Id.* § 230.10(a)(2).
[242] *See id.* § 230.10(a)(3).
[243] *See* U.S. Army Corps of Engineers, Memorandum for Commanders, Major Subordinate Commands and District Commands Re: Updated Standard Operating Procedures for the U.S. Army Corps of Engineers Regulatory Program at 20 (2009).

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that the basic purpose of the project—producing gold from ore reserves—is not water-dependent, and it acknowledges that that determination creates a presumption that practicable alternatives less damaging to wetlands exist.[244] The DEIS fails to rebut the presumption.[245] Although the Corps did consider a few options that would have lesser impacts on wetlands than the proposed action,[246] it never coherently explains how the project in its current configuration qualifies as the LEDPA.[247] Given the scale of the project's potential impacts on wetlands, the Corps must conduct a more thorough analysis of alternatives that may qualify as the LEDPA.[248] It should correct this deficiency in the FEIS.

B. The DEIS does not describe how the project's impacts on wetlands would not significantly degrade those ecosystems.

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Under the 404(b)(1) guidelines, the Corps may not permit discharges of fill material that will "cause or contribute to significant degradation" of wetlands.[249] Examples of effects contributing to significant degradation include loss of fish and wildlife habitat or loss of wetlands' capacity to filter water.[250] The extent and duration of the impacts on wetlands, as well as the wetlands' uniqueness, are relevant considerations.[251] If the Corps finds that the project would significantly degrade wetlands, it may issue a permit conditioned on minimization of, or compensation for, impacts.[252] However, inadequacies in plans for minimization or compensation[253] may invalidate the decision to allow discharge.[254]

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[244] *See* DEIS at 1-10.

[245] *Cf. Greater Yellowstone Coal. v. Flowers*, 321 F.3d 1250, 1262 n.12 (10th Cir. 2003) ("[U]nder the [Clean Water Act], it is not sufficient for the Corps to consider a range of alternatives to the proposed project: the Corps must rebut the presumption that there are practicable alternatives with less adverse environmental impact.").

[246] *See* DEIS App. C at C-24, Tbl. C-3 (reducing mine access road to one lane in wetlands); *id.* App. C at C-50, Tbl. C-10 (commingling the waste rock facility and the tailings storage facility); *id.* App. C at C-79, Tbl. C-22 (eliminating the pipeline).

[247] *Cf. Nw. Bypass Grp. v. U.S. Army Corps of Eng'rs*, 470 F. Supp. 2d 30, 44-45 (D.N.H. 2007) (noting that the Corps had evaluated the practicability and impacts to wetlands of several different routes in approving the construction of a road).

[248] *Cf. Greater Yellowstone Coal.*, 359 F.3d at 1271-73 (citing 40 C.F.R. § 230.6(b) and concluding that the Corps' level of effort and documentation in determining the LEDPA sufficed because the project at issue would eliminate only 1.45 acres of wetlands).

[249] 40 C.F.R. § 230.10(c).

[250] *See id.* § 230.10(c)(3).

[251] *See Bering Strait Citizens for Responsible Res. Dev. v. U.S. Army Corps of Eng'rs*, 524 F.3d 938, 949 (9th Cir. 2008).

[252] *See City of Olmstead Falls, Ohio v. EPA*, 435 F.3d 632, 637-38 (6th Cir. 2006); *Ohio Valley Envtl. Coal. v. U.S. Army Corps of Eng'rs*, 674 F. Supp. 2d 783, 790 (S.D. W. Va. 2009).

[253] *See infra* pp. 32-33 (identifying deficiencies in the DEIS's discussion of minimization of wetlands impacts); *infra* pp. 35-36 (identifying issues with Donlin Gold's compensatory mitigation plan).

The DEIS does not address the "significant degradation" finding that the Corps must make under the 404(b)(1) guidelines. That omission is significant because a positive finding would elevate the importance of the mitigation measures proposed in the DEIS. Indeed, where
CWA 4 the Corps' decision to issue a permit relies on a NEPA document, flaws in the underlying analysis may call into question the Corps' finding that the project would not result in significant degradation of wetlands.[255] The Corps should explain how the proposed mitigation would avoid significant degradation of wetlands, and it must account for any differences between the FEIS and the DEIS regarding impacts to these ecosystems.[256]

C. Alternative 2 does not include all appropriate and practicable measures to minimize potential impacts to wetlands.

The 404(b)(1) guidelines prohibit issuance of a permit "unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem."[257] Subpart H of the guidelines provides examples of actions the Corps might take to minimize adverse effects,[258] which courts have viewed as the "correct factors" for the Corps to consider when making its determination.[259] They include limiting the
MIT 21 solid or liquid components of material to be discharged, using lined containment areas to reduce leaching of chemicals, and capping contaminated material in place with clean material, among other things.[260]

The Corps has largely deferred any action to minimize impacts on wetlands at this point, noting that minimization is part of a separate mitigation process that is "commonly not completed at the time of release of the Draft EIS for public review."[261] Thus, the DEIS notes: "The layout of major mine facilities was designed to minimize wetland impacts . . . . The 404(b)(1) analysis will document the steps taken to minimize wetlands impacts."[262] Likewise, transportation infrastructure would be located "along ridge tops whenever possible to minimize wetlands . . . impacts."[263] These proposed design features would apparently *avoid* actions directly in wetlands where possible, an important first step in decreasing harms to aquatic

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[254] *See All. to Save the Mattaponi v. U.S. Army Corps of Eng'rs*, 606 F. Supp. 2d 121, 134 (D.D.C. 2009).
[255] *See Friends of the Earth v. Hall*, 693 F. Supp. 904, 945-46 (W.D. Wash. 1988).
[256] *Cf. Sierra Club v. U.S. Army Corps of Eng'rs*, 614 F. Supp. 1475, 1495-96, 1517 (S.D.N.Y. 1985) (holding arbitrary the Corps' decision to issue a landfill permit where its conclusions about impacts on a fishery differed dramatically from those in a draft EIS).
[257] 40 C.F.R. § 230.10(d).
[258] *See id.*
[259] *Sierra Club v. U.S. Army Corps of Eng'rs*, No. Civ.A. 05-1724JAP, 2005 WL 2090028, at *17 (D.N.J. Aug. 29, 2005).
[260] *See* 40 C.F.R. §§ 230.71(b), 230.72(a)(2) & (b).
[261] DEIS at 5-1. The DEIS goes on to say that mitigation measures will be included as they become available, *id.*, although it is unclear where those measures will be presented.
[262] *Id.* at 5-11, Tbl. 5.2-1.
[263] *Id.* at 5-13, Tbl. 5.2-1.

ecosystems. Other supposed minimization measures also focus on avoidance or are too vague to satisfy the 404(b)(1) guidelines.[264] Yet the 404(b)(1) guidelines additionally require minimization of the effects of unavoidable filling. When the Corps undertakes a complete analysis under Section 404(b)(1), it will be important to provide an additional opportunity for comment on substantial changes to the project necessary to minimize impacts on wetlands.

MIT 21

D. The DEIS omits the factual determinations necessary to reach a conclusion that the proposed action complies with the 404(b)(1) guidelines.

In order to conclude that the proposed discharge complies with the 404(b)(1) guidelines, the Corps must make a number of detailed factual determinations.[265] These determinations include effects on substrates, water circulation and chemistry, turbidity, contamination, and aquatic ecosystems—including cumulative and secondary effects on ecosystems.[266] For each of these types of effects, the Corps must address specific impacts or explain why it was not able to do so.[267]

The DEIS does not make the detailed factual determinations required by the 404(b)(1) guidelines. Instead, it simply lists "placement of fill in wetlands" as one consequence of construction and notes that "filling within the Waste Rock and Tailings Storage facilities would occur throughout the active life of the mine."[268] It does not explain how filling would specifically alter wetland characteristics, instead vaguely discussing a range of construction impacts together:

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> Excavation, filling, and clearing of wetlands and waters in the American Creek, Snow Gulch, Omega Gulch, Anaconda Creek, and Crooked Creek watersheds would alter or remove their capacity to provide hydrologic, biogeochemical, and biological functions. Construction-related disturbances could alter wetland modification of groundwater functions (recharge and discharge), and would decrease storm and floodwater storage and modification of stream flow functions by decreasing the wetlands' potential to dissipate energy and reduce peak flows. Between 10 and 35 percent of the mine site study area wetlands that are rated high for any of these hydrologic functions would be altered by mine construction. These altered hydrologic functions would extend to the streams connected to or downstream from the affected wetlands. A total of 42 miles of streams would be

[264] *See id.* at 3.11-77 (listing various best management practices and closure standards); *see also id.* at 3.11-91 (similar list for transportation facilities); *id.* at 3.11-114 to 3.11-115 (similar list for pipeline); *id.* at 3.11-119 to 3.11-120 (overview list).
[265] 40 C.F.R. § 230.11.
[266] *Id.* § 230.11(a)-(e), (g)-(h).
[267] *See Ohio Valley Envtl. Coal. v. Aracoma Coal Co.*, 556 F.3d 177, 200-01 & n.19 (4th Cir. 2009); *Sierra Club v. U.S. Army Corps of Eng'rs*, 464 F. Supp. 2d 1171, 1215-16 (M.D. Fla. 2006).
[268] DEIS at 3.11-56 to 3.11-57; *see also* 3.11-94 (listing "conversion of wetlands to uplands due to filling" as one potential effect of pipeline construction).

> directly affected by construction, including 29 miles of perennial streams and 13 miles of intermittent streams.[269]

This explanation falls far short of the site-specific impact analysis required by NEPA. In one short discussion, it blends an array of direct and indirect impacts from discharges of fill material and other construction-related activities, concluding vaguely that they could "alter" various functions in thousands of acres of wetlands. It is impossible to tell what activities would cause what kinds of impacts, in what ways the various functions would be "altered," or what the environmental consequences of those alterations would be. The DEIS's quantitative estimates of wetlands impacts are similarly imprecise, indicating only numbers of acres affected by wetland function.[270] The 404(b)(1) guidelines require more, and the Corps must include this additional analysis in the FEIS.[271]

Along the same lines, the DEIS insufficiently assesses the cumulative impacts of filling. The Corps limited its analysis of cumulative impacts to "the close vicinity of the project footprint" and identified only a few activities that "have removed some wetlands and introduced or spread invasive species."[272] While it is possible that there are no other discharges that would compound the proposed filling, the Corps must "collect information and solicit information from other sources about the cumulative impacts on the aquatic ecosystem."[273] There is no indication that the Corps did so.[274] Moreover, the DEIS's discussion of cumulative impacts on wetlands does not consider effects on other aquatic ecosystems, as required by the 404(b)(1) guidelines.[275] The Corps should provide a more complete assessment of the cumulative impacts of the discharge of fill material in the FEIS.

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[269] *Id.* at 3.11-59 (citations omitted); *see also id.* at 3.11-82 (similar discussion of wetland impacts from construction of transportation facilities); *id.* at 3.11-99 (similar discussion of wetland impacts from pipeline construction).

[270] *See id.* at 3.11-62, Tbl. 3.11-15; *see also id.* at 3.11-84, Tbl. 3.11-25 (similar table for transportation facilities); *id.* at 3.11-101, Tbl. 3.11-32 (similar table for pipeline construction).

[271] To the extent that analyses of other alternatives rely on the analysis for Alternative 2, they are equally deficient. *See id.* at 3.11-121 to 3.11-122, 3.11-124, 3.11-130, 3.11-141. Where they do address different wetlands impacts, they likewise fail to provide the detailed consideration of the effects of filling required by the 404(b)(1) guidelines. *See id.* at 3.11-126, 3.11-130, 3.11-136, 3.11-138, 3.11-141.

[272] *Id.* at 4-38.

[273] 40 C.F.R. § 230.11(g)(2).

[274] *Cf. Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs*, 351 F. Supp. 2d 1232, 1257 (D. Wyo. 2005) (faulting the Corps for not collecting and soliciting information on the cumulative effects of the proposed action on non-wetland aquatic ecosystems).

[275] *See* 40 C.F.R. § 230.11(g)(2); *see also Wyo. Outdoor Council*, 351 F. Supp. 2d at 1256 ("[T]he Corps failed to evaluate the cumulative effect of [the proposed action] on non-wetland aquatic environments, particularly those downstream waters that might feel . . . secondary effects.").

## III. DONLIN GOLD'S COMPENSATORY MITIGATION PLAN DOES NOT SATISFY APPLICABLE REGULATORY REQUIREMENTS.

Donlin Gold has developed a "conceptual Compensatory Mitigation Plan" to offset unavoidable impacts to wetlands.[276] The Corps intends to select specific compensatory mitigation measures in the record of decision and approved permit.[277]

Under EPA regulations, developed jointly with the Corps, "[w]hen evaluating compensatory mitigation options, the [Corps] will consider what would be environmentally preferable," taking into account "the likelihood for ecological success and sustainability," as well as "the location of the compensation site relative to the impact site and their significance within the watershed."[278] "In general, the required compensatory mitigation should be located in the same watershed as the impact site."[279] Donlin Gold's proposed plan is problematic for a number of reasons, and the Corps should require more-rigorous compensatory mitigation before issuing a permit.

Donlin Gold proposes to use mitigation bank credits to compensate for some of the project's unavoidable wetlands impacts.[280] Such credits may only be used when permitted impacts are located within the service area of an approved mitigation bank.[281] Although the
MIT 7 pipeline would traverse the service areas of two approved mitigation banks—the Su-Knik Mitigation Bank and the Pioneer Reserve LLC Mitigation Bank[282]—the validity of credits issued by the former has been called into question.[283] The only mitigation bank that contains the mine site within its service area, the Chuilnuk Bank, has apparently not yet been approved. Donlin Gold cannot reliably use credits from the Su-Knik and Chuilnuk Banks to offset wetlands impacts.

The compensatory mitigation plan also identifies an in-lieu fee program, sponsored by the Conservation Fund, that offers credits in some regions of the state.[284] As with mitigation banks, in-lieu fee programs can only provide credits for impacts located within their service areas.[285] The program's service area contains the mine site, but it is not selling credits while it is

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[276] DEIS at 5-33.
[277] *Id.*
[278] 40 C.F.R. § 230.93(a)(1); *see also* 33 C.F.R. § 320.4(r)(2) ("[A]ll mitigation will be directly related to the impacts of the proposal" and "appropriate to the scope and degree of those impacts.").
[279] 40 C.F.R. § 230.93(b)(1).
[280] DEIS App. M at 12-13.
[281] 40 C.F.R. § 230.93(b)(2).
[282] *See* DEIS App. M at A-2 to A-3, Figs. 1-2 (showing service areas).
[283] *See Walther v. United States*, No. 3:15-cv-0021-HRH, 2015 WL 6872437, at *3 (D. Alaska Nov. 9, 2015) (noting that Pioneer Reserve, L.L.C. alleged that Su-Knik's banking credits were invalid).
[284] *See* DEIS App. M at 13.
[285] 40 C.F.R. § 230.93(b)(3).

undergoing an audit.[286] Obviously, the Corps cannot include credits from this program in a permit until the audit is complete.

Finally, the permittee-responsible mitigation (PRM) measures proposed in the compensatory mitigation plan raise a number of concerns. One of the PRM projects Donlin has carried forward is "Pit Lake Development," which it suggests would create aquatic habitat in the form of lakes and wetlands.[287] The plan for that project acknowledges that "[t]he lake cannot be fully functional because the lake will not meet state water quality standards will not have fish [*sic*], and the lake will take time to have wetland fringes and develop an organic biomass."[288] Indeed, according to the pit-lake ERA, "development of a littoral and riparian zone is expected to be minimal" because of changing water levels.[289] Yet the pit lake, if approved as a PRM project, would provide a significant number of credits in supposedly creating 250 acres of wetlands.[290] Because the quality of the water in the pit lake is a problem in its own right,[291] and because the habitat created would be insubstantial, the Corps should not treat it as a substitute for degraded or destroyed wetlands.

Other PRM proposals are also dubious. Donlin Gold seeks a ten percent "bonus" on
MIT 7 wetlands credits for educating local communities about waste management and the value of wetlands in the ecosystem.[292] Similarly, it asks for ten percent extra credit for developing a manual on how to restore tailings storage facilities to wetlands.[293] Another of its proposals entails "educat[ing] the local governments on how to run and operate the local landfills and encourag[ing] the removal of derelict recyclable goods from the watershed," and it seeks a bonus for that program as well.[294] While such educational efforts are laudable, it is doubtful whether they actually compensate for the destruction of wetlands.[295] Out-of-kind PRM projects of this sort should only be considered as a last resort and should not be allowed to constitute such a substantial portion of the mitigation plan.[296]

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[286] DEIS App. M at 13.
[287] *See id.* App. M at 15-16 & Tbl. 5-4.
[288] *Id.* App. M, C.9 at 4.
[289] *See id.* App. S at 9 (PDF 369).
[290] *See id.* App. M, C.9 at 2.
[291] *See supra* pp. 3-5.
[292] DEIS App. M, C.2 at 2, 6; *id.* App. M, C.4 at 5.
[293] *Id.* App. M., C.6 at 5.
[294] *Id.* App. M., C.5 at 1-3.
[295] *See* R. C. Gardner, *Money for Nothing? The Rise of Wetland Fee Mitigation*, 19 Va. Envtl. L.J. 1, 21-22 (2000).
[296] *See* 40 C.F.R. § 230.93(b)(6).

IDITAROD NATIONAL HISTORIC TRAIL

Congress designated the INHT when it enacted the National Parks and Recreation Act of 1978.[297] The INHT "commemorates a 2,300-mile system of winter trails that first connected ancient Alaska Native villages, opened up Alaska for the last great American gold rush, and now plays a vital role for travel and recreation in modern day Alaska."[298] The pipeline's impacts on the INHT are of paramount importance to Trail users. Indeed, the Iditarod Historic Trail Alliance (IHTA), a statewide nonprofit organization dedicated to advancing the knowledge, appreciation, and enjoyment of the Trail,[299] recently adopted a resolution formally expressing its concerns about potential impacts of the pipeline on the INHT.[300] It is therefore critical that the DEIS fully address these consequences, analyze possible alternatives with reduced impacts, and explain how a right-of-way for the pipeline comports with state and federal law.

I. THE DEIS UNDERSTATES THE PIPELINE'S IMPACTS ON THE INHT AND FAILS TO CONSIDER A REASONABLE RANGE OF ALTERNATIVE PIPELINE ROUTES.

The IHTA's resolution states that the pipeline's impacts to the INHT "are not adequately identified or conveyed in a complete and concise manner that allows for an understanding of the scope and scale of the cumulative adverse impacts to the [INHT] during construction, operations, and reclamation phases in the DEIS."[301] It further calls on the Corps to "re-examine the DEIS and require an alternative that re-routes the pipeline to avoid impacts to the INHT and preserve its historical, cultural and scenic qualities."[302] By presenting a limited description of the pipeline's impacts on the INHT and failing to consider a reasonable range of alternative pipeline routes, the DEIS violates NEPA.

PAA 32

A. The DEIS understates the pipeline's impacts on the INHT.

An EIS must "provide full and fair discussion of significant environmental impacts."[303] Where the information in an EIS is "so incomplete or misleading that the decisionmaker and the public [cannot] make an informed comparison of the alternatives, revision of an EIS may be necessary to provide a reasonable, good faith, and objective presentation of the subjects required

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[297] *See* Pub. L. No. 95-625, § 551(4), (9), 92 Stat. 3467, 3511-12, 3513 (1978); *see also* 16 U.S.C. § 1244(a)(7).
[298] *Iditarod National Historic Trail*, BLM, http://www.blm.gov/ak/st/en/prog/nlcs/iditarod.html (last visited May 24, 2016).
[299] *About Us*, Iditarod Historic Trail Alliance, http://www.iditarod100.org/about-us.html (last visited May 24, 2016).
[300] *See* Iditarod Historic Trail Alliance, Resolution 16-01 at 1-2 (Apr. 12, 2016).
[301] *Id.* at 2.
[302] *Id.*
[303] 40 C.F.R. § 1502.1.

IDIT 9

by NEPA."[304] NEPA regulations also require that agencies "identify any methodologies used" to assess environmental impacts.[305]

The DEIS obscures the pipeline's consequences for the INHT. In its analysis of impacts on recreation, the DEIS indicates that the pipeline would be collocated with the INHT (i.e., the Trail would be within 100 feet of the pipeline corridor) for 4 miles and would be proximate to

IDIT 10

the INHT (i.e., the Trail would be within 1,000 feet of the pipeline corridor) for 10.5 miles, crossing the Trail 13 times.[306] This segmented approach greatly understates the true impacts. A figure in the section of the DEIS on land-use impacts reveals that the pipeline would be in the vicinity of the INHT for about 60 miles.[307] The pipeline's repeated crisscrossing of the Trail for 60 miles is a significant impact to the historical and recreational qualities of the Trail, which is lost in the arbitrary 1,000-foot "proximate" analysis. The DEIS should expand its definition of proximity to capture the full range of potential impacts to the INHT.

IDIT 6

Moreover, the DEIS misleadingly minimizes the impacts of shoofly roads used during construction of the pipeline on the Trail. In comments on a preliminary version of the DEIS, BLM pointed out that shoofly roads would frequently have permanent effects, "irretrievably alter" the Happy River Steps stretch of the INHT, and degrade the recreation experience in combination with other construction activities.[308] The Corps agreed with BLM's observations and promised to redraft its analysis accordingly,[309] yet the DEIS does not reflect these concerns.[310] The FEIS must include a full and fair discussion of the impacts of shoofly roads on the INHT.

IDIT 7

The DEIS also fails adequately to disclose the impacts on visibility during construction. It concludes that construction-related activities could be seen by winter recreationists where the Trail crosses the viewshed of the right-of-way.[311] Yet it does not identify the portions of the INHT that would be affected by construction activities, instead referring the reader to two photosimulations of the cleared right-of-way.[312] These simulations do not depict impacts of

[304] *Native Ecosystems Council*, 418 F.3d at 965 (quoting *Animal Def. Council v. Hodel*, 840 F.2d 1432, 1439 (9th Cir. 1988), *amended by* 867 F.2d 1244 (9th Cir. 1989)).
[305] 40 C.F.R. § 1502.24; *see also id.* (suggesting that agencies discuss methodology in an appendix).
[306] DEIS at 3.16-19, Tbl. 3.16-5.
[307] *See id.* at 3.15-13, Fig. 3.15-2.
[308] *See* Agency & Applicant Comments at 52-53; *see also id.* at 55 (noting that "the area within one mile of the Happy River Steps is proposed to contain an 86 acre airfield, a 16.8 acre construction camp, a similar size material excavation site, two [horizontal directional drilling] construction workspaces, a water extraction site, and [a] 1.64 mile shoofly road, all bisected by the 150 foot wide construction [right-of-way]"); *id.*at 77 (describing visual impacts near the Happy River Steps).
[309] *See id.* at 52-53, 55.
[310] *See* DEIS at 3.16-17 to 3.16-18.
[311] *Id.* at 3.17-58.
[312] *See id.*; *see also id.* at 3.17-46 to 3.17-47, Figs. 3.17-23A, 3.17-23B.

IDIT 7

construction infrastructure, which the DEIS vaguely describes as "moderate visual contrast of straight lines, cubic forms, and variable textures of camp facilities, airstrips, material sites, and pipeline storage yards against the contiguous open forests of the surrounding landscape."[313]

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Furthermore, as BLM notes in its comments, the analysis of impacts on visual resources does not consider wintertime views, when recreational use of the Trail is at its highest[314]; does not adequately consider effects on aerial views[315]; improperly assumes that the pipeline is the vantage point, rather than the Trail[316]; and selects key observation points that only infrequently see use.[317] The DEIS should provide the details of its viewshed analysis and present a fuller picture of potential construction-related impacts on views from the INHT.

B. The DEIS fails to consider a reasonable range of alternative pipeline routes.

An EIS must also "inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[318] The alternatives section is the "heart of the [EIS]."[319] It must "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[320] "The existence of a viable but unexamined alternative renders an [EIS] inadequate."[321]

PAA 32

The DEIS refused to consider in detail any pipeline options that might have lesser impacts on the INHT relative to the proposed action.[322] Most importantly, it summarily rejected the Kichatna River Valley route because of greater surface disturbance, more wetlands impacts and river crossings, and significant additional costs, among other things.[323] The specifics of these considerations are not disclosed in the DEIS,[324] and the reasons given do not support the

[313] *Id.* at 3.17-58; *see also* Agency & Applicant Comments at 73 (BLM comments calling on the Corps to depict off-highway vehicle trails and construction impacts in photosimulations).
[314] *See* Agency & Applicant Comments at 63-64.
[315] *See id.* at 65-66.
[316] *See id.* at 66-67.
[317] *See id.* at 67-69.
[318] 40 C.F.R. § 1502.1.
[319] *Id.* § 1502.14.
[320] *Id.*
[321] *Or. Nat. Desert Ass'n v. BLM*, 625 F.3d 1092, 1100 (9th Cir. 2008) (quoting *Westlands Water Dist. v. U.S. Dep't of the Interior*, 376 F.3d 853, 868 (9th Cir. 2004)).
[322] *See* DEIS at 2-195 to 2-196, Tbl. 2.4.4 (PL-2, 3, 16, 26).
[323] *Id.* App. C at C-75, Tbl. C-21.
[324] *See* 40 C.F.R. § 1502.41(a); *cf. Citizens for Smart Growth v. Dep't of Transp.*, 669 F.3d 1203, 1213 (11th Cir. 2012) (upholding EIS that discussed the environmental effects and costs of rejected alternatives).

conclusion that this route was unworthy of analysis in the DEIS.[325] Indeed, many of the disadvantages of the Kichatna River Valley route also apply to the Dalzell Gorge route, which the Corps included as an alternative in the DEIS.[326] In contrast to the Dalzell Gorge alternative,[327] the Kichatna River Valley option has a significant advantage over any of the alternatives considered: it greatly reduces impacts to the INHT.[328] This enormous advantage should have been weighed against the stated disadvantages of the route after considering the impacts in detail, rather than simply rejecting the route out of hand. As discussed below, this is particularly true in light of the command in the NHPA to consider alternatives that avoid impacts

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[325] BLM proposed this option at a meeting to develop alternatives in August 2013. *See* URS, Alternatives Meeting Notes at 19-20 (Aug. 28-29, 2013). In a December 2013 letter to the Corps, BLM expressed its view that the Kichatna River Valley route is reasonable and warrants full analysis in the EIS. *See* Letter from A. Bittner, BLM, to D. Kuhle, U.S. Army Corps of Engineers at 2 (Dec. 6, 2013). Donlin Gold soon thereafter produced an internal memorandum concluding that the option did not meet the Corps' alternative-screening criteria because of greater surface disturbance and impacts to wetlands and streams, pipeline integrity issues, and significant additional costs, among other things. Memorandum from J. Fueg, Donlin Gold, LLC, to N. Enos, Donlin Gold, LLC at 1, 5 (Dec. 19, 2013). Yet an independent review by the Corps' consultant concluded that there was no "decisive element of technical and logistical feasibility or environmental footprint that would readily lead to dismissal." Memorandum from B. Craig & T. Brelsford, URS, to D. Kuhle & K. Gordon, U.S. Army Corps of Engineers at 4 (Jan. 30, 2014). A subsequent review of additional analysis by Donlin Gold found increased impacts to wetlands and river channels, as well as increased exposure to geohazards, along the Kichatna River Valley route. *See* B. Craig & T. Brelsford, URS, to D. Kuhle & K. Gordon, U.S. Army Corps of Engineers at 7 (Apr. 9, 2014). Nevertheless, it acknowledged BLM's concerns about the proposed action's impacts to the INHT and did not make a recommendation as to whether to carry the Kichatna River Valley option forward. *See id.* On May 6, 2014, the Corps rejected the option as unreasonable, based on the impacts identified by Donlin Gold. *See* D. Kuhle, U.S. Army Corps of Engineers, Memorandum for the Record at 1-3 (May 6, 2014). In sum, BLM viewed the Kichatna River Valley route as a reasonable alternative, and the Corps' independent consultant agreed that the alternative could have been carried forward in the DEIS. Eliminating it from consideration was therefore arbitrary.

[326] *See* DEIS at 2-171, Tbl. 2.3-44 (noting "[m]ore medium intensity impacts from doubled length of high-risk unstable slopes through the AK Range portion of the pipeline route" under Alternative 6A); *id.* at 2-176, Tbl. 2.3-44 (noting that, under Alternative 6A, "[d]irect impacts to wetlands would increase by 98 acres compared to Alternative 2"); *cf. Se. Alaska Conservation Council v. Fed. Highway Admin.*, 649 F.3d 1050, 1057-59 (9th Cir. 2011) (holding that an agency's decision to eliminate an alternative when other alternatives could have been rejected for the same reasons was arbitrary).

[327] *See* DEIS at 2-181, Tbl. 2.3-44 (noting that Alternative 6A would affect more of the INHT than Alternative 2).

[328] *Cf. Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038-39 (9th Cir. 2008) (holding that an EIS that failed to consider "different means for addressing" a problem did not "allow for a real, informed choice").

PAA 32 to historic properties. NEPA demands that the Kichatna River Valley alternative be carried forward in the EIS.[329]

II. GRANTING A RIGHT-OF-WAY FOR THE PIPELINE WOULD BE INCONSISTENT WITH THE STATE OF ALASKA'S AGREEMENTS WITH BLM AND ADNR'S LAND USE PLANS.

Because the entire length of the pipeline in the vicinity of the INHT is on state lands, the Alaska Department of Natural Resources (ADNR) will have to decide whether to issue a right-of-way for the pipeline.[330] Based on information presented by the DEIS, it is questionable whether ADNR may lawfully do so.

A. Granting a right-of-way for the pipeline would be inconsistent with the State of Alaska's agreements with BLM.

LAND 13 BLM finalized a comprehensive management plan (CMP) for the INHT in 1986.[331] The CMP's goal was for the federal government "to initiate cooperative management of the [INHT], so that eventually the State of Alaska and a coalition of volunteer organizations may assume the major portion of the management responsibility for the Trail system."[332] Thus, the State of Alaska entered into a memorandum of agreement with BLM over the INHT in 1987, in which it agreed "to manage, according to the laws, regulations, and policies directing each [state] agency or department, INHT segments and historic sites identified in the CMP in a manner which protects and interprets their historic values."[333]

A pipeline would significantly impair the historic values of the Trail in violation of the CMP. The DEIS acknowledges that the pipeline would have "[p]ermanent" impacts of "[m]edium" intensity over an "[e]xtended" geographic area, in an "[i]mportant" context.[334] The pipeline would run alongside the Trail segment from Skwentna to Farewell Lake,[335] which includes the priority sites of the Rohn River Roadhouse and Pioneer Roadhouse.[336] The DEIS concludes that the pipeline "would result in both direct temporary construction-related impacts

[329] *See* 40 C.F.R. § 1502.14(a) (providing that an EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives"); *Pac. Coast Fed'n of Fishermen's Ass'ns v. Blank*, 693 F.3d 1084, 1099 (9th Cir. 2012) ("We review an agency's range of alternatives under a 'rule of reason' standard." (citation and some internal quotation marks omitted)).
[330] DEIS at 1-41, Tbl. 1.10-2; *id.* at 3.15-12.
[331] *See generally* BLM, The Iditarod National Historic Trail Seward to Nome Route: A Comprehensive Management Plan (1986) (CMP).
[332] *Id.* at Introduction; *see also id.* at 6; *id.* at 65-66.
[333] Memorandum of Agreement Between State of Alaska and Bureau of Land Management, U.S. Department of the Interior Concerning the Iditarod National Historic Trail, AK-974-MU8-INHT-03 at 2 (1987).
[334] DEIS at 3.20-46, Tbl. 3.20-13.
[335] *See id.* at 3.15-13, Fig. 3.15-2.
[336] CMP at 88.

and longer-term indirect impacts to the cultural setting [of the INHT] through effects to visual resources."[337] It recognizes the Rohn Roadhouse as a "Significant Viewpoint[]."[338] On the whole, these significant impacts do not comport with the CMP's requirement to "protect[] . . . [the] historic values" of the INHT.[339]

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B. Granting a right-of-way for the pipeline would not be consistent with ADNR's land use plans.

ADNR has adopted plans for the management of state lands within its jurisdiction. The Susitna Matanuska Planning Area and the Kuskokwim Planning Area contain the length of the INHT that would lie in the vicinity of the proposed pipeline. Regarding the "Iditarod Race Trail,"[340] the plans for both areas state:

> No permanent structures or equipment should be placed in the trail corridor if they could adversely affect the trail experience or access along the trail. Where necessary, trail crossings may be permitted to allow access to lands on both sides of the trail. Crossings should be limited to a few discrete areas rather than scattered crossings in many places along the trail.[341]

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The pipeline, as proposed, would violate the prohibitions against both "permanent structures" and "scattered crossings in many places." The pipeline would cross the Trail 13 times over the span of 60 miles, significantly compromising the historic character of the Trail.[342] In addition, at least three above-ground mainline valves would be located along the length of the

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[337] DEIS at 3.20-39.

[338] *Id.* at 3.20-24.

[339] CMP at Introduction. Granting a right-of-way may also contravene the requirement that the trail administrator permit only those uses of a trail that will not "substantially interfere with the nature and purposes of the trail." 16 U.S.C. § 1246(c). BLM has suggested that an agency might have to determine whether the proposed use of the INHT would constitute a "substantial interference." *See* Agency & Applicant Comments at 92-93. The DEIS, however, dismisses this possibility because the portions of the Trail that would be affected by the pipeline are on state lands. *See* DEIS at 3.20-5. It is far from clear that the statutory requirement is so limited, and the Corps and BLM must address this issue before approving the project. For the reasons discussed above, the proposed pipeline very likely would substantially interfere with the nature and purposes of the INHT.

[340] Each plan also has guidelines for managing the Iditarod National Historic Trail System, including "trails and historic sites" located within the planning area. *See* Alaska Department of Natural Resources (ADNR), Susitna Matanuska Area Plan at 2-56 (2011) (Susitna Matanuska Area Plan); ADNR, Kuskokwim Area Plan at 2-60 (1988) (Kuskokwim Area Plan). The plans indicate that the INHT system will be managed consistently with the memorandum of agreement between the state and BLM. *See* Susitna Matanuska Area Plan at 2-56; Kuskokwim Area Plan at 2-60.

[341] Susitna Matanuska Area Plan at 2-55; Kuskokwim Area Plan at 2-60.

[342] DEIS at 3.16-19, Tbl. 3.16-5.

pipeline in the vicinity of the INHT.[343] They would remain for the decades of operation and potentially longer.[344] The pipeline's multiple crossings of the INHT and its long-term above-ground facilities make granting a right-of-way inconsistent with ADNR's area plans.

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III. THE CORPS MUST COMPLETE THE PROCESS PRESCRIBED BY NHPA SECTION 106 BEFORE SIGNING A RECORD OF DECISION.

Under Section 106 of the NHPA, the Corps will have to complete an assessment of the pipeline's impacts on historic resources (including the INHT), attempt to resolve adverse effects on those resources, and consider alternatives that would avoid adverse effects before issuing a permit.[345] The DEIS suggests that this process has only recently been initiated. Nonetheless, the Corps should document its conclusions under NHPA Section 106 in the FEIS, including its assessment of alternatives that would reduce harms to the INHT and other historic resources.

Section 106 of the NHPA requires agencies involved in an "undertaking" that needs a federal permit to determine whether the undertaking has the potential to affect historic properties.[346] Both the INHT and specific sites along the Trail qualify as "historic properties," i.e., "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior."[347] The DEIS acknowledges that the INHT is eligible for inclusion in the National Register of Historic Places.[348] The 1986 CMP also lists the Skwentna Roadhouse and Rohn River Roadhouse—both located on the portion of the Trail that could be affected by the pipeline—as "Level 1 Sites" to be evaluated for nomination to the National Register of Historic Places.[349] Therefore, the Corps must complete the Section 106 process before permitting the mine.

NHPA 2

Under NHPA Section 106, agencies must identify historic properties, assess adverse effects on these properties, and attempt to resolve the effects in consultation with state and tribal historic preservation offices.[350] As part of their efforts to resolve adverse effects, agencies must "develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties"[351] and "provide an opportunity for members of the public to express their views on resolving adverse effects."[352] Furthermore,

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[343] *See id.* at 2-69, Tbl. 2.3-15.
[344] *See id.* at 2-128 to 2-129.
[345] *See id.* at 3.20-4; *see also* 36 C.F.R. Part 800.
[346] *See* 36 C.F.R. § 800.3(a); *see also id.* § 800.16(y) (defining "undertaking").
[347] *Id.* § 800.16(l)(1).
[348] DEIS at 3.20-21, 3.20-23, Tbl. 3.20-1; *see also id.* at 3.20-37 to 3.20-39, Tbl. 3.20-8.
[349] CMP at 56, 58, Tbl. 5. The Rohn Roadhouse Safety Cabin has apparently since been added to the Register. *See Rohn Roadhouse Safety Cabin*, Alaska.org, http://www.alaska.org/detail/rohn-roadhouse-safety-cabin.
[350] *See* 36 C.F.R. §§ 800.4-800.7.
[351] *Id.* § 800.6(a).
[352] *Id.* § 800.6(a)(4).

agencies should "ensure that preparation of . . . an EIS and record of decision (ROD) includes appropriate scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects."[353] If the Section 106 process has not been properly carried out when an agency permits an undertaking, its decision may be held invalid.[354]

NHPA 2 The DEIS raises questions about the Corps' compliance with NHPA Section 106. It states that the Corps, as lead federal agency, has begun to prepare a "programmatic agreement" (PA) among the Corps, the State Historic Preservation Office, the Advisory Council on Historic Preservation, BLM, local governments, and Alaska Native tribes and organizations.[355] The PA will "provide agencies with a framework for completing the Section 106 framework in a phased manner," including "identification and evaluation of cultural resources, consultation, and mitigation of effects."[356] This description does not mention the NHPA's requirement to consider alternatives—which reinforces NEPA's parallel command—and the Corps must consider options that would avoid impacts to historic properties such as the INHT.[357] It has not yet satisfied this requirement[358]; it must do so before permitting the mine, and it should document its compliance with NHPA Section 106 in the FEIS.[359]

SCOPE

NEPA requires that EISs analyze actions connected with or cumulative to the proposed action.[360] Although agencies have discretion to define the scope of the environmental review, "connected or cumulative actions must be considered together to prevent an agency from dividing a project into multiple 'actions,' each of which individually has an insignificant environmental impact, but which collectively have a substantial impact."[361] The Corps has improperly limited the scope of the DEIS by neglecting two actions related to the project.

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[353] *Id.* § 800.8(a)(3).
[354] *See* 54 U.S.C. § 306108; *Mont. Wilderness Ass'n v. Connell*, 725 F.3d 988, 1005, 1010 (9th Cir. 2013).
[355] DEIS at 3.20-6.
[356] *Id.* at 3.20-33.
[357] 36 C.F.R. § 800.6(a).
[358] *See supra* pp. 39-41.
[359] *See* 36 C.F.R. § 800.8(a)(3). As part of documenting its compliance with the NHPA, the Corps should more accurately describe potential impacts on the INHT's cultural values. Comments by BLM point out that the DEIS "severely understates the adverse impacts to the [INHT]" and improperly focuses on visual, rather than cultural, resources. *See* Agency & Applicant Comments at 107-110. We support these comments and urge the Corps to provide a more appropriate discussion of cultural impacts to the INHT in the FEIS.
[360] *See* 40 C.F.R. § 1508.25(a)(1), (2).
[361] *Wetlands Action Network v. U.S. Army Corps of Eng'rs*, 222 F.3d 1105, 1118 (9th Cir. 2000), *abrogated on other grounds by Wilderness Soc'y v. U.S. Forest Serv.*, 630 F.3d 1173 (9th Cir. 2011) (citation and some internal quotation marks omitted).

## I. THE DEIS DOES NOT ADEQUATELY DISCUSS THE CONNECTED ACTION OF CONSTRUCTING AND OPERATING THE BETHEL CARGO TERMINAL.

Connected actions are those actions that are closely related to the proposed action and are automatically triggered by it or depend on it for their justification.[362] Courts use an "independent utility test" to determine whether multiple actions are so closely connected that they must be considered in a single EIS.[363] The question is whether the two projects would have taken place without each other.[364] "When one of the projects might reasonably have been completed without the existence of the other, the two projects have independent utility and are not 'connected' for NEPA's purposes."[365]

The DEIS does not adequately discuss the consequences of the connected action[366] of developing the Bethel port. The expansion would involve a new 16-acre cargo terminal,[367] as well as an 850-foot-long bulkhead extending 150 feet into the Kuskokwim River.[368] An unidentified third party would "determine what additional storage space and waterfront
NEP 6 structures, if any, would be required to accommodate demand."[369] The DEIS notes a number of effects from the construction and operations of the cargo terminal in Bethel, such as: placement of sand, gravel, and riprap behind the ends of the sheetpile;[370] increased runoff and erosion and altered river flow;[371] loss of 2.9 acres of wetlands;[372] "minimal[]" effects on subsistence from construction and operations,[373] including displacement of a "small portion" of fishing area; and a "slight increase" in surface traffic.[374] These descriptions do not fully disclose the impacts of such a major facility. For example, the DEIS indicates that the bulkhead would alter flow in the river, but it ignores potential impacts of increased flow on Oscarville, which is situated on a

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[362] *See* 40 C.F.R. § 1508.25(a)(1).
[363] *See Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 969 (9th Cir. 2006).
[364] *Id.*
[365] *Id.* (citation omitted).
[366] This development would occur as a direct result of the construction of the mine, and the mine as proposed could not exist without it. *See* DEIS at 2-48 ("A 16-acre cargo terminal would likely need to be constructed in Bethel to receive barges."); *id.* at 3.23-11 (noting that the Bethel port is "the only area in the region" for loading and unloading bulk petroleum, storing boats and barges, and preparing them for the shipping season); *see also id.* at 2-48 to 2-49 ("Since [construction and operation of the Bethel cargo terminal] would be a connected action for the proposed Donlin Gold Project, the environmental effects are evaluated in [the DEIS] as indirect effects.").
[367] *Id.* at 2-48.
[368] *Id.* at 3.5-101.
[369] *Id.* at 2-48.
[370] *Id.* at 3.2-71.
[371] *Id.* at 3.5-101.
[372] *Id.* at 3.11-89.
[373] *Id.* at 3.21-156.
[374] *Id.* at 3.23-21.

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slough immediately downstream of the bulkhead.[375] It also fails to respond to serious concerns expressed by the Bethel Native Corporation about the bulkhead's consequences for subsistence, simply noting that "[a]dditional discussion between the permit applicant and the Corps is underway regarding the potential hydrological effects."[376] The Corps should provide more analysis in the FEIS.

## II. THE DEIS FAILS TO ADDRESS THE CUMULATIVE EFFECTS OF A POSSIBLE EXPANSION OF THE MINE.

Even where two actions are not "connected," an agency must discuss them in the same EIS if they will have cumulatively significant effects.[377] A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."[378] Projects do not need to be finalized to be reasonably foreseeable.[379] Rather, "NEPA requires that an EIS engage in reasonable forecasting. Because speculation is . . . implicit in NEPA, [courts] must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."[380]

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The Corps does not address the potential impacts of expanding the mine. The only "past, present, and reasonably foreseeable" mineral exploration and mining the DEIS considers are projects undertaken by other parties at different sites.[381] In a recent presentation for investors, however, Donlin Gold co-owner NOVAGOLD notes that there are "[g]ood prospects to discover meaningful deposits outside [the] current mine footprint," and that "[r]eserves and resources are contained within just 3 km of an 8 km long trend."[382] These statements plainly reveal that expansion of the mine site is a "reasonably foreseeable" action that would have cumulative effects on the region. The Corps should have addressed these impacts in the DEIS.

[375] *See id.* at 3.5-101; U.S. Army Corps of Engineers, Erosion Information Paper – Oscarville, Alaska at 1-2 (Mar. 2008) (noting that Oscarville "reported bank erosion on the Kuskokwim River and Oscarville Slough").
[376] DEIS at 3.21-159.
[377] *See* 40 C.F.R. § 1508.25(a)(2); *Morongo Band of Mission Indians v. FAA*, 161 F.3d 569, 579-81 (9th Cir. 1998).
[378] 40 C.F.R. § 1508.7.
[379] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1078 (9th Cir. 2011).
[380] *Id.* at 1079 (internal quotation marks and citation omitted).
[381] *See* DEIS at 4-5, Tbl. 4.2-1.
[382] NOVAGOLD, 2016 First Quarter & Project Update at 12 (Apr. 2016).

CLIMATE CHANGE

Global warming is the most pressing environmental problem of our time, and nowhere are its effects more visible than in Alaska.[383] While extracting and processing gold ore is not an inherently climate-polluting activity, Donlin Gold proposes to do so at an unparalleled scale, using a highly energy-intensive method.[384] The project could thus emit over one million tons of greenhouse gases every year.[385] Its design will have to anticipate—and its effects would likely be exacerbated by—a shifting climate.[386] Moreover, communities and ecosystems that are already struggling to adapt to climate change are especially vulnerable to environmental harms.[387] It is therefore imperative that the FEIS thoroughly discuss both (I) the project's contribution to climate change and (II) the ways in which climate change could alter the project's other impacts.[388]

I. THE DEIS DOES NOT ADEQUATELY ADDRESS THE PROJECT'S CONTRIBUTION TO CLIMATE CHANGE.

NEPA requires agencies to discuss cumulative impacts, i.e., "the incremental impact[s] of the action when added to other past, present, and reasonably foreseeable future actions."[389] "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[390] Climate impacts fit this description well because they are caused by the incremental additions of greenhouse gases to the atmosphere from numerous sources.[391] An EIS must therefore address the proposed action's and alternatives' contribution to

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[383] *See Climate Impacts in Alaska*, EPA, https://www3.epa.gov/climatechange/impacts/alaska.html (last visited May 23, 2016) (noting that Alaska has experienced more than twice the warming that the rest of the United States has in the past 60 years).
[384] *See* DEIS at 3.26-26.
[385] *Id.*
[386] *See generally id.* at 3.26-24 to 3.26-61.
[387] *See* DEIS at 3.19-12.
[388] *See* Council on Environmental Quality, Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews at 2 (2014) (CEQ Guidance) ("[A]nalyzing the proposed action's climate impacts and the effects of climate change relevant to the proposed action's environmental outcomes can provide useful information to decisionmakers and the public."); *see also id.* at 3 (noting that agencies should consider both the proposed action's potential effects on climate change and the implications of climate change for the proposed action's impacts).
[389] 40 C.F.R. § 1508.7.
[390] *Id.*
[391] *See Ctr. for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1216-17 (9th Cir. 2008) ("The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."); *cf. Massachusetts v. EPA*, 549 U.S. 497, 524 (2007).

climate change.[392] Rather than predicting particular effects, however, the Council on Environmental Quality (CEQ) recommends that agencies use projected greenhouse gas emissions as a proxy.[393] Doing so allows agencies to "present the environmental impacts of the proposed action in clear terms and with sufficient information to make a reasoned choice between the no-action and proposed alternatives and mitigations."[394]

A. The DEIS does not fully assess the proposed action's contribution to climate change.

*1. The project's emissions*

NEPA requires that agencies discuss not only a proposed action's environmental effects, but also their significance.[395] Comparing the proposed action's greenhouse gas emissions to global emissions is "not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations" because it "does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make relatively small additions to global atmospheric [greenhouse gas] concentrations that collectively have huge impact."[396] Instead, CEQ recommends that agencies use applicable federal, state, tribal, or local goals for greenhouse gas emissions reductions as a frame of reference.[397]

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The DEIS rates the magnitude of climate impacts as a percentage of statewide greenhouse gas emissions.[398] An impact receives a rating of "high" only if it amounts to more than ten percent of the emissions of the entire State of Alaska in 2005.[399] This system is misleading for two reasons. First, it minimizes the project's impacts by comparing them to statewide emissions more than ten years ago, when emissions were at an all-time high.[400] The FEIS should compare impacts to a more recent point of reference. Second, as noted, statewide emissions do not provide a meaningful comparator for an individual project's contributions to cumulative climate effects. As a possible alternative, the Mitigation Advisory Group of the Governor's Climate Change Sub-Cabinet developed a series of recommendations which, if implemented, would reduce statewide emissions of greenhouse gases by 11.7 million metric tons

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[392] *Ctr. for Biological Diversity*, 538 F.3d at 1217.
[393] CEQ Guidance at 8.
[394] *Id.* at 8-9.
[395] *See* 40 C.F.R. § 1502.16(a), (b).
[396] CEQ Guidance at 9.
[397] *Id.* at 14.
[398] *See* DEIS at 3.26-24, Tbl. 3.26-8.
[399] *Id.*
[400] *Compare id.* at 3.26-26 (asserting that most recent data on carbon-dioxide equivalent emissions for the State of Alaska are only available for 2005, when emissions totaled 52.1 million metric tons), *with* Alaska Department of Environmental Conservation, Alaska State Greenhouse Gas Emissions Inventory at 14 ex. 5 (2015) (showing statewide carbon-dioxide equivalent emissions of 54.64 and 43.04 million metric tons in 2005 and 2010, respectively).

in 2025.[401] During operations, the project would cancel out approximately 16 percent of these savings.[402]

Another approach to assessing the significance of climate impacts is using the social cost of carbon. Developed by a federal interagency working group, the social cost of carbon is an estimate of the monetized damages from an incremental increase in carbon emissions in a given year, which includes—but is not limited to—climate-related changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.[403] According to CEQ guidance, "[w]hen an agency determines it appropriate to monetize costs and benefits, then . . . the Federal social cost of carbon . . . offers a harmonized, interagency metric that can provide decisionmakers and the public with some context for meaningful NEPA review."[404] Although NEPA does not require a cost-benefit analysis, where an agency chooses to quantify the economic advantages of the proposed action, it is arbitrary to ignore the social cost of carbon emissions.[405]

The DEIS anticipates several economic benefits from the project, including: $1.2 billion in construction labor, with $940 million in payroll going to Alaska construction-industry workers[406]; $5.2 billion in expenditures on construction materials and equipment, with $1.7
CLIM 12 billion going to Alaska suppliers[407]; $390 million in wages generated statewide through multiplier effects during construction[408]; $2.7 billion total payroll during operations, with $1.7 billion going to Alaska residents[409]; about $14 billion in expenditures on materials and services during operations, with $9.8 billion spent in Alaska[410]; $18.7 billion in profits over the life of the project, with $1.5 billion in royalties going to Calista Corporation[411]; $250,000 in annual lease payments to regional corporations that own lands crossed by the pipeline[412]; $40 million in

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[401] *See* Alaska Climate Change Strategy's Mitigation Advisory Group Final Report: Greenhouse Gas Inventory and Forecast and Policy Recommendations Addressing Greenhouse Gas Reduction in Alaska at 1-9 to 1-10 & Tbl. 1-1 (2009).
[402] *See* DEIS at 3.26-27, Tbl. 3.26-9, 3.26-29, Tbl. 3.26-10, 3.26-31, Tbl. 3.26-11.
[403] Interagency Working Group on Social Cost of Carbon, U.S. Government, Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866 at 2 (July 2015 revision).
[404] CEQ Guidance at 16.
[405] *See High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014) (noting that the agency had estimated the revenues, royalties, payroll, and local payment for goods and services that would be forgone under the no-action alternative but failed to account for the costs of carbon emissions).
[406] DEIS at 3.18-35, 3.18-37.
[407] *Id.* at 3.18-38.
[408] *Id.* at 3.18-39.
[409] *Id.*
[410] *See id.* at 3.18-41.
[411] *Id.*
[412] *Id.* at 3.18-42.

wages generated statewide through multiplier effects during operations[413]; $337 million in oil and gas property tax during construction and operations of the pipeline[414]; $701.4 million and $536.9 million in state corporate income tax and state mining tax, respectively, over the life of the project[415]; and $1.5 billion in federal income tax from the project.[416] In contrast, the DEIS states that "[t]he amount of greenhouse gas emissions from implementation of Alternative 2 is not likely to create socioeconomic effects from climate change."[417] Given that expected damages from each ton of carbon dioxide emitted are available in the form of the social cost of carbon, and that the mine site alone could emit nearly two million tons of carbon-dioxide equivalent annually,[418] the FEIS should monetize the project's potential climate-related harms.

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Aside from its assessment of the significance of the project's greenhouse gas emissions, the DEIS also fails to account for certain sources of emissions. Permafrost, for example, contains about twice as much carbon as the atmosphere and could accelerate climate change through a positive feedback cycle of warming and melting.[419] The DEIS observes that the project area largely contains warm, discontinuous permafrost,[420] and that this type of permafrost is particularly susceptible to surface thaw as ground temperatures increase.[421] It refers the reader to the section on air quality for estimates of greenhouse gas emissions resulting from permafrost degradation in the project area,[422] but that section contains no such information.[423] The FEIS must discuss the quantity of greenhouse gases that could be emitted from permafrost due to the project, as well as cumulative effects of permafrost degradation throughout the region.

*2. Related emissions*

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In addition to estimating a proposed action's direct contributions to climate change, agencies must analyze its indirect effects.[424] These effects include "emissions from activities that have a reasonably close causal relationship to the [proposed] action, such as those that may

[413] *Id.*
[414] *Id.* at 3.18-43.
[415] *Id.* at 3.18-45.
[416] *Id.*
[417] *Id.* at 3.18-49.
[418] *See id.* at 3.26-27, Tbl. 3.26-9.
[419] *See* E. A. G. Schuur *et al.*, *Climate Change and the Permafrost Carbon Feedback*, 520 Nature 171, 171 (2015); K. Schaefer *et al.*, *The Impact of the Permafrost Carbon Feedback on Global Climate*, 9 Envtl. Res. Letters 1, 2 (2014); *see also* DEIS at 3.26-20 (acknowledging that melting permafrost can give off greenhouse gases, and that permafrost stores almost twice the amount of carbon presently in the earth's atmosphere).
[420] DEIS at 3.26-17.
[421] *Id.* at 3.26-18.
[422] *Id.* at 3.26-40.
[423] *See id.* at 3.8-1 to 3.8-78. Section 3.8.2.4 includes the only mention of permafrost, but merely refers the reader back to section 3.26.
[424] *See* 40 C.F.R. § 1508.8(b) (defining indirect effects as those that are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable").

occur as a predicate for the agency action (often referred to as upstream emissions) and as a consequence of the agency action (often referred to as downstream emissions)."[425] For example, an EIS for an open-pit mine might need to analyze the downstream effects of using the resource, as well as various upstream effects.[426] Agencies must also assess the emissions of connected actions.[427]

The DEIS falls short in describing related emissions. It notes that emissions from the Bethel Port facility, admittedly a connected action,[428] are considered project emissions but are not disclosed because information is not available.[429] Similarly, it contemplates leaving electrical power facilities intact[430] and maintaining the pipeline after the mine closes,[431] yet it does not discuss the emissions that could result from continuing to operate the natural gas power plant.[432] Several upstream emissions go unmentioned as well, such as those caused by generating the electricity used at the pipeline compressor station[433] and by extracting natural gas.[434] Finally, the DEIS disregards potential emissions from a pipeline rupture or leak,[435] even

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[425] CEQ Guidance at 11.
[426] *See id.* at 12.
[427] *See* 40 C.F.R. § 1508.25 (defining connected actions as those that are "closely related and therefore should be discussed in the same impact statement").
[428] *See* DEIS at 2-48 to 2-49.
[429] *Id.* at 3.26-29, Tbl. 3.26-10 n.a.
[430] *Id.* at 2-41 ("When the electrical power demand no longer requires an operational power plant, the power plant, substations, overhead power lines, and associated facilities would be removed from the site, unless it is agreed upon by the land owner to keep them.").
[431] *Id.* at 2-128.
[432] *See id.* at 3.26-27 (discussing greenhouse gas emissions from the mine site during closure); 3.26-30 (discussing greenhouse gas emissions from the pipeline during closure).
[433] *See id.* at 3.26-30 ("The compressor station . . . would be powered by electricity; therefore, it would not have combustion causing GHG emissions."). *But see id.* at 3.8-62 ("Indirect air quality impacts associated with the operations phase of the natural gas pipeline component would occur at the Beluga power plant, due to increase in electricity generation required to power the compressor station.").
[434] *See id.* at 3.26-26 to 3.26-27 (failing to mention extraction-associated emissions as an indirect source); *see also id.* App. B at 90 (noting concerns, raised during scoping, about the use of hydraulic fracturing to extract natural gas for the project). Hydraulic fracturing can release much more methane—a potent greenhouse gas—than conventional methods of extraction. *See, e.g.*, R. W. Howarth, R. Santoro & A. Ingraffea, *Methane and the Greenhouse-Gas Footprint of Natural Gas from Shale Formations*, 106 Climatic Change 679, 685 (2011).
[435] *See* DEIS at 3.26-24 ("The effects of project-related spills . . . on climate change are considered not applicable."); *see also id.* at 3.24-20 (noting that about 2 pipeline incidents are expected to occur over the life of the project but that, "[b]ecause of the unlikelihood and negligible impacts of escaped natural gas to the environment, that scenario is not discussed in this analysis").

CLIM 12 though recent experience shows that natural-gas releases are not uncommon and can have major climate impacts.[436] The FEIS should fully discuss these foreseeable emissions.

B. The DEIS fails to disclose the emissions of the alternatives and explore options that would decrease emissions.

Under NEPA, agencies must "rigorously explore and objectively evaluate all reasonable alternatives," giving each of them "full and meaningful consideration."[437] According to CEQ:

> [I]f a comparison of . . . alternatives based on [greenhouse gas] emissions, and any potential mitigation to reduce emissions, would be useful to advance a reasoned choice among alternatives and mitigations, then an agency should compare the levels of [greenhouse gas] emissions caused by each alternative—including the no-action alternative—and mitigations to provide information to the public and enable the decisionmaker to make an informed choice.[438]

CLIM 3 One type of alternative an agency should consider to reduce greenhouse gas emissions is using renewable energy.[439] If an agency ignores an alternative that is reasonably related to the project's purpose, its NEPA analysis may be held invalid.[440]

The DEIS does not compare the alternatives' greenhouse gas emissions sufficiently to inform the Corps and the public. The underlying technical analysis of air quality impacts apparently assumes that the power plant generator and almost all other mine-site combustion sources will run on diesel fuel rather than liquefied natural gas (LNG).[441] Thus, the absolute impacts of Alternative 2 are not presented, and only the emission reductions from various changes in project design can be quantified. For example, the DEIS notes that using LNG-power haul trucks at the mine site under Alternative 3A would reduce emissions by about 64,000 tons of carbon-dioxide equivalent as compared to Alternative 2, without disclosing what the actual

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[436] *See* E. Ponsot, *California Natural Gas Leak Just One of Thousands Across Country*, PBS (Jan. 18, 2016), http://www.pbs.org/newshour/updates/california-natural-gas-leak-just-one-of-thousands-across-country/; J. Warrick, *California Gas Leak Was the Worst Man-Made Greenhouse-Gas Disaster in U.S. History, Study Says*, Wash. Post (Feb. 25, 2016), https://www.washingtonpost.com/news/energy-environment/wp/2016/02/25/california-gas-leak-was-the-worst-man-made-greenhouse-gas-disaster-in-u-s-history-study-says/.

[437] *Ctr. for Biological Diversity*, 538 F.3d at 1217 (internal quotation marks and citations omitted).

[438] CEQ Guidance at 19-20.

[439] *See id.* at 20.

[440] *See Ctr. for Biological Diversity*, 538 F.3d at 1219.

[441] *See* Air Sciences Inc., Air Quality Impacts Analysis Report: Donlin Gold Project, Alaska, App. A at 82-83 (2015). *Compare id.* App. A at 82 (using a conversion factor of 73.96 kg $CO_2$/MMBtu), *with* EPA, Emission Factors for Greenhouse Gas Inventories at 1 (2015) (showing conversion factors in the range of 73-75 kg $CO_2$/MMBtu for distillate fuel oils vs. 53.06 kg $CO_2$/MMBtu for natural gas).

emissions of either alternative would be.[442] Even more problematically, the climate-related advantages of Alternative 2 over Alternative 3B (diesel pipeline) are obscured by assuming diesel use in both alternatives; the DEIS simply notes that, under Alternative 3B, there would be "increased [greenhouse gases] from combustion of diesel in the mine site combustion equipment."[443] The FEIS should present greenhouse gas emissions under all the alternatives, and it should clearly identify the source of that information.

CLIM 3 Further, the Corps eliminated from consideration, without a satisfactory explanation, options that would have reduced the project's climate impacts. For example, it rejected wind power and run-of-the river hydroelectricity, supposedly because such technologies are infeasible at the scale necessary to power the mine.[444] Yet the DEIS does not explain why these and other renewable energy options, perhaps used in combination, could not provide at least some of the power the mine needs. It simply states that "other power alternatives remain infeasible to produce a portion of the power supply, especially considering the proposed action would provide natural gas to the site."[445] It also omits efficiency measures from the design features most important to reducing climate impacts.[446] Under NEPA, agencies must discuss "[e]nergy requirements and conservation potential of various alternatives and mitigation measures"[447]; this discussion is required even where a particular technique offers only a partial solution to the problem.[448] By disregarding options and design features that would reduce the project's greenhouse gas emissions, the Corps violates NEPA's command to consider reasonable alternatives.

## II. THE DEIS DOES NOT EXPLAIN HOW CLIMATE CHANGE WOULD ALTER THE PROJECT'S IMPACTS.

CLIM 1 NEPA requires that an EIS describe the environment that would be affected by the proposed action.[449] "The current and expected future state of the environment without the proposed action represents the reasonably foreseeable affected environment that should be described based on available climate change information, including observations, interpretive

[442] *See* DEIS at 3.26-49. Other differences in emissions from the proposed action that could be quantified are not. *See, e.g.*, *id.* at 3.26-54 ("Alternative 4 [Birch Tree Crossing Port] would have a slight increase in GHG emissions during operations of the transportation facilities when compared to Alternative 2.").
[443] *Id.* at 3.26-51. Elsewhere the DEIS states that using natural gas in the power plant and other machinery at the mine site would reduce greenhouse gas emissions by about 9.6 million metric tons over the life of the mine, but it is unclear how it calculated this figure. *See id.* at 3.26-47.
[444] DEIS App. C at C-67, Tbl. C-20. The Corps apparently did not consider solar energy, *see id.*, even though this option was raised in scoping comments, *see id.* App. C at C-5, Tbl. C-1.
[445] *Id.* App. C at C-68, Tbl. C-20.
[446] *See id.* at 3.26-47.
[447] 40 C.F.R. § 1502.16(e).
[448] *See Nat'l Wildlife Fed'n v. NMFS*, 235 F. Supp. 2d 1143, 1154-55 (W.D. Wash. 2002) (citing *Nat. Res. Def. Council, Inc. v. Morton*, 458 F.2d 827, 836 (D.C. Cir. 1972)).
[449] *See* 40 C.F.R. § 1502.15.

assessments, predictive modeling, scenarios, and other empirical evidence."[450] Depending on anticipated conditions, full NEPA review may disclose climate-related hazards and thus reveal more-resilient alternatives that should be considered.[451] In addition, communities and ecosystems that are already experiencing climate-related stresses may be more susceptible to environmental harms.[452] The Corps must therefore explain how climate change could exacerbate the project's impacts.

A. The DEIS disregards or downplays climate-related hazards.

Studies analyzing daily precipitation in Alaska generally indicate that extreme precipitation events will increase in frequency and intensity over the coming decades.[453] The frequency of these outlier events may respond more to warming than the frequency of average precipitation events because the atmosphere can hold exponentially greater amounts of moisture as temperatures rise.[454] Recent experience shows that abnormally high levels of precipitation and ensuing flooding can destroy waste dumps, seepage capture systems, and mine access roads; cause impoundments to overflow and dams to be breached; and push water treatment costs over-budget or cause releases of untreated water.[455] These impacts underscore the need to plan for worst-weather events throughout a project's lifetime and closure.[456]

The DEIS notes that dams at the mine site and the seepage recovery system were designed to accommodate maximum runoff events under the state's dam safety guidelines.[457] Those guidelines recommend and in some instances require a site-specific hydro-meteorological analysis to determine the probable maximum precipitation.[458] Yet the meteorological data for the mine site were apparently collected in 2004 and updated in 2011,[459] and they may no longer be current. In any event, the FEIS should assess the possible effects of climate change on the magnitude of inflow the dams and other facilities will likely need to withstand.

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[450] CEQ Guidance at 21.
[451] *See id.* at 23-24.
[452] *See id.* at 22.
[453] *See* K. E. Bennett, Changes in Extreme Hydroclimate Events in Interior Alaskan Boreal Forested Watersheds at 197 (Dec. 8, 2014) (unpublished Ph.D. dissertation, University of Alaska Fairbanks).
[454] *Id.* at 198.
[455] *See* W. McCullough, W. Jepson & B. Maehl, Zortman: Dealing with Extreme Weather Events at 5, 9-11, 15-16, 19, 26-28 (2011); T. D. Pearce *et al.*, *Climate Change and Mining in Canada*, 16 Mitigation & Adaptation Strategies for Global Change 347, 357-58, 360 (2011).
[456] R. D. Williams, BLM, Climate Change – Extreme Conditions: Do Plans of Operations Need to Include an Ark? at 29-44 (2012).
[457] *See* DEIS at 3.26-33. The same criteria apply to the design of the dam holding the operating pond under Alternative 5A. *See id.* at 3.26-57.
[458] *See* ADNR, Guidelines for Cooperation with the Alaska Dam Safety Program at 6-4 (2005).
[459] *See* BGC Eng'g Inc., Donlin Creek Gold Project Feasibility Study Update II: Tailings Storage Facility Design at 6 (2011).

Regarding the transportation facilities, the DEIS observes that higher precipitation in the fall and winter could lead to greater snowmelt during breakup, potentially blowing out culverts and bridges along the mine access road.[460] It rates the effect of climate change on these structures as low, however, because they are typically designed to withstand rare-weather events.[461] Similarly, it notes that greater discharge at breakup could increase the risk of bank erosion and scour where the pipeline crosses rivers[462] but characterizes these potential effects as "mostly low, in that the depth of cover designed for the 100-year event would be within the limits of historical variation"—while acknowledging that greater precipitation due to climate change could exceed historical maximums.[463] The FEIS should assess the likelihood that bridges and culverts will collapse and that the pipeline will be exposed at stream crossings under reasonable climate scenarios, and it should describe the extent of the resultant environmental impacts if structures fail during a major precipitation event.

Water management at the mine site also becomes an issue with increasing precipitation. The DEIS downplays such concerns by noting that Donlin Gold's water balance modeling included the 90th percentile of precipitation conditions from the past 30 years.[464] The model for pit-lake filling similarly assessed conditions in which groundwater recharge and stream flows were doubled.[465] Assessing the effects of wetter-than-average years on the mine's water balance or a long-term increase in filling rates on the pit lake, however, does not capture the possibility of dramatically higher short-term precipitation or worst-weather events that could result from climate change. As one expert explains, the pit lake's "pump and treat system would be required forever so all possible combinations of weather will eventually occur."[466] Likewise, "[t]reatment
CLIM 1 facilities must be designed to accommodate larger inflows that occur both as storm events and as long-term climate cycles."[467] The FEIS should address the capacity of the pit lake and the water treatment facility to sustain such inflows.

Not only could precipitation inundate facilities as temperatures increase, but permafrost thaw could destabilize structures and potentially even weaken the walls of the open pit.[468] At one mine in Canada's Yukon Territory, for instance, unexpected permafrost thaw caused tailings dumps to collapse and intrude into creeks, destroying fish habitat.[469] Structures built on slopes are especially susceptible to slumping and sliding as frozen soils melt and lose cohesion.[470]

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[460] *See* DEIS at 3.26-38.
[461] *Id.*
[462] *Id.* at 3.26-39.
[463] *Id.*
[464] *See id.* at 3.26-33 to 3.26-34.
[465] *Id.* at 3.26-34.
[466] Myers Memo at 4; *see also id.* at 18 ("It is critical to consider the potential inflow to the pit lake with not just an increased average flow but with a much increased variance to account for large inflow events occurring during a wet period.").
[467] *Id.* at 23.
[468] *See* Pearce *et al.*, *supra* note 455, at 349, 360.
[469] *Id.* at 358.
[470] *Id.* at 360.

The DEIS observes that areas upslope of the waste rock facility situated on ice-rich soils could become unstable, especially if hydraulic erosion occurs.[471] Seismic events could also cause deformation or slope failure if ice-rich soils remain under the waste rock facility post-construction.[472] Donlin Gold's engineering consultant concludes that excess ice in soils is not pervasive at the mine site even though about a third of the samples tested contained excess ice.[473] It recognizes that, where excess ice is present, thaw-induced settlement could compromise the integrity of the waste rock facility.[474] Yet neither the feasibility study nor the DEIS considers climate change when discussing the waste rock facility's stability,[475] and the DEIS's assertion that areas of permafrost underneath structures would largely be shielded from warming is unsupported.[476] The FEIS should analyze whether warming over the life of the mine and post-closure could cause the waste rock facility to collapse.

In addition, the DEIS briefly notes that thaw-settlement of ice-rich soils could lower the western rim of the open pit and increase the likelihood that Crooked Creek would overtop the wall during a flood.[477] Again, it does not discuss the effects of climate change on this risk or consider the possibility that thaw-induced settlement could compromise the integrity of the pit walls.[478] The FEIS should explain how the full range of potential settlement might increase the risk of overtopping and affect the pit itself.

Ground settlement underneath the pipeline could also cause serious impacts. The DEIS predicts that the ground underneath the pipeline could settle by as much as 23.5 feet during operations and 43 feet post-closure from permafrost thawing, with climate change accounting for 13 feet of the total settlement.[479] Air temperature is a useful proxy for ground temperature, and permafrost begins to disappear when mean annual air temperature rises to about 28 °F.[480] The modeling the DEIS relies on assumes that temperatures in the area of concern will continue to

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[471] DEIS at 3.2-81.
[472] *Id.* at 3.2-79; *id.* at 3.3-41 to 3.3-42.
[473] BGC Engineering, Inc., Donlin Creek Gold Project Feasibility Study Update II: Waste Rock Facility Design at 14-15 (2011).
[474] *See id.* at 46.
[475] *See id.*; DEIS at 3.2-79, 3.2-81.
[476] *See* DEIS at 3.26-41.
[477] *Id.* at 3.2-81; *id.* at 3.3-56 to 3.3-57.
[478] *See id.* at 3.2-81; *id.* at 3.3-56 to 3.3-57.
[479] *Id.* at 3.26-43. The DEIS identifies the north side of the Alaska Range as an area of particular concern. *Id.* A recent study confirms that this area will face an increasing risk of permafrost settlement due to warming at least through 2050. *See* E. Hong, R. Perkins & S. Trainor, *Thaw Settlement Hazard of Permafrost Related to Climate Warming in Alaska*, 67 Arctic 93, 100, Fig. 4 (2014).
[480] *See* Hong, Perkins & Trainor, *supra* note 479, at 95.

increase stepwise, by .04 °F per year, or a total of 3 °F, over the next 75 years.[481] Data from the University of Alaska Fairbanks's Scenarios Network for Alaska and Arctic Planning, however, indicate that warming may occur more rapidly.[482] The FEIS should analyze possible ground settlement under the pipeline based on realistic climate projections, instead of assuming that warming will continue to occur at its historical rate. It should also consider the potential for wildfires to exacerbate permafrost thaw and resultant ground subsidence.[483]

Along these lines, the Corps should characterize the risk of a pipeline rupture from thaw-induced ground settlement. The DEIS notes that Donlin Gold may apply for a special permit to use strain-based design in areas of discontinuous permafrost,[484] and that its application would involve tests replicating anticipated operating and environmental conditions.[485] Yet the DEIS does not specify the degree to which ground settlement could strain the pipeline, whether under the base case[486] or in a climate change scenario.[487] The Corps should address these potential impacts in the FEIS.

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[481] Memorandum from J. Fueg, Donlin Gold LLC, to N. Darigo, URS at 2 (May 14, 2014); *see also* J. P. Zarling, Geotechnical Thermal Analysis of Donlin Creek Mine Pipeline at 8 (2011) ("[A]n annual rate of increase in the mean annual temperature of 0.04 F°/year was chosen for this analysis. This results in an increase of 1.2 F° in the mean annual temperature over a 30-year period."); CH2M HILL, Donlin Creek Pipeline Project Geotechnical Report at 6-4 (2011) ("Potential effects of global warming were simulated with an annual increase in mean annual air temperature of 0.04°F over a 30-year period.").

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[482] *See* Community Charts, SNAP, https://www.snap.uaf.edu/sites/all/modules/snap_community_charts/charts.php (last visited May 5, 2016) (enter "McGrath, Alaska," select "High" representative concentration pathway, and hover over bars representing average monthly temperature from 2010-2019 and 2090-2099).

[483] *See* D. R. N. Brown *et al.*, *Interactive Effects of Wildfire and Climate on Permafrost Degradation in Alaskan Lowland Forests*, 120 J. Geophysical Res.: Biogeosciences 1619, 1636 (2015).

[484] DEIS at 3.25-15.

[485] *Id.* at 3.25-16.

[486] *Id.* at 3.2-84 ("Differential thaw settlement can have long-term effects on pipeline integrity."); *id.* at 3.2-85 ("[T]ransitions [between thaw-unstable and thaw-stable soils] are more likely to result in adverse thaw settlement or differential ground movement that could subject the pipeline to additional strain."); *id.* at 3.2-89 ("The effects of differential settlement below the pipe on pipeline integrity would be addressed through . . . Special Permit conditions."); *see also id.* App. E at E-7 ("Differing amounts of settlement along the alignment may . . . cause longitudinal bending in the pipe resulting in strains in excess of 0.5%."); *id.* App. E at E-8 ("Donlin Gold . . . recognize[s] the presence of discontinuous permafrost between [milepost] XX and [milepost] YY [*sic*] could potentially result in thaw settlement causing longitudinal pipe strains in excess of 0.5%.").

[487] *See id.* at 3.26-44 ("[T]he effects of differential settlement on pipeline integrity would be addressed through . . . Special Permit conditions."); *see also id.* at 3.26-6 ("Alternative pipeline designs to accommodate permafrost thaw effects would be evaluated . . . prior to issuance of a special permit.").

B. The DEIS does not adequately discuss how climate change could render the environment more susceptible to the project's impacts.

As an initial matter, the DEIS does not explain why it limits its analysis of climate change to the atmosphere, water, permafrost, biological resources, and subsistence.[488] Climate change will alter all aspects of the affected environment, and any discussion of the project's impacts that does not recognize this altered baseline is incomplete.[489]

In addition, the DEIS assumes that climate change would affect biological resources incrementally and that biomes would shift over an extended timeframe.[490] Even if warming occurs gradually and a total transformation of the living environment does not happen during the life of the mine, however, biological communities could begin to experience climate-related stresses within a timeframe relevant to project planning, and they may already be facing suboptimal conditions.[491] In northern regions in particular, amplified warming can have dramatic effects on species adapted to cooler habitats.[492] Partly due to this phenomenon and the resultant increase in wildfires, boreal forests in interior Alaska have been shifting from coniferous to deciduous composition since 1990, and the trend is expected to continue over the next several decades.[493] The FEIS should account for the near-term vulnerability of ecosystems potentially affected by the project when assessing its impacts on biological resources.

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[488] *See id.* at 3.26-6; *see also* Agency & Applicant Comments at 15-16 (comments by BLM identifying this issue).
[489] *See* CEQ Guidance at 21-22.
[490] *See id.* at 3.26-47; *see also id.* at 3.26-3 ("Because the effects would be incremental, the intensity of impacts for biological resources and subsistence would be low.").
[491] *See, e.g.*, C. Wobus *et al.*, *Hydrologic Alterations from Climate Change Inform Assessment of Ecological Risk to Pacific Salmon in Bristol Bay, Alaska*, 10 PLoS ONE 1, 2, 19 (2015) (noting that "salmon habitat quality could . . . be significantly modified by climate change over timescales that are relevant to planning for any large-scale mining activities"); A. S. Weed, M. P. Ayres & J. A. Hicke, *Consequences of Climate Change for Biotic Disturbances in North American Forests*, 83 Ecological Monographs 441, 454 (2013) (describing spruce beetle outbreaks associated with warming in Alaska); D. J. Isaak *et al.*, *Climate Change Effects on Stream and River Temperatures Across the Northwest U.S. from 1980–2009 and Implications for Salmonid Fishes*, 113 Climatic Change 499, 511-12, 513-14 (2012) (documenting recent warming of streams in the Pacific Northwest and concomitant effects on salmon).
[492] *See, e.g.*, Wobus *et al.*, *supra* note 491, at 2; *see also* A. W. R. Seddon *et al.*, *Sensitivity of Global Terrestrial Ecosystems to Climate Variability*, 531 Nature 229, 229-30 & Fig. 1 (2016) (finding that parts of the boreal forest belt, including southwest Alaska, have high ecological sensitivity to climate variability, which may indicate "pending ecological change").
[493] *See* D. H. Mann *et al.*, *Is Alaska's Boreal Forest Now Crossing a Major Ecological Threshold?*, 44 Arctic, Antarctic, and Alpine Res. 319, 323, 329 (2012); J. M. Wolken *et al.*, *Evidence and Implications of Recent and Projected Climate Change in Alaska's Forest Ecosystems*, 2 Ecosphere 1, 4, 10-11 (2011).

The DEIS also disregards the interactive or indirect effects of climate change on ecosystems. Variations in air temperature and precipitation can increase the prevalence of insects, disease, and invasive species; decrease snow and ice cover and permafrost; and drive wildfires, all of which may alter forest ecosystems.[494] For example, wildfires caused by warmer and drier conditions can affect the organic layer of soils and degrade permafrost, throwing off the successional trajectories of boreal forests.[495] Fungal infection has caused dieback in alders weakened by drought,[496] and loss of snow cover exposes birds and wildlife such as ptarmigan and snowshoe hares to predation.[497] In aquatic ecosystems, higher temperatures and a longer ice-free season may increase the rate of methylation of mercury, while extended food chains could lead to greater bioaccumulation of mercury in fish.[498] Complexities such as these go largely unacknowledged in the DEIS,[499] and their combined effects could make plants and animals—including subsistence resources—more susceptible to the project's impacts.

The climate-related impacts on ecosystems that the DEIS does mention do not receive adequate attention. It notes that "[a]n increase in wildfire frequency and intensity may create more early successional vegetation communities favorable to moose,"[500] but it omits the fact that burns may also impair habitat that caribou passing though the project area depend on during other seasons.[501] Similarly, it equivocates that warming may have "positive or negative" effects on fish and aquatic resources as habitat and food webs change, but it does not discuss how altered stream flows and more-intense barge scour could harm fish.[502] Indeed, the DEIS does not attempt to estimate alterations in flow from changes in precipitation,[503] even though studies suggest that the Kuskokwim River is sensitive to these kinds of variations.[504] Finally, the DEIS

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[494] Wolken *et al.*, *supra* note 493, at 8, Fig. 3.
[495] *Id.* at 10-11; *see also* H. Genet *et al.*, *Modeling the Effects of Fire Severity and Climate Warming on Active Layer Thickness and Soil Carbon Storage of Black Spruce Forests Across the Landscape in Interior Alaska*, 8 Envtl. Res. Letters 1, 2, 8 (2013); E. E. Jafarov *et al.*, *The Effects of Fire on the Thermal Stability of Permafrost in Lowland and Upland Black Spruce Forests of Interior Alaska in a Changing Climate*, 8 Envtl. Res. Letters 1, 9 (2013).
[496] Wolken *et al.*, *supra* note 493, at 12.
[497] *Id.* at 11.
[498] *See* G. A. Stern *et al.*, *How Does Climate Change Influence Arctic Mercury?*, 414 Sci. Total Env't 22, 30, 32 (2012).
[499] *See* DEIS at 3.26-45 to 3.26-47.
[500] *Id.* at 3.26-46.
[501] *See id.* at 3.12-18 (observing that individuals from several caribou herds could be present in the project area); K. Joly, P. A. Duffy & T. S. Rupp, *Simulating the Effects of Climate Change on Fire Regimes in Arctic Biomes: Implications for Caribou and Moose Habitat*, 3 Ecosphere 1, 12 (2012) (concluding that wildfires may cause significant declines in parts of some caribou's winter habitat).
[502] *See* DEIS at 3.26-35 to 3.26-37, 3.26-46; *see also id.* at 3.13-164 to 3.13-165.
[503] *See id.* at 3.26-12, 3.26-13, 3.26-15.
[504] *See* K. E. Bennett, A. J. Cannon & L. Hinzman, *Historical Trends and Extremes in Boreal Alaska River Basins*, 527 J. Hydrology 590, 601, 602-03 (2015).

CLIM 1 ignores potential climate-related cumulative effects that could worsen the project's impacts.[505] Without a more complete picture of the effects of climate change on the affected environment, it is impossible for the Corps and the public to evaluate the consequences of the proposed action.[506]

## CONCLUSION

For the reasons discussed above, the DEIS does not adequately analyze the potential consequences of the proposed action, nor those of the full range of reasonable alternatives. NEPA demands that it do so. Given the project's magnitude, the complexity of the risks posed, and the sensitivity and cultural importance of the resources affected, it is essential that both the public and the Corps be fully informed before the Corps renders a permitting decision. We therefore urge the Corps to prepare an SEIS that completely addresses the issues identified in these comments, as well as those raised by other interested groups and individuals.

Sincerely,

Thomas S. Waldo Peter Heisler

*Attorneys for Northern Alaska Environmental Center, Alaska Community Action on Toxics, Earthworks, Center for Biological Diversity, Cook Inletkeeper, Friends of Alaska National Wildlife Refuges, Kachemak Bay Conservation Society, and Sierra Club*

[505] *See* DEIS at 4-56 (discussing only other actions' contributions to climate change); *see also id.* at 3.26-63 ("While climate change effects on permafrost would be extended in extent, project-related impacts on climate-altered permafrost would be limited to intermittent areas of permafrost and localized beneath facility footprints and cleared areas.").

[506] *See* 40 C.F.R. § 1502.15 (requiring agencies to include in an EIS a description of the affected environment sufficient to understand the effects of the alternatives).

**DOCUMENTS CITED IN EARTHJUSTICE'S COMMENTS ON THE DONLIN GOLD PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT (MAY 31, 2016)**


Air Sciences Inc., Air Quality Impacts Analysis Report: Donlin Gold Project, Alaska (2015)

Alaska Climate Change Sub-cabinet Mitigation Advisory Group, Final Report: Greenhouse Gas Inventory and Forecast and Policy Recommendations Addressing Greenhouse Gas Reduction in Alaska (2009)

Alaska.org, *Rohn Roadhouse Safety Cabin*

Alaska Department of Environmental Conservation, Alaska State Greenhouse Gas Emissions Inventory (2015)

Alaska Department of Natural Resources (ADNR), Guidelines for Cooperation with the Alaska Sam Safety Program (2005)

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# TECHNICAL MEMORANDUM
# REVIEW OF THE DRAFT SUPPLEMENT ENVIRONMENTAL IMPACT STATEMENT FOR THE DONLIN GOLD PROJECT

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Prepared for: Northern Alaska Environmental Center

Prepared by: Tom Myers, PhD, Hydrologic Consultant, Reno NV

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# 1.0 INTRODUCTION

Donlin Gold, LLC (Donlin) has proposed to construct the Dolin Gold Project in the Kuskokwim watershed in southwest Alaska. The U.S. Army Corps of Engineers (Corps) is the lead agency for the preparation of the draft environmental impact statement (DEIS). The proposed project includes a large open pit mine with transportation facilities to a port at Bethel Alaska, and a natural gas pipeline from Cook Inlet.

This technical memorandum reviews the DEIS and supporting documents with an emphasis on hydrogeology at the mine sites. The emphasis is on the effects of mine dewatering, pit lake development, treatment of contact water (rainfall or snowmelt that has contacted lands disturbed by mining), and seepage from tailings and waste rock facilities reaching the streams. Dewatering effects include the effects on stream baseflow. This review does not include transportation facilities, port development, or the natural gas pipeline.

My background includes a PhD and MS in hydrology/hydrogeology from the University of Nevada, Reno and a BS in civil engineering from the University of Colorado. I have 35 years of employment experience in consulting, academics and government, with about 20 years specific to mining and energy development hydrogeology. My specialties include numerical modeling and contaminant transport. I have published 17 peer-reviewed journal articles with five articles since 2009 concerning groundwater modeling, contaminant transport, and aquifer water balance. My CV is attached to this review.

# 2.0 SUMMARY OF MAJOR IMPACTS OF THE PROPOSED PROJECT AND ERRORS WITH THE DEIS ANALYSIS

GRD 1

Development of the proposed mining project would affect the hydrogeology in the mine site area in the following ways.

Mine dewatering will substantially lower the groundwater table near the pit and in surrounding bedrock. Although errors in the conceptual flow model and numerical groundwater model cause the DEIS to under-predict the dewatering impacts, dewatering to keep the pit dry would intercept groundwater flowing toward a stream where it would be become baseflow. Dewatering will reduce streamflows by up to 10 and 30 % during summer and winter, respectively, according to the DEIS. Various uncertainties acknowledged in the DEIS could increase the flow loss from the creek.

HYD 7

Mine construction affects surface runoff in many ways, including the pit intercepting surface runoff in American Creek, thereby preventing it from reaching the stream and the tailings impoundment covering 70% of the Anaconda Creek drainage which prevents a large proportion

HYD 7

of that streams' flow from discharging to Crooked Creek. Ancillary mine facilities such as freshwater reservoirs divert or use surface water runoff which can affect both high and low streamflow rates. Together these effects could lower flows in the creek even more than just by dewatering, with some estimates being as high as 100 percent loss during winter baseflow periods.

WAQ 10

The mine would require approximately 17,438 gpm for processing which would be discharged to the tailings impoundment during operations. Water for the process plant comes from various places, including freshwater reservoirs, contact water reservoirs, and dewatering wells. Excess water would be discharged to Crooked Creek with treatment, so failures in the collection and treatment system would discharge contaminants to and degrade Crooked Creek. During operations, expected discharge from the water treatment plant is 1268 gpm with 786 gpm from mine dewatering and the remainder from underdrains and contact water reservoirs. All sources are subject to much uncertainty meaning that periodic high flows could overwhelm the treatment system. For example, if the bedrock has a significantly higher conductivity, the dewatering rates could be much higher because it would pull water from further away and allow recharge to enter the bedrock from the shallow aquifer faster. Heterogeneity in the bedrock including with the faults could cause periodic high dewatering amounts. The DEIS does not plan for the probability that the treatment facilities will be periodically exceeded by dewatering water or other contact water requiring treatment before discharge.

CLIM 8

The pit lake would recover during mine closure to a point where it would overflow its rim, if allowed, into Crooked Creek. The pit lake water quality would be very poor, according to pit lake modeling, due to waste rock seepage into the pit and acid generating rock around the pit and backfilled into the pit. Donlin would start pumping pit lake water when it reaches 33 feet below the rim to treat and discharge into Crooked Creek. At this point, most of the flow losses from Crooked Creek would cease. However, there are uncertainties not considered in the DEIS that could cause the pit lake to fill and overwhelm the pump and treat system. A spill could devastate Crooked Creek. Climate change could increase precipitation by up to 25% on average but there would also be more frequent very large events, which is not considered in the DEIS. This pump and treat system would be required forever so all possible combinations of weather will eventually occur.

GRD 1

The DEIS relies on the mine dewatering system and the pit lake to draw groundwater including seepage from the waste rock dump and prevent it contaminating downgradient groundwater or discharging to Crooked Creek. However, there is a significant probability that a perched aquifer will form in the shallow aquifer as dewatering lowers the groundwater table. This will short-circuit seepage from the waste rock dump to Crooked Creek. I describe the details in the next few paragraphs concerning the numerical groundwater model. Drawdown occurs under the

GRD 1

tailings impoundment but it will not draw groundwater to the pit because drawdown does not eliminate the ridge in the groundwater table between the tailings and the pit. Seepage escaping the underdrain will flow through the colluvium under Anaconda Creek and either discharge into Anaconda Creek or into the alluvium around and ultimately into Crooked Creek.

DAM 3

The DEIS does not consider the impacts of catastrophic failure, such as would occur with a tailings dam failure. The analysis should consider the probable maximum flood occurring in the watershed because the facility will be there forever. The DEIS should present hydraulic routing of a reasonable portion of the half million tons of tailings down Anaconda Creek and Crooked Creek to show the potential damages.

GRD 4

Most of the DEIS predictions are from a numerical groundwater model. Two aspects of the numerical groundwater model severely bias the predicted impacts of dewatering. The bias is that simulated dewatering does not spread far from the mine pit and affects stream flows much less than it probably will.

- The conceptualization of the bedrock away from the mine pit has very low conductivity, lower than measured in most pump tests and lower than would be expected by considering the scale effects of small-scale test and regional scale models. It is treated as undifferentiated bedrock, meaning treated as one single mass, with a conductivity an order of magnitude less than most of the bedrock simulated within the pit area. This low conductivity prevents the spread of drawdown from the pit into the bedrock, thereby limiting how far the effects can spread. The low conductivity is not justified by observed pump test values or by scale effects which would cause the conductivity to be higher than determined from small-scale pump tests. This prevents the simulated drawdown from affecting overlying streams and wetlands.
- The alluvium around Crooked Creek is simulated with a very high conductivity and very low storativity. Low conductivity bedrock and colluvium surrounds the alluvium. This effectively isolates the alluvium and Crooked Creek from impacts of dewatering. The low storage coefficient allows the alluvium to release very little water for a change in water levels in the alluvium while the very high conductivity limits the change in head. This explains why dewatering drawdown effectively hits a wall at the creek.

GRD 1

The numerical modeling also fails to consider that a perched aquifer could develop in the shallow aquifer. This is partly due to the large difference between bedrock and shallow aquifer conductivity. As simulated drawdown lowers the water table from the shallow groundwater into the bedrock, it is likely that an unsaturated zone would form between a saturated zone in the shallow aquifer and bedrock. Seepage from the waste rock facility would discharge to Crooked Creek rather than be drawn to the pit lake, as relied upon in the DEIS. Drawdown

GRD 1 would occur in the bedrock and pull contaminants toward the pit lake, but perched zones in the shallow aquifer would provide a saturated pathway for contaminants to reach Crooked Creek. The numerical model fails to simulate this because the model cannot simulate such as system. The only potential mitigation would be a liner beneath the waste rock with a leak capture system.

PAA 9 The option for the tailings facility that best prevents seepage from degrading Crooked Creek is dry stack tailing with both a liner and impervious cover to minimize potential seepage with time after closure. This is necessary because the tailings are outside of the pit capture zone and seepage would drain to the streams.

PAA 14 The TSF should have a 100-mil liner rather than a 60-mil liner to make leaks would be less likely. The TSF should have an impervious cover to prevent percolation through the tailings from mounding on the liner, which would increase head on the liner and the leak rates and potentially cause instability problems.

HYD 9 Donlin should consider removing the Snow Gulch Reservoir from the plan to avoid impacts to that tributary watershed.

PAA 27 They should also leave a buffer between the pit and the Crooked Creek alluvium to decrease the connection with the alluvium and decrease the amount of water potentially drawn from the creek.

## 3.0 DEIS ALTERNATIVES

The DEIS describes five alternatives, including no action (alternative 1), the proposed action (alternative 2,) (mine layout shown in Figure 1), two alternatives that alter the pipeline and transportation routes but leave the mine plan basically as proposed under alternative 2 (alternatives 3 and 4), and an alternative that would alter the mine plan to use dry stack tailings rather (alternative 5) than a slurry system. Dry stack tailings alternative 5 has two options. Option 1 would not be lined but there would be an underdrain to remove seepage. Option 2 would have a liner. There would be eight freshwater wells for domestic and sanitary uses, and up to 35 pit perimeter wells and 80 in-pit dewatering wells (DEIS, p 2-9).

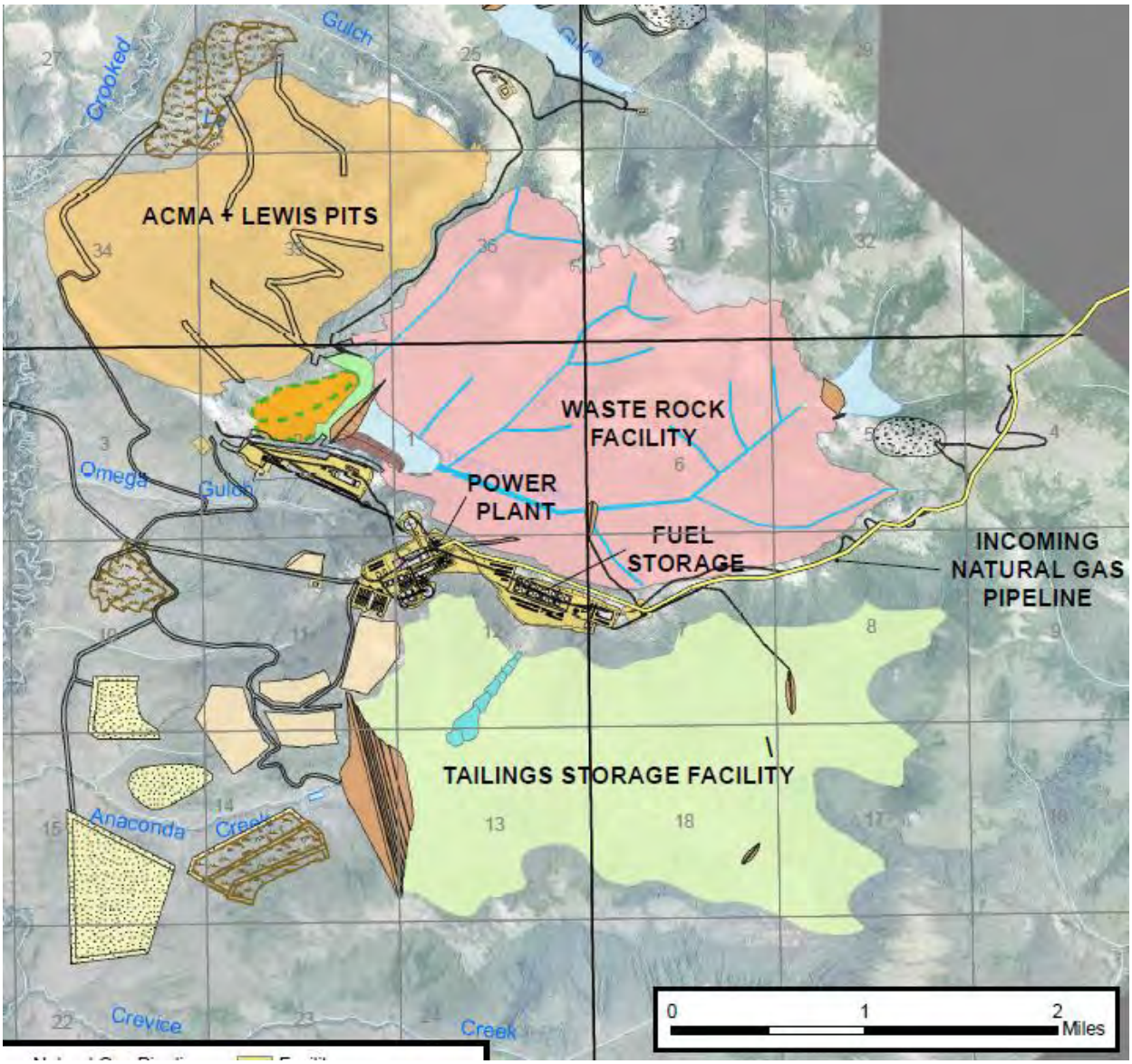


*Figure 1: Alternative 2 general mine layout - DEIS Figure 2.3-1*

## 3.1 Recommended Additional Alternative

PAA 27

A primary impact of this proposed mine is the impacts mine dewatering and pit lake formation could have on stream flows. As will be discussed in section 9.0, the properties of the bedrock separating the proposed pit from the alluvium under Crooked Creek have some control over the amount of surface water drawn from the stream into the groundwater. Several amendments should be made to Alternative 2 or should be added to an existing alternative and considered as a new alternative.

PAA 27
- The DEIS should include a setback alternative which requires the pit excavation not intersect the Crooked Creek alluvium. There should be a minimum setback from the creek of several hundred feet to protect stream flows. The exact distance could be determined based on additional understanding of the bedrock properties.

PAA 14
- The waste rock facility (WRF) that would be constructed over the American Creek should have a drain through it to allow streamflow to pass without being captured in an upper contact water pond. Below the WRF, there should be a channel created to allow it to pass the proposed pit

HYD 9
- Snow Gulch Reservoir should be removed if not really needed. See section 7.3 below.

## 3.2 Adaptive Management and Monitoring

The Corps calls for adaptive management activities pertaining to groundwater hydrology. Donlin should assess monitoring data especially with respect to drawdown to assess whether the groundwater monitoring regime is adequate. Donlin should assess whether drawdown has extended beyond the monitoring system.

- If drawdown at the most distant wells from the mine has become significant, new monitoring wells should be installed. This should be assessed at least every three years during operations.

GRD 12 The groundwater model would be reexamined after three years of pit dewatering to "minimize uncertainty about dewatering effects" (DEIS, p 3.6-44; DEIS, Table 5.7-1). This should include verification of the original model to assess the accuracy of the DEIS predictions.

- If they differ substantially, then new modeling and new NEPA analysis should be completed based on new predictions. A substantial difference is difficult to establish in advance, but would probably include the dewatering pumping rate being off by 100% (pumping twice the expected amount), having drawdown at a monitoring well twice that predicted, or having Crooked Creek lose flow along an unexpected rate or more than expected.
- New modeling should include new ideas of the conceptual flow model in the area. Two obvious considerations are the modeling of the bedrock as a porous media without considering fractures and the distribution of recharge throughout the area.

CLIM 10 The Corps indicates that climate change should be considered in future modeling (DEIS, p 3.6-45, DEIS Table 5.7-1 #3). Long-term climatic observations at the site should be compared with climate model predictions to assess the accuracy of the predictions with respect to Donlin.

CLIM 10

- Climate change effects on the project should be included with each model update and use the most current precipitation forecasts from global climate models. If the simulations predict substantially different potential future conditions, the Corps should complete supplementary NEPA analysis to disclose to the public the potential changes and to allow the public to provide additional comment.

## 4.0 MINE DEWATERING

Mine dewatering is the process of removing groundwater for the purpose of lowering the water table, or causing drawdown, to keep the mine pit dry. At Donlin, the company would use pit perimeter wells, in-pit wells, and horizontal drains in the pit wall. The water table would be drawn down near the Donlin pit as much as 1400 feet.

The lateral extent that drawdown expands to depends on recharge because recharge replaces groundwater as it is removed. Dewatering removes water out to the extent of an influence zone where the dewatering pumpage equals the sum of recharge that is captured and streamflow induced to recharge. Drawdown will expand until it has captured an amount of recharge and streamflow equal to the pumping rate needed to lower the water table at the mine. At the point where dewatering pumpage equals recharge, the groundwater pumping will approach steady state. Dewatering affects larger areas in dry regions because the recharge is low and smaller areas in wet regions because of the much higher recharge.

GRD 17

The bedrock hydrogeology controls the dewatering rate and affects how rapidly the drawdown expands. This effectively means conductivity (K), the ease with which groundwater flows through a porous media. All else being equal, more water will be pulled more quickly from further away with a high K value. This means the drawdown cone would approach its maximum extent more quickly with a high K.

### 4.1 Recharge

Groundwater recharge equals 5.5 in/y or 28 percent of average annual precipitation (DEIS, p 3.6-11). The DEIS does not provide a reference for this estimate, but the numerical model report (BGC 2014c) references BGC (2011b) as the source of the recharge estimate. That document mentions recharge only in an appendix which is a memorandum regarding "Potable Water Supply Assessment"; it states: "[a]verage annual recharge in the mine area was assumed to be 139 mm/y, based on the feasibility calibration of the numerical groundwater flow model (BGC 2007c)". The reference section does not have a BGC 2007c, but BGC 2007g is "Numerical Hydrogeologic Model Results ad Pit Dewatering Design, Final Report".

Recharge is usually estimated in a conceptual model report, but the most recent conceptual model report for Donlin, BGC (2014g), does not derive recharge. The amount used for this project, 5.5 in/y, is not unreasonable, based on my experience, although it is higher as a proportion of annual precipitation than most areas. Because snowmelt is a slow process the estimate is not unreasonable.

- It is important for the DEIS to have an accurate description of recharge, one of the most important hydrogeologic parameters, and how it was determined.

GRD 17 Recharge equals groundwater discharge from a basin which is at steady state (Myers 2016, Cherkauer 2004). Usually, groundwater discharge is stream baseflow. For the Crooked Creek watershed, recharge would equal baseflow at the mouth of the basin expressed as a depth, in inches, over the watershed. It could be estimated for smaller tributary basins if such detail is desirable but the accuracy may decrease if groundwater tributary areas do not exactly match topographic boundaries. In the Crooked Creek watershed, there could be two forms of baseflow because discharge from alluvial/colluvial aquifers should differ from discharge from bedrock aquifers. Shallow aquifers could effectively drain more quickly than the bedrock aquifers which should provide the late-winter baseflow. If the actual amount of recharge reaching bedrock is small, the drawdown in bedrock should expand more than it appears to and have a much larger effect on winter than on late summer flows (DEIS, Figure 3.6-8).

Recharge affects the DEIS predictions by its effects on groundwater model simulations, as reviewed below in section 9.3. In general, higher recharge means higher discharge and calibrating a model using higher groundwater flux rates would lead to higher estimated K values. Together, high recharge and high K could lead to higher dewatering estimates.

GRD 1 The modeled bedrock K is very low and that of the shallow aquifer, either colluvium or alluvium is much higher, as I describe below, so some of the recharge probably moves through the surficial aquifer to the nearest stream under natural conditions. Depending on the connection between the shallow and bedrock aquifer, dewatering of the bedrock might not pull all of the groundwater from the shallow aquifer into the bedrock which means that the shallow aquifer might remain saturated and continue discharging to the streams. While this might limit the effect of dewatering it also would affect the transport of contaminants from the TSF and WRF to the streams. Isotope data indicates that the age of groundwater varies from 21 to 56 years and that deeper water is older which generally follows the groundwater recharge path.

GRD 1 The DEIS notes that prediction of the impacts due to dewatering are very uncertain. "Sensitivity analysis simulations (see discussion below in this section) suggest that prediction of the amount of streamflow depletion is difficult." (DEIS, p 3.6-25) This refers to sensitivity of

GRD 1 the model predictions to both recharge and bedrock properties. I review model sensitivity in section 9.7.

## 4.2 Bedrock Hydrogeology

Most pit excavation will be in bedrock, so bedrock will control groundwater flow to the pit and, through connections with streams, control how dewatering affects groundwater baseflow. The DEIS (Table 3.6-2) reports bedrock K varies over about four orders of magnitude at each depth level for three different levels, upper (<330 ft), middle (330 – 660 feet depth), and lower (>660

GRD 2 ft depth). The K ranges are 0.006-14, 0.0009-0.9, and 0.0003-0.2 ft/d, respectively.

The gap analysis for hydrogeologic data acknowledges that scale could affect the hydrogeologic properties in the modeling (BGC 2013b). In general, the K of a formation increases with the scale of the volume being considered. This generally means that a single-well pump test or slug test yields a lower K estimate than a several day pump test with monitoring wells, with lab tests and groundwater modeling K estimates also considered on a similar scale relationship. The gap analysis suggests that BGC complete larger scale pump tests. As noted below in section 9.0, the numerical model did not account for scale effects.

The conceptual model report identifies up to 18 faults crossing the open pit zone (BGC 2014g). Little is known about the faults from a hydrogeologic perspective and they are not even mapped outside of the pit area. The bedrock hydrogeology treats the bedrock as a porous media meaning that the faults are not considered individually, either as flow barriers or conduits. Drawing 2 (BGC 2014g) shows mapped thrust faults mostly crossing the pit in a general east-west direction, but the mapping does not extend much beyond the pit. There is no indication of whether the fault layout in the pit is representative of faults beyond the pit. BGC (2014g, p 19) suggests that there is no indication of a trend of K with respect to the proximity to faults, but Drawing 26 does not show sufficient tests in the area with faults to

GRD 3 support this claim. Thrust faults can have high permeability damage zones. Therefore, if faults intersected by the pit have long-scale high permeability damage zones, dewatering effects could extend for a long distance beyond the pit and the predicted drawdown cone.

- The DEIS does not adequately disclose the properties of the faults that intersect the pit. The DEIS also does not propose monitoring or adaptive management for dealing with a fault system that extends drawdown far from the pit or causes much higher dewatering than expected. Model sensitivity analysis without actually simulating the faults is insufficient planning for the faults.

GRD 3

- If there is sufficient data, the DEIS should provide a plot of K versus distance from a faults to estimate whether there is a trend. There should also be more pump testing completed in the pit area among the faults to collect sufficient data for analysis.

## 5.0 PIT LAKE FORMATION

After mining ceases, mine dewatering would stop and groundwater would begin to flow into the mine. The open pit would fill in 50 to 55 years with groundwater inflow, surface runoff, and water from the TSF (DEIS, p 2-40), although other reports have estimated other times up to 60 years (Lorax 2012). TSF water would be pumped to the pit lake whenever it does not meet standards (DEIS, p 2-40); at the beginning of closure, about 30,000 acre-feet (af) of tailings water would be pumped into the pit so simulations of pit lake development start with an initial volume. The pit initially would be a hydrologic sink for regional groundwater but would eventually fill to a point where it would discharge into Crooked Creek, except that when the water level is 33 feet below the crest, the mine would begin pumping and discharging the water. This would be required in perpetuity to prevent the pit lake from overtopping its banks (Id.). Treatment sludge would be dumped into the pit lake (Id.).

GRD 6

Inflow to the pit lake is groundwater and runoff from various sources. The pit lake essentially would exist forever so the planning must account for all potential inflows and climate change. BGC (2015l) considers some of the extreme conditions the pit would experience in future, specifically "the ability of the pit lake to handle storm events during the post-closure period" (BGC 2015l, p 1). The average discharge to Crooked Creek, if not treated would average 2812 gallons per minute (gpm) and the treatment plant would be able to treat at rates up to 7486 gpm (Id.) with an operating period of six months per year. More inflow would require a longer annual operating period. To provide freeboard (not designed for any specific return interval), treatment of the pit lake would begin when the pit lake is 33 feet below its crest (Id.). There would be a spillway in the southwest corner of the pit near Crooked Creek designed to accommodate the probable maximum flood of 11,301 cfs (with flood routing through the pit lake, the actual discharge rate would be less). At water level elevation 328 (33 feet below the crest), the pit lake volume would be 376,170 af and at the crest of 359 feet above mean sea level (amsl) the volume would be 405,360 af (BGC 2015l, p 2). The watershed area above the outlet would be 5122 acres (Id.), although much of that would be the pit lake, and the estimated average annual runoff is 4700 af/y (Id.). At this rate it would require six years to fill the pit over the upper 33 feet, or 29,190 af (Id.). Presumably the difference would be made up by groundwater inflow.

## 5.1 Pit Lake Water Quality

The DEIS discloses that the pit lake "water quality … will not meet applicable water quality criteria without treatment" (DEIS, p 3.6-35). The DEIS and supporting documents complete substantial modeling of the pit lake water quality and show that it would be very poor. Details of that modeling are not reviewed here because there are huge uncertainties that lead to the precise predictions being inaccurate (Maest et al. 2005). The models are accurate enough to provide general trends of pit lake quality. DEIS Table 3.7-36 shows that the water quality of the surface layers of the pit lake would exceed standards for aluminum, antimony, arsenic, cadmium, copper, iron, lead, manganese, molybdenum, selenium, and mercury with pH being lower than standard (DEIS, p 3.7-129). Seepage inflows to the pit lake from PAG waste rock and from the tailings impoundment are extremely poor with sulfate inflow being as high as 180,000 mg/l (compare to a standard of 250 mg/l) (DEIS, Table 3.7-37). The modeling does depend on the pit lake remaining stratified because the pit lake quality at depth is extremely poor.

GRD 6

The predictions are accurate enough to plan around two aspects of the pit lake. Groundwater outflow from the pit lake would contaminate surrounding groundwater and discharges from the pit lake to surface water would contaminate Crooked Creek, in violation of standards and discharge permits.

## 5.2 Pit Lake Discharge Control

The plan is to use lake level management, basically pumping, to maintain the lake level at 10 to 30 feet below the level of Crooked Creek (Id.). The pumped water would be treated and discharged to Crooked Creek (Id.). The long-term treatment of water pumped from the pit lake, to prevent it overflowing, would be at 2911 gpm (BGC 2014b, Figure 5-4). This is pumping and treating in perpetuity. After closure and complete pit lake development[1], the groundwater inflow rate will probably not vary as much as it could during dewatering. However, the higher bedrock K scenario leads to substantially more groundwater inflow into the long term. The long-term pump and treat requirement could be much higher than specified here as a long-term average due to higher groundwater inflows. Runoff and precipitation entering the pit lake would cause short term variability.

WAQ 10

BGC estimates the volume of the probable maximum precipitation over the watershed is 5030 af in 24 hours, which is about one sixth of the freeboard (Id.). Treatment capacity in six months

[1] Many pit lakes only approach full development if evaporation exceeds inflow, mostly of groundwater. These terminal pit lakes usually have only evaporation as an outflow. The Donlin pit lake will reach full conditions because it will fill to its rim if pumping did not establish an outflow. The pit lake as a whole would therefore not be subject to significant evapoconcentration as a pit lake with evaporation as its exclusive outflow.

is 5920 af (Id.). BGC's conclusion is that the pit lake would have no difficulty holding large volumes of runoff for treatment in the future.

WAQ 10

This is essentially a treatment in perpetuity plan. The calibrated groundwater model predicted the pit lake would fill in 52 years while two sensitivity analyses predicted 26 and 39 years for a wet climate and more conductive bedrock scenario, respectively. The wet climate scenario had increased recharge and streamflow rates by a factor of two and the more conductive bedrock scenario has increased bedrock K by a factor of five. Both scenarios filled the lake faster because they provided more water more quickly than the calibrated model scenario. After the pit is full, groundwater presumably continues to flow toward it from all directions (Id.).

### 5.3 Groundwater Flows

GRD 6

The DEIS discloses that pit lake water would discharge to surrounding groundwater both initially and in the long term (DEIS, p 3.6-35), as described in Figure 2. This is partly due to the placement of unsaturated backfill in the pit and to the fact that as the pit lake fills water from the pit lake will resaturate the surrounding bedrock. This differs from many pit lake systems which fill primarily by groundwater inflow, but at Donlin the bedrock K is low and does not recover immediately. Figure 3 shows simulated groundwater inflow and outflow at Donlin.

GRD 6

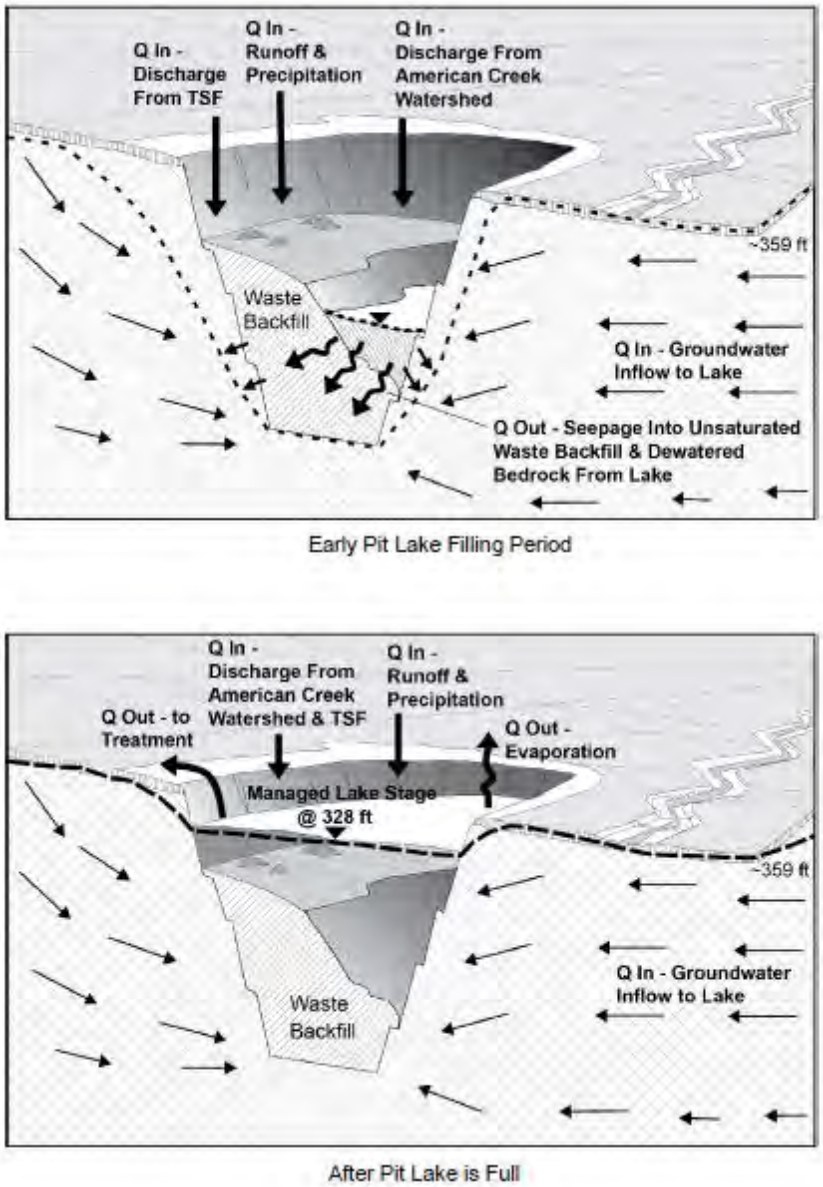


*Figure 2: Snapshot of a portion of DEIS Figure 3.6-9 showing the model of pit lake inflow and outflow.*

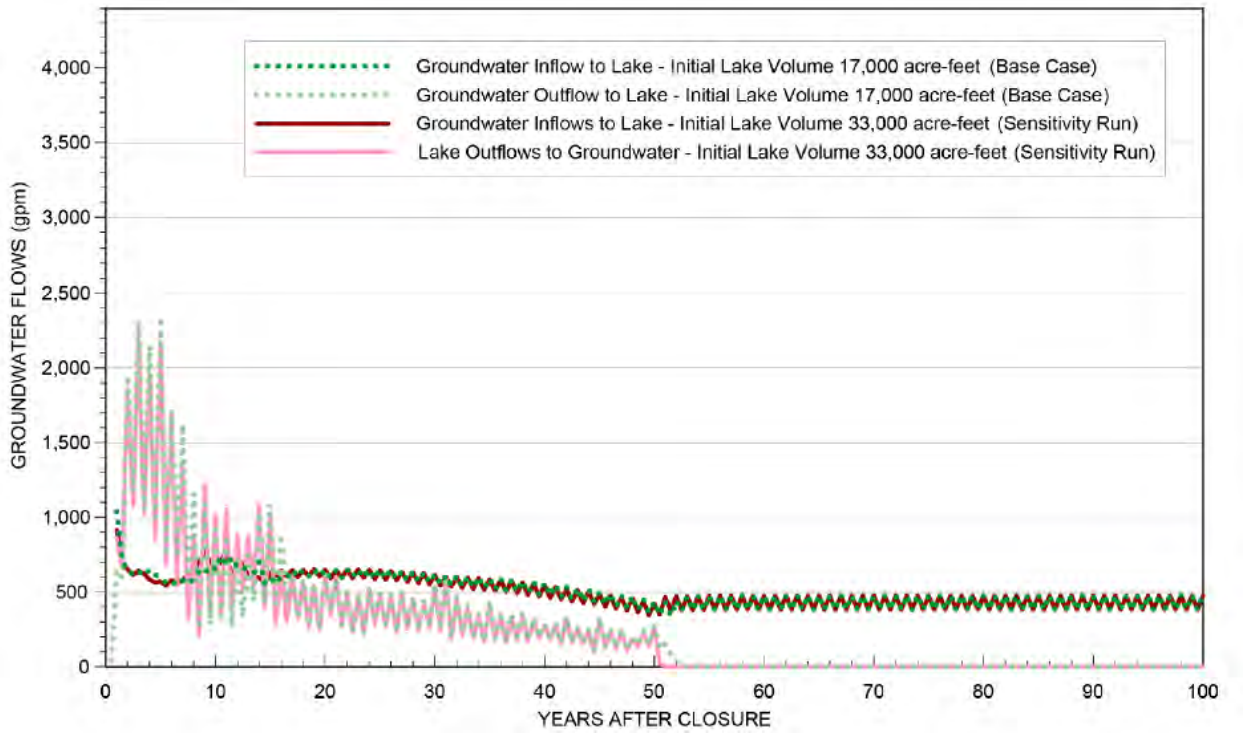


*Figure 3: Snapshot of a portion of DEIS Figure 3.6-10 showing simulated groundwater inflow to and outflow from the pit lake as the pit fills with water.*

GRD 6

Partially backfilling the pit causes an interesting system of groundwater inflow/outflow at the pit lake. The backfill would be unsaturated at the beginning of pit lake formation and therefore has to be wetted as part of the pit lake formation by groundwater outflow from the pit lake to the backfill (DEIS, p 3.6-35) (Figure 2). BGC (2014c) describes the groundwater/pit lake relationship:

> Results of the post-closure simulation show that the pit lake is predicted to fill to its managed maximum stage (i.e., 331 ft amsl or 101 m amsl) approximately 60 years after closure (Drawing 48). During the first 8 years after closure, pit lake water is predicted to seep out of the lake into the dewatered bedrock and into the pore space of the waste rock placed as backfill within the pit (see Figure 4-4). Predicted lake outflow during this period declines from approximately 2,860 gpm to 1,100 gpm (15,600 m3/d to 6,000 m3/d; Drawing 49). From Year 8 to 60 after closure, lake seepage or outflow is simulated to decline from 1,100 gpm to 0 gpm (6,000 m3/d to 0 m3/d) as groundwater elevations rise toward stable levels. Once the pit lake fills and groundwater elevations stabilize around the pit lake, seepage from the lake is predicted to cease. Thereafter, groundwater fluctuations are in response to seasonal changes and seasonal management of the lake stage. The managed lake stage results in a slight hydraulic gradient oriented toward the open pit, making the pit a groundwater sink. (BGC 2014c, p 45)

It is difficult to visualize how so much water leaves the pit lake and enters the surrounding groundwater (Figure 3), considering how the water table is hundreds of feet higher than the pit lake level (Figure 4). However, the modeling shows a significant outflow that is controlled partly by seasonal pit lake level changes. The net groundwater flow to the pit lake is very small (Figure 3) and the fact that discharge from the pit lake continues until the pit lake is almost full suggests pathways exist for flow to leave the pit lake and not return. This could occur at various depths depending on the details of the potentiometric surface.

GRD 6

The groundwater contours at the end of mining suggest one possible pathway for contaminants to leave the pit and possibly enter surface water (Figure 4). Southwest of the pit the groundwater contours are much lower than northeast of the pit due to the general slope of groundwater in the area. If the pit lake fills faster than the surrounding groundwater table, as indicated by Figures 2 and 3, it is possible that the pit lake creates pressure in deeper bedrock that causes an upward gradient to the creek away from the pit. Pit lake water could flow through deeper bedrock layers then upward toward the surface due to higher pressure conditions in deep bedrock.

- The DEIS or BGC (2014c) should present a detailed analysis of the potentiometric surface at depth near the pit lake to estimate where groundwater discharging from the pit lake would go. (The particle tracking diagrams in BGC (2014c) are not useful because they are apparently for single model layers whereas actual contaminants would change layers.)
- The DEIS or BCG (2014c) should present potentiometric surface maps for each model layer to assess whether outflow is possible from some depths in the pit lake.

GRD 6

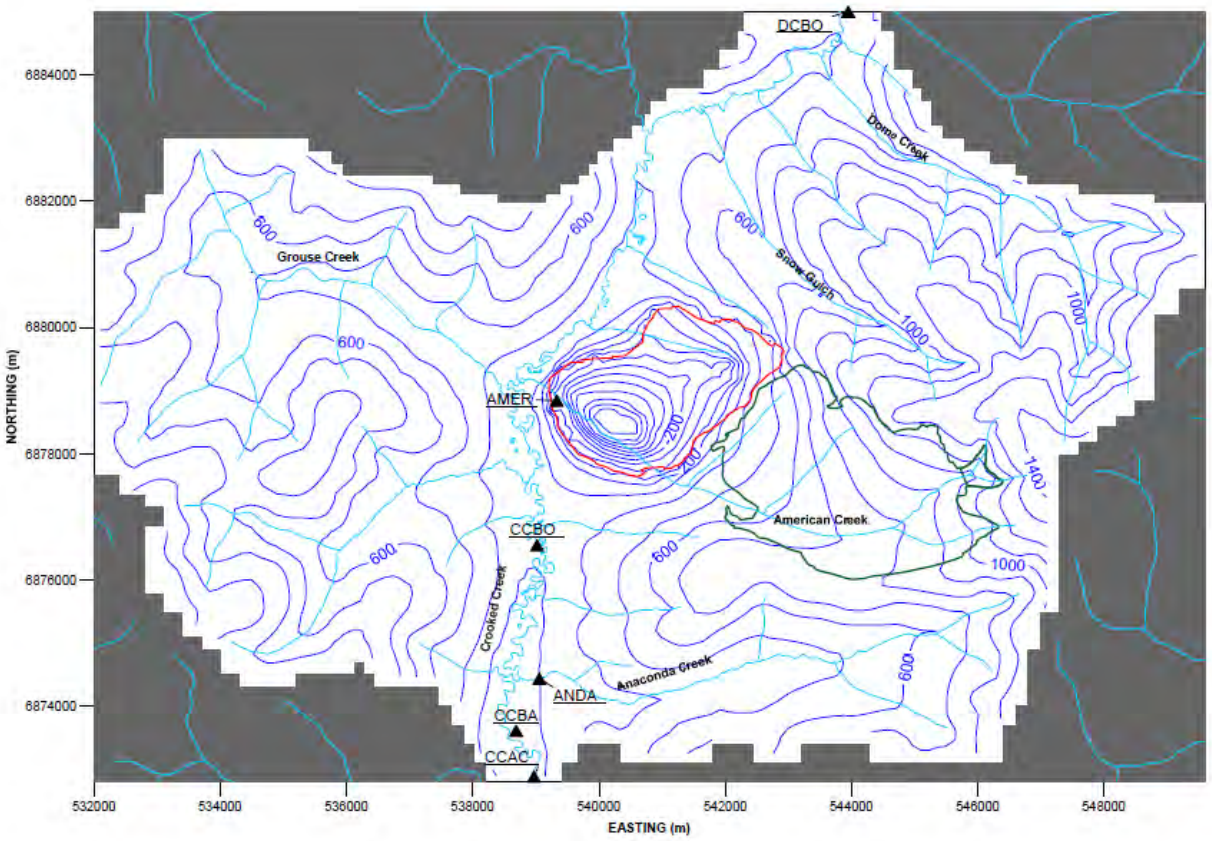


*Figure 4: Snapshot of Drawing 39 (BGC 2014c) showing simulated groundwater contours at the end of mining.*

## 5.4 Climate Change Impact on Pit Lake Planning

CLIM 8

The DEIS must plan for significant climate change into the future, as it appears to acknowledge (DEIS, p 3.26-2), due to the necessity of pumping and treating the pit lake water in perpetuity. Increased precipitation in this part of the Alaska must be considered because it could vastly increase the inflows to the pit. If they occur over a short-term period, it would seem likely that the potential for spills from the pit would increase.

However, the modeling does not include climate change. The design water balance is based on a deterministic data set of precipitation running from 1940 to 2010. Climate change will increase precipitation up to 25% over the next 80 years (DEIS, section 3.23), but as discussed above, the increase would be highly variable. It is critical to consider the potential inflow to the pit lake with not just an increased average flow but with a much increased variance to account for large inflow events occurring during a wet period.

CLIM 8

- Pit lake water balance simulations should include stochastically simulated precipitation events to account for the increased frequency of what are currently low frequency events.
- Pit lake simulations with climate change should also include simulations with higher groundwater inflow that could result from higher bedrock K or high-K faults and fractures.

Combined with the fact that groundwater inflow could be much higher (see section 9.0), the freeboard analyzed in BGC (2015l) is not as sufficient as suggested.

- The DEIS should disclose whether the closure treatment plant would be able to operate up to 12 months a year in all kinds of weather.
- The DEIS should plan for treatment on future conditions with climate change rather than being just based on the current climate statistics.

# 6.0 IMPACTS ON STREAM FLOWS

## 6.1 Pit Construction

Pit construction affects streamflow in two ways. First, dewatering to keep the pit dry would intercept groundwater flowing toward a stream where it would be become baseflow. Dewatering will reduce streamflows by up to 10 and 30 % during summer and winter, respectively (BGC 2014c, Drawing 44). Figure 5 shows reductions in groundwater discharges to various Crooked Creek tributaries caused by dewatering (BGC 2014c, p 40). The impact of dewatering decreases with distance from the stream.

HYD 7

Second, mine construction affects surface runoff in many ways, many having to do with mine water management described in Section 7.0. The pit would intercept surface runoff in American Creek, thereby preventing it from reaching the stream (BGC 2015h). The tailings impoundment would cover about 70% of the Anaconda Creek drainage (DEIS, p 3.5-77) which removes a large proportion of that streams' flow from discharging to Crooked Creek; much of that flow is diverted to mine water management as tailings water or as captured by the tailings underdrain. Ancillary mine facilities also divert or use surface water runoff which can affect both high and low streamflow rates.

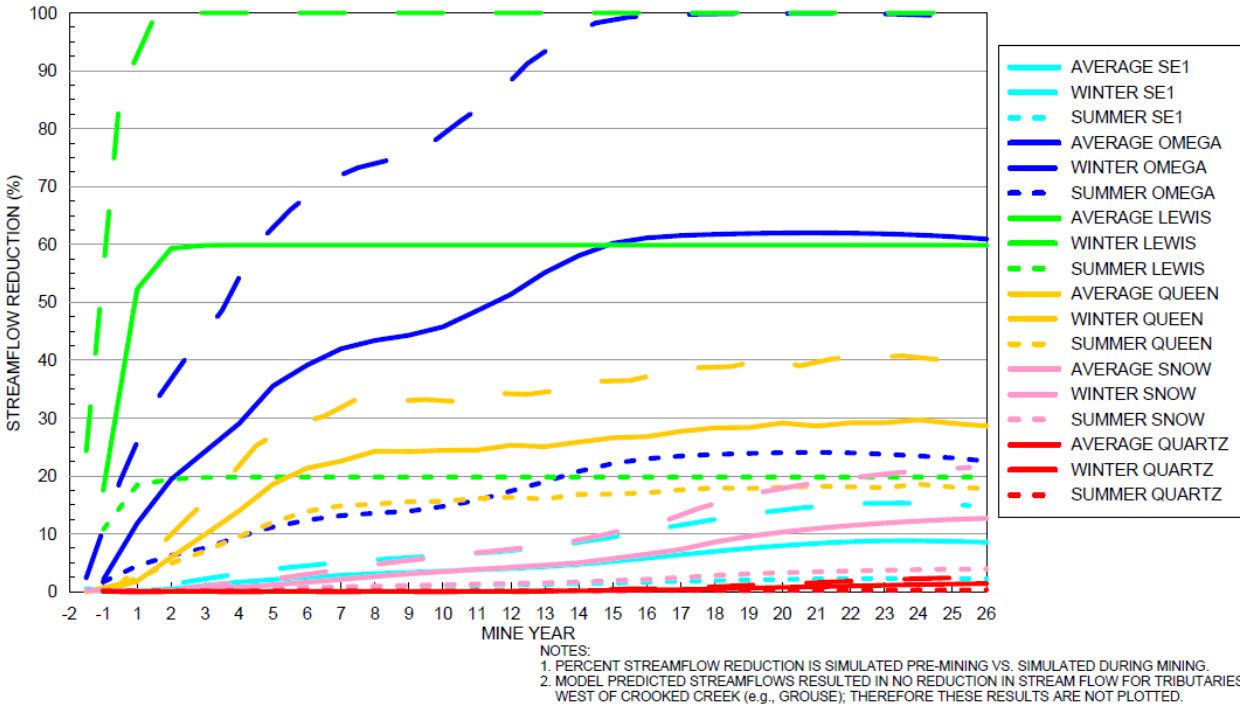


*Figure 5: Snapshot of Drawing 45 (BGC 2014c) showing reductions in flow from various Crooked Creek tributaries due to mine dewatering.*

HYD 7

Together, dewatering and mine water management cause very substantial changes in streamflows in Crooked Creek and its tributaries. The DEIS separates the discussion of impacts which can be very confusing. For example, the description of flow losses to Anaconda Creek (DEIS, p 3.5-76 - -77) does not address a loss to mine dewatering, but the summary of loss in DEIS Table 3.5-26 does include dewatering (as shown by the variation in losses for the high-K scenario which is a mine dewatering scenario in the groundwater model (BGC 2014c)). The DEIS apparently considers all impacts to Crooked Creek including cumulative impacts from the tributaries, which includes dewatering impacts (Figure 5). The failure to assign flow losses to specific activities increases the difficulty of considering mitigation.

- The DEIS should tabulate all of the predicted streamflow losses in the same table so that their magnitude can be compared

There is a lot of uncertainty around the predicted losses to Crooked Creek and other features.

MIT 31

Effects on Crooked Creek flow could vary widely depending on season, precipitation conditions, bedrock hydraulic K, phase of mine operations, and distance from the mine. For example, Crooked Creek flow below the mine site near Crevice Creek would be

MIT 31

reduced by 20 percent in winter under average precipitation and K conditions, and by 26 percent in dry conditions, during late operations (year 20 onward). The greatest flow reduction experienced near the mouth of Crooked Creek (at Bell Creek about 8 miles downstream of the mine) is projected to be 4 to 10 percent under the above conditions. In the event that K is higher than expected, 45 to 100 percent of Crooked Creek flow could be reduced in winter near the mine site under average to dry precipitation conditions, with much of the flow restored below Crevice Creek (16 to 40 percent reductions) due to tributary inflows. (DEIS, p 3.5-2)

Year 20 may be the year of maximum impact on Crooked Creek stream flows because the pit footprint would be at its maximum extent which would make for the greatest capture of runoff by the pit and because pit dewatering captures its maximum rate in year 20 (DEIS, p 3.5-82). Flow losses from Crooked Creek are as high as 100% (during year 20 at the confluence with American Creek for the high bedrock K, low precipitation scenario, DEIS Table 3.5-26), but are substantial all along the reach to Bell Creek.

- The DEIS should implement as mitigation for these flow losses a plan to discharge treated waste water in locations that would mitigate these losses.

## 6.2 Pit Lake Formation

Pit lake formation creates a permanent loss of water from Crooked Creek in two ways. First, the groundwater flow that pre-mine had been toward the creek will be reversed with the permanent drawdown to the pit reversing the gradient at the creek so that water flows into the groundwater. The Corps relies on this reversal of gradient to prevent highly contaminated pit lake water from reaching groundwater or downstream surface water. The streamflow loss to the pit lake would apply along the creek in the pit lake capture zone (the continuing drawdown cone near the pit lake). The second is that the pit would capture surface flows from American Creek, thereby preventing both high and low flows from reaching Crooked Creek.

- The overall effect of the pit depends on the timing of groundwater diversion from the creek, the hydrograph of captured water from American Creek, and the discharge of pit lake water into Crooked Creek.

Effects on surface drainages (Figure 3-5.1) appear mostly constrained to three drainages. If there are facilities that slope over drainage divides, the Corps should make efforts to avoid doing so.

# 7.0 MINE WATER MANAGEMENT

Mine water management is the plan for how the mine would handle water requirements throughout its operation. It is both a plan for obtaining necessary production water and for discarding water that hinders production. For example, approximately 17,438 gpm would be used for processing and discharged to the tailings impoundment during operations (DEIS, 3.5-21). Water for the process plant comes from various places, including freshwater reservoirs, contact water reservoirs, and dewatering wells. Stormwater management and mine dewatering are the two activities for which the mine attempts to discard excess water. Efficient management of the two can decrease the impacts the mine has on the environment, but the Donlin water management could be improved as described here.

## 7.1 Discharge to Crooked Creek

Excess water would be discharged to Crooked Creek with treatment, so failures in the collection and treatment system would degrade Crooked Creek. During operations, expected discharge is
WAQ 10 1268 gpm with 786 gpm from mine dewatering (DEIS, Figure 3.5-21). The remainder is from underdrains and contact water reservoirs, with all estimates being highly uncertain. There is a lot of uncertainty in the dewatering estimates, but during operations, most of the dewatering water (547 + 694 = 1241 gpm), whether through perimeter or in-pit dewatering wells, would be treated and discharged (783 gpm) to Crooked Creek (BGC 2014b, Figure 4-2). However, as discussed below, the high K modeling scenario would result in dewatering as much as 3.3 times higher than the predicted scenario. With time, the mine would have to increase its treatment capacity to accommodate this much extra flow. However, the actual geology is highly heterogeneous so it is probable that actual dewatering rates would be variable and could periodically far exceed the 3.3 times, especially if there are high K faults combined with the high K bedrock. The high precipitation scenario which estimates treatment at 859 gpm (BGC 2014b, Figure 4-3) does not encompass the potential for higher treatment rates due to heterogeneous bedrock.

- The DEIS should better plan for treating higher flow rates of dewatering water (and contaminated water from other sources.
- HYD 9 The DEIS should better plan to use dewatering water in operations rather than capturing freshwater flows. For example see section 7.3 regarding the need for Snow Gulch Reservoir.

## 7.2 Climate Change

CLIM 8

The Corps considered a climate change scenario for the mine site by using an estimate from a group at the University of Alaska Fairbanks, Scenarios Network for Alaska + Arctic Planning (SNAP). It was based on global climate models (GCMs). The SNAP data shows that precipitation during winter months "is projected to increase from current conditions over these decades" (DEIS, p 3.26-10), referring to the time from now to the end of the 21st century. By the 2060-2099 time frame, the SNAP data suggests that precipitation at the mine could increase by from 17 to 25 percent. DEIS Table 3.26-3 shows the increase by month for several future time periods. The table implies a systematic increase by month, but this does not disclose how those changes may occur. It is not likely that each storm system simply has increased precipitation. It is far more likely that a few large events will cause much of the increased precipitation. This could have significant impacts on aspects of the project affected by runoff, which would be much higher during these events. This perhaps could be most important with respect to treatment of runoff from various facilities.

- Treatment facilities must be designed to accommodate larger inflows that occur both as storm events and as long-term climate cycles.

## 7.3 Snow Gulch Reservoir

HYD 9

A reservoir would be constructed on Snow Gulch, north of the minesite, to provide a contingency source of water for the project (DEIS, p 2-27). "In years with average or below-average precipitation, the CWDs and pit dewatering system would not be able to meet process plant water requirements, in which case additional water would be obtained from the Snow Gulch reservoir" (Id.). However, the water balance modeling shows it provides only a small amount of water to the mine plan and that much more water would be discharged to Crooked Creek than obtained from Snow Gulch (BGC 2014b). During average conditions Snow Gulch would provide 136 gpm of water to the process plant (BGC 2014b, Figure 4-2) and BGC (2014b) Figure 4-1 shows the reservoir would hold about 3000 af most of the time. The process plant uses a large amount of water, with 17,484 gpm being discharged to the tailings; sources include contact water from the Lower and Upper Contact Water Dams (waste rock runoff and seepage), recycled water from the tailings, and dewatering water. Considering the treatment plant discharges 783 gpm to Crooked Creek, and that it is mostly dewatering water during operations, there does not seem to be a need for Snow Gulch water.

- The DEIS should provide better justification for constructing a reservoir in Snow Gulch. It should consider whether the water otherwise obtained from Snow Gulch could be obtained by dewatering at higher rates temporarily.

## 8.0 WATER QUALITY

WAQ 20

Donlin Mine could affect water quality in many ways although they can be summarized into three possibilities. First, meteoric waters could seep through waste facilities (waste rock or tailings) to reach groundwater or streams. Second, there would be discharge of waters collected from various sources to surface water after treatment. The sources include collected seepage from waste facilities, excess tailings water, contact water from contact water reservoirs, and excess dewatering water (DEIS, Figure 3.5-21). If the collection and treatment facilities work as planned, treated water should not degrade water quality. A third source is the long-term discharge of pit lake water to groundwater or surface water, as discussed above in section 7.1.

### 8.1 Seepage from Waste Facilities

WAQ 20

A significant issue is the potential for seepage from the WRF or TSF to reach streams thereby causing degradation. There will be over 3,000,000 kilotons of waste rock, which the DEIS claims would be about 91% NAG and the rest being PAG over varying time periods (DEIS, p ES-12). Most PAG-6 rock would be mined early and placed in isolated cells in the waste rock facility (WRF) (Id.). PAG-7 and some PAG-6 rock would be backfilled into the ACMA pit (Id.). In section 2.3, the DEIS identifies 2.99 billion tons waste rock, with 2.46 bil tons going into the WRF and the remainder backfilled into the ACMA pit (DEIS, p 2-7). Conventional tailings at 568 million tons will be held in a slurry tailings impoundment (DEIS, p 2-8).

GRD 1

DEIS Table 3.7-47 notes seepage from the WRF and TSF will exceed standards for various constituents. The Corps assumes that the seepage would either be captured by underdrains and treated or discharged to the pit lake (DEIS, Table 3.7-47, p 3.7-207). The modeling predicts that seepage from the waste rock dump would be diverted to the pit, both while dewatering and as a long-term pit lake. The DEIS relies on this mechanism to prevent stream degradation. The pit will likely be a sink for the bedrock aquifer, but there is much uncertainty regarding the shallow aquifer and whether it would drain towards the pit. The DEIS and supporting studies treat the shallow and bedrock groundwater system as being connected through the mining period, but there is no evidence supporting the assumption.

GRD 1

During pre-mining conditions, overall the aquifer would be unconfined with the pressure head in bedrock being similar to the water table in the shallow aquifer. As the groundwater simulation lowers the pressure below the top of the bedrock, it simulates the shallow aquifer becoming desaturated so that the bedrock aquifer becomes an unconfined aquifer. The reality may be that as pressure in the bedrock drops below the top of the bedrock, an unsaturated zone develops in the bedrock while the shallow aquifer remains saturated and functions as a

GRD 1

perched aquifer. The groundwater modeling code used to simulate dewatering, MODFLOW, is not capable of simulating the development of such an unsaturated zone, so the model results are not evidence against this idea.

GRD 1

Seepage from waste facilities would be into a rather thin surficial layer of alluvium, near the streams, or colluvium, over the mountains. The conceptual model report shows overburden thickness maps that indicate the colluvial thickness is rarely more than 30 feet in the American Creek drainage and mostly less than five feet in the Anaconda Creek drainage, except directly under the creek where it is more than six feet thick (BGC 2014g, Drawings 3 and 4). The groundwater model simulated the shallow aquifer as being 16 feet thick.

The shallow aquifer could have K substantially higher than the bedrock, at least in areas. As noted, the model cannot simulate the hydraulic disconnect that could occur during dewatering. Rather, the groundwater model simply draws groundwater from the surficial layer into the bedrock; the MODFLOW code can do nothing else because it simulates all layers as a saturated porous media with connections among all layers. It cannot simulate an unsaturated zone developing between the surficial layer and the bedrock in the upper part of the bedrock. Simulated drawdown in bedrock would lower the potentiometric surface below the bottom of the surficial aquifer after which MODFLOW simulations would simply desaturate the surficial aquifer.

GRD 1

Because the bedrock K is low, the surficial aquifer could remain saturated, and due to dewatering become perched at least in areas away from fractures. If hydraulic separation occurs and a perched aquifer develops, seepage from the waste facilities may not enter the bedrock and flow to the pit. Rather, the seepage could flow laterally through the surficial aquifer to the streams, thereby bypassing the pit. Seepage from the waste rock and tailings facilities could degrade surface water, primarily in Crooked Creek but also in its tributaries. All assumptions in the DEIS regarding contaminants reaching the pit and not the streams would be incorrect.

GRD 8

Mitigation would be very difficult. Pumpback wells, or converting monitoring wells to pumping wells, would not be effective unless they are very closely spaced[2]. This is because the surficial aquifer is thin and there is a limit to any capture zone that can be created. A capture zone is the portion of the aquifer that would be drawn to the pumping well. If the saturated zone within the aquifer is just a few feet or tens of feet thick, drawdown at the well would be limited

[2] Four monitoring wells would be installed downgradient of the TSF, two on each side of Anaconda Creek. On each side, one would be deep and one would be shallow. Each would be capable of pumping up to 90 gpm if necessary to capture TSF seepage downgradient of the tailings impoundment (DEIS, p 3.6-32). This would be grossly insufficient to capture seepage from the TSF.

GRD 8 to the interface with the bedrock; attempting to draw it lower could just create another bedrock/surficial aquifer disconnect. While theoretically, it is possible to intercept the flow through the surficial aquifer, the required well spacing could be as low as a hundred feet or even less.

PAA 14
- The only effective mitigation would be to avoid the seepage by having a liner under the waste rock. A liner would cause most seepage to collect in the underdrains.

GRD 1
- There is too little information concerning the connection between the surficial aquifer and the bedrock. Pump tests that show pumping in bedrock drawing from the stream are not actually testing what occurs if the potentiometric surface draws below the top of the bedrock; pump tests do not stress the system sufficiently to estimate the potential for a hydraulic disconnect.

## 8.2 Tailings Facility

The tailings impoundment would be lined with 60-mil liner. This is the same thickness as was used at the TSF at the Stillwater Mine in Montana. At Stillwater, the TSF has been shown to be leaky and the company will shift during future stages to 100-mil liner due to the failure of the 60-mil liner.

PAA 14

- The Donlin Mine should have a 100-mil liner rather than a 60-mil liner to make leaks would be less likely It would also reduce the amount of seepage captured in the underdrain and recirculated which could allow the TSF to be decommissioned more quickly.

The tailings facility is not within the pit capture zone, as shown in Figure 6. The tailings facility would lie over the Anaconda Creek drainage at the bottom of the figure. Although most of the watershed has drawdown due to the tailings impoundment capturing recharge (BGC 2014c, Drawing 40), the groundwater contours show that most of the Anaconda Creek watershed would drain to the low point beneath Anaconda Creek. The creek would lose substantial water due to a loss of recharge due to the tailings. Seepage however would report to the colluvium beneath Anaconda Creek and then to Crooked Creek.

PAA 9

- The best alternative from the perspective of avoiding contamination from the tailings facility is to use dry stack tailings with both a liner beneath them and then an impervious cover as part of reclamation. The DEIS predicts that seepage would be very low after 200 years. If leaks were limited, this option would minimize degradation to Crooked Creek. The impervious cover would help to prevent percolating water from mounding on the liner as well.

PAA 9

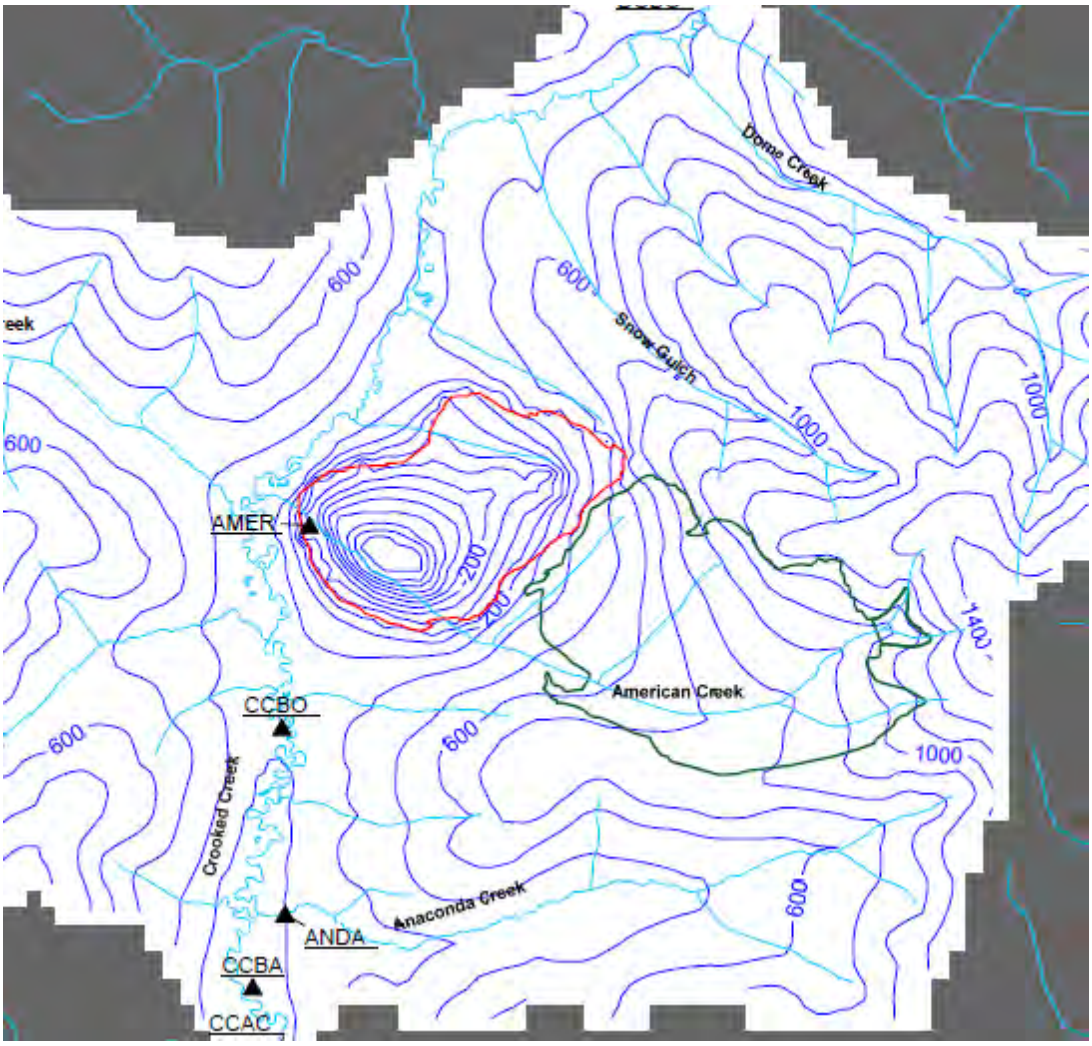


*Figure 6: Snapshot of a portion of Drawing 39 (BGC 2014c) showing the bedrock potentiometric surface at the end of mine operations.*

NEP 6

Some facilities are not within the predicted pit drawdown cone and the DEIS acknowledges a potential for contaminants to leach to Crooked Creek (DEIS, p 3.6-34). Mitigating measures include liners or other hydraulic containment and doing "further studies such as fate and transport groundwater modeling during final design" (Id.). These suggestions indicate the DEIS was issued prematurely since planning for the mine has not progressed far enough to even have completed all necessary studies or planned adequate mitigation.

- A supplemental DEIS is necessary to disclose important plans such as mitigation for seepage and to complete fate and transport modeling of contaminants leaching from mine facilities.

NEP 6 In closure, the pit lake would remain a hydraulic sink, but it would pull groundwater from much less of a distance during operations or early closure.

### 8.3 Failure Analysis

The Exec Summary notes that tailings are a "hazardous substance of concern" and that "focus is on high consequence, low probability occurrences [including] … partial tailings dam failure" (DEIS, p ES-44). DEIS section 3.24.3.5 notes such a failure as being a 1 in a thousand year event (DEIS, p 3.24-30), but a tailings impoundment must last forever so even events considered very rare or unlikely have a good chance of eventually occurring. The DEIS should complete a detailed flow routing of slurried tailings.

DAM 5

- The DEIS should analyze the risks associated with tailings dam failure. The analysis should consider the PMF occurring in the watershed because the facility will be there forever. The DEIS should present hydraulic routing of a reasonable portion of the half million tons of tailings down Anaconda Creek and Crooked Creek to show the potential damages.

The DEIS notes that "complete failure of the TSF SRS could lead to release of untreated water in a matter of weeks" (DEIS, p ES – 34). This is another example of a potential systems failure that could lead to substantial degradation in a short time period.

## 9.0 REVIEW OF GROUNDWATER MODEL DETAILS

Most of the numerical predictions of mine dewatering and impacts on stream flow rely on groundwater modeling. The details of groundwater modeling were presented in BGC (2014c) which is reviewed in this section. BGC (2014c) used the MODFLOW SURFACT code which is based on the MODFLOW code but has a proprietary numerical solver and a routine for simulating unsaturated seepage of recharge to the water table.

GRD 4

### 9.1 Model Structure

Layer 1 represents alluvium or colluvium up to 200 m amsl and is 5 to 10 m thick (BGC 2014c, p 22). Above 200 m amsl, layer 1 is bedrock, presumably representing an outcrop. Layers 2 through 9 are bedrock with layer 4 being about 70 m thick and layers 5 through 9 increasing from 100 m to 240 m thick (Id.). Layers are thickest in the uplands.

## 9.2 Parameter Zones

The geologic formations in an aquifer are delineated into zones for simulation. Each model cell is assigned a zone according to its geology. The properties include horizontal and vertical K, storage coefficients, and porosity. The values are initially set based on tests or literature values, and then adjusted during model calibration.

### 9.21 Conductivity

Within the pit area, the bedrock was delineated into 8 different sedimentary rock formations along with intrusives (BGC 2014c, p 24). Outside of the pit area, the bedrock was considered undifferentiated bedrock of the Kuskokwim group (Id.). Presumably this was done because the bedrock near the pit is better known than away from the pit. The figures showing parameter zones by layer show a complex square section near the pit that abuts against single parameters extending to the boundary; the single parameters are Kuskokwim – Valley and Kuskokwim – Ridge. There could be abrupt transitions among various parameter zones within a layer. This could have large effects on the flow patterns if the changes are substantial.

GRD 4

Basal Greywacke and Upper Greywacke have the same calibrated K values for the same layers (BGC 2014c, Table 7). For layers 1-4, 5, and 6-9 the K values are 0.1, 0.06, and 0.01 ft/d. These formations abut the Kuskokwim formation, which for layers 5, 6-7, and 8-9 have K equal to 0.03, 0,006, and 0.001 ft/d; above layer 5 the Kuskokwim (Ridge) K is 0.03 ft/d and the Kuskokwim (Valley) K varies from 0.1 to 0.3 ft/d (Id.). For layers 5 and lower the surrounding bedrock, undifferentiated Kuskokwim, has K about an order of magnitude lower than near the pit. The low calibrated K values away from the pit are not supported by the observed K values for bedrock near the pit area. The intrusive and shale formations within the pit area are also low K, but above layer 5 these will be removed within the pit. The detailed modeling occurs within the pit area and primarily is important during calibration because it would not be part of the simulation of either dewatering or pit lake development.

- The low K values away from the pit may prevent the expansion of drawdown away from the pit.

GRD 3 Zonation includes a trend of decreasing K with depth. Although they are extensive across the pit area (section 4.2), faults were not modeled except in the sensitivity analysis (Id.).

GRD 1 Calibrated horizontal and vertical K in the alluvium under Crooked Creek is 300 and 70 ft/d. These values are substantially higher than the colluvium which are respectively 0.2 and 0.06 ft/d. These K estimates for alluvium are about three times higher than the observed values.

The colluvium estimates are close to the observed values but the tests in colluvium are small scale. Colluvium K may be substantially underestimated because the thinness of the aquifer would bias the estimate of K through pump test or slug tests to be low.

BGC (2014c, p 8) describes the colluvium as "well-graded materials ranging from cobbles and gravel to sand, silt and clay". Unless the fine materials, silt and clay, fill most of the pores in the cobbles and gravel, K should be much higher. Low simulated K values in the colluvium could limit the amount of water that enters the bedrock due during recharge and could limit the amount drawn into the bedrock during dewatering as long as the colluvium remains hydraulically connected to the bedrock. The contrast between higher K in the colluvium and low K in the bedrock could cause the seepage from waste facilities to move laterally through the shallow groundwater rather than enter deeper bedrock. As discussed in section 7.0, the dewatering simulation could cause a hydraulic disconnect between the bedrock and shallow groundwater allowing a perched zone to form in the shallow groundwater.

Model layer 1 has a sharp transition from alluvium along Crooked Creek to colluvium surrounding the alluvium (Figure 7). Conductivity changes from 300 to 0.6 ft/d along a long reach of the stream. Such large changes in K between adjacent cells often leads to water balance errors in the model solutions. BGC should address the potential for local errors which
GRD 1 can lead to large inappropriate head changes. Conductivity of the valley Kuskokwim formation, which underlies the alluvium (Figure 8), ranges from 0.1 to 0.3 ft/d (BGC 2014c, Table 7). Effectively, the model simulates the high K alluvium as being surrounded by very low K bedrock or colluvium which essentially disconnects the alluvium from the rest of model domain; the model conceptualization as simulated here effectively isolates the alluvium. Using more appropriate K values to simulate the alluvium and surrounding formation would provide a more accurate simulation of flow across the formation boundaries and of the surface/groundwater interchange at Crooked Creek.

- The model simulates the alluvium with a very high K surrounded by low K bedrock and colluvium. This effectively isolates the alluvium and minimizes the effects of dewatering on the stream.

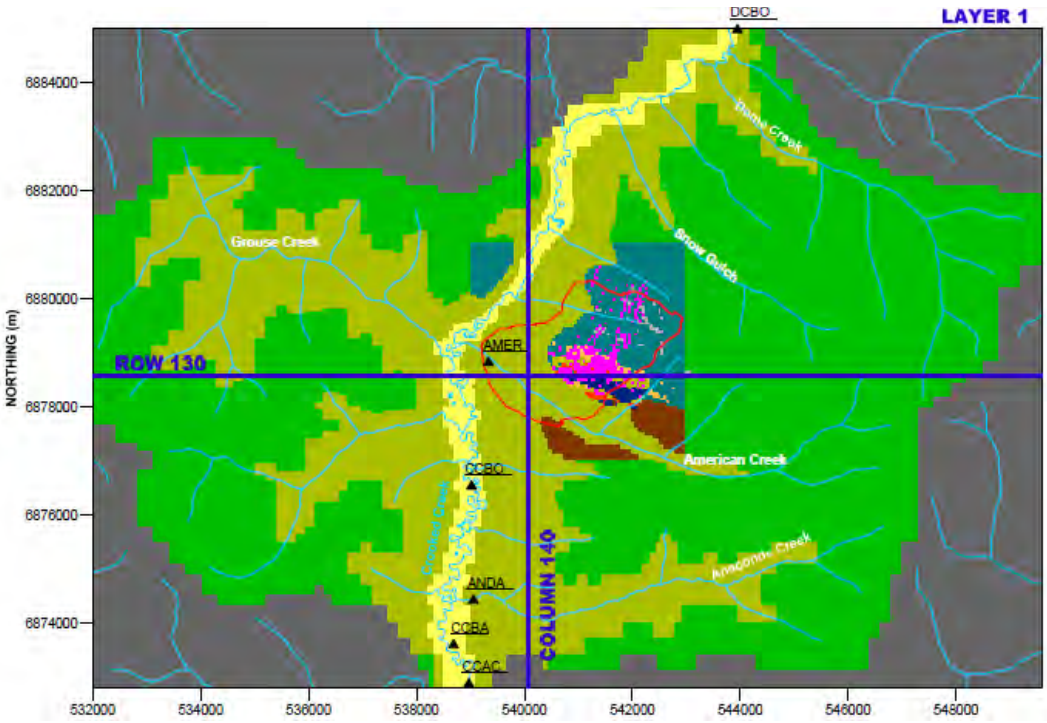


*Figure 7: Snapshot of a portion of BGC (2014c) Drawing 17 showing parameter zones in model layer 1. See Figure 9 for a legend.*

GRD 1

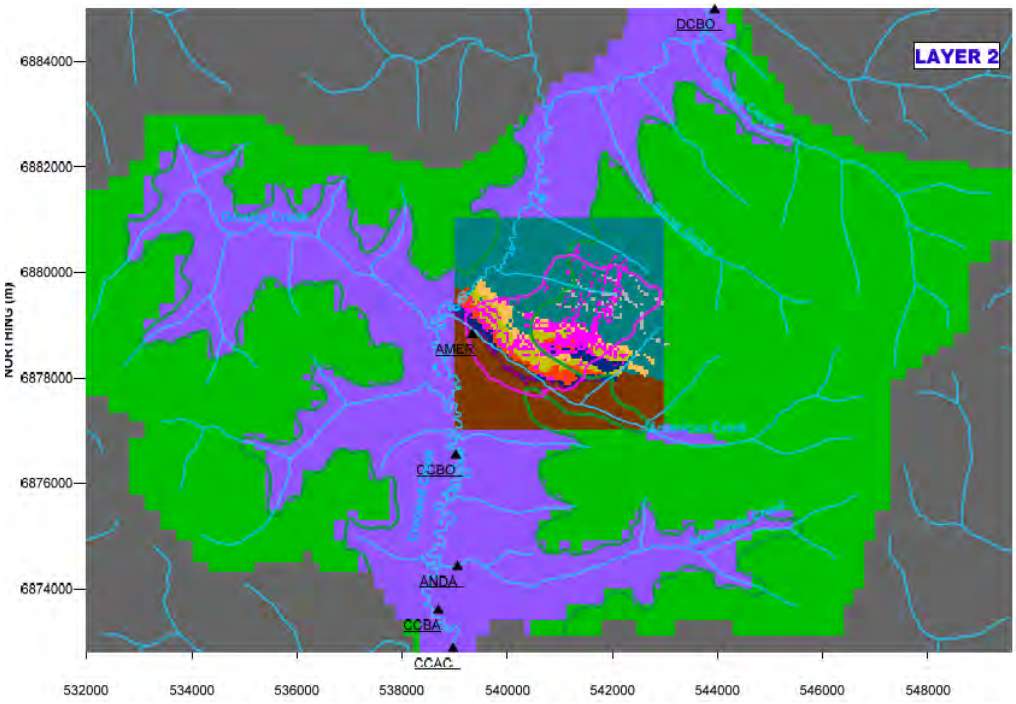


*Figure 8: Snapshot of a portion of BGC (2014c) Drawing 18 showing parameter zones in model layer 2. See Figure 9 for a legend.*

GRD 1

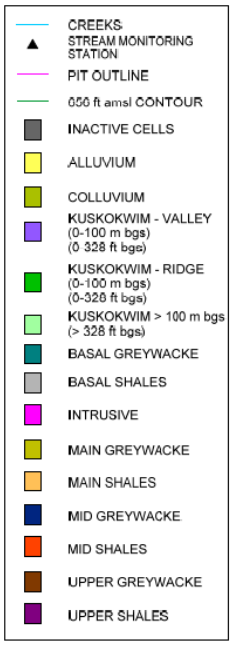


*Figure 9: Snapshot of the legend from BGC (2014c) Drawing 18 describing parameter zones used for all of the model drawings. This applies to Figure 7 and 8.*

GRD 2

The K estimates represent very small sections of their respective aquifers, but in setting the formation properties, the authors ignore important scale factors. In general, the representative volume of a pump test is the amount of water pumped, divided by the effective porosity (Schulz-Makuch et al. 1999); this effectively means a sample volume, including all pore spaces affected by the pumping. Short-term tests represent properties only over a very small volume. Figure 10 shows an example from the literature of variability for a fracture-flow media, the type of media that controls the flow near the pit. Hydraulic conductivity varies over seven orders of magnitude in the example (Figure 10), depending upon the volume of the aquifer represented in a given test. Setting K for the undifferentiated bedrock as a single value less than most of the tests violates these concepts of scale.

From the perspective of flow and transport prediction (as needed near the pit and waste rock dumps), small-scale properties control local flow while the larger-scale measurements control regional flow, which can be estimated without understanding localized details. A mine that intersects and excavates significant portions of a formation affects flow at a regional level, and therefore needs property measurements at that scale. The short-term tests in the crystalline bedrock presented by INTERA are not relevant at a regional scale.

- Most of the hydrogeologic properties estimated for the DEIS are for a small-scale and yield conductivity values that are much too low for regional flow analysis. This causes the DEIS to predict impacts limited to the areas closer to the Mine.

GRD 2

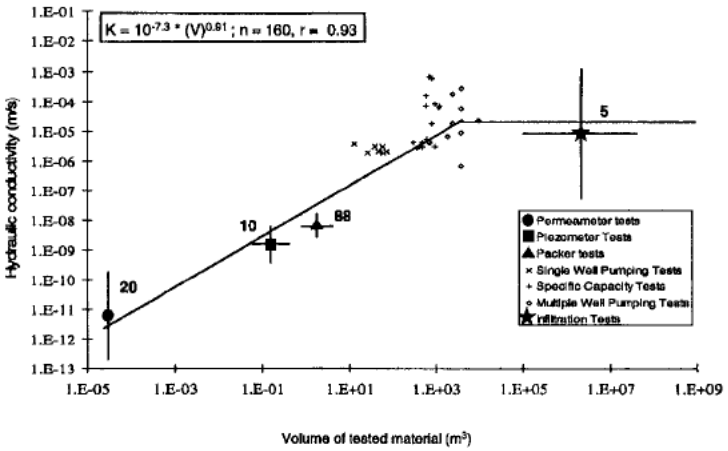


**Figure 6. Relationship of hydraulic conductivity to scale of measurement in the Racine Formation of the carbonate aquifer of southeastern Wisconsin. Permeameter, piezometer, packer, and passive infiltration tests were plotted as geometric means with 95% confidence intervals; pumping tests and specific capacity data as single values. Number of observations are given adjacent to means. Passive infiltration tests are derived from the infiltration of Lake Michigan water into the Racine Formation due to the construction of a sewage tunnel. The regression line is derived from all individual values (n = 160) below the infiltration scale. The 95% confidence interval about the slope is 0.91 ± 0.06, and r is the correlation coefficient.**

*Figure 10: Figure 6 from Schulz-Makuch et al. (1999) showing the variation of hydraulic conductivity with volume of material used for testing. The Racine Formation is a fracture-flow formation and is used here only as an example of the variability.*

## 9.22 Storage Coefficients

GRD 1

Specific yield (Sy) for the alluvium is extremely low, being set at 0.01 (BGC 2014c, Table 7). Sy is the amount of water that is released from storage for a unit drop in the water table; for Sy=0.01, a head drop of one foot would release just 0.01 foot of water from storage. Usually, Sy is much higher. Table 3.5 in Anderson and Woessner (1992) shows a range of 0.01 to 0.46 for categories from fine sand through coarse gravel, the particle sizes found in the alluvium along Crooked Creek. The published range of Sy technically includes the value used in this model for alluvium, but Sy = 0.01 is for fine sand (Id.). Crooked Creek alluvium includes a mixture of particle sizes and the estimates for fine sand have a mean of 0.33 (Id.). Without a substantial detailed pump test estimate of Sy for the alluvium, the value used for the Donlin groundwater model is suspect. Also, the very high K and low Sy in the alluvium are incongruous because Sy is often a surrogate for porosity, and having porosity equal 0.01 is inconsistent with K being 300 ft/d.

- A low Sy for the alluvium will cause the model to underestimate the amount of water drawn into the bedrock during dewatering.

GRD 1 Together the high K and low Sy in the alluvium would serve to minimize the simulated flux from the alluvium into the bedrock. The Sy value affects the simulated interchange of water between the stream and the alluvium and then between the alluvium and the bedrock beneath it. The amount of water drawn into the bedrock from the alluvium due to dewatering could be grossly underestimated. The very high K would allow the alluvium to provide water to the bedrock very easily, meaning without substantial change in head. The gradient at the stream boundary would change very little due to the high K. The streambed K was set equal to the alluvium K so the stream allowed water to pass easily, meaning it provided the necessary water with very little change in gradient. The simulated drawdown would be very low.

### 9.3 Recharge

The model assumes that recharge enters the model domain at a 28% of annual precipitation per year rate, with all 5.5 in/y applied all in the summer period. If the water surface is above the ground surface, the model does not accept the recharge and it becomes surface runoff to the stream network (BGC 2014c, p 25).

Three conceptual problems with this recharge simulation are obvious. The method does not account for recharge variability due to precipitation amount, slope, or geology. Studies from around the western US have shown variable rates of recharge as a proportion of precipitation, although none of the studies were based in Alaska.

GRD 17 Because recharge must first percolate through a soil zone it is likely that a higher proportion will do so for a higher precipitation because the amount of evapotranspiration is unlikely to increase linearly along with precipitation and because higher precipitation would more often have moister antecedent conditions leading to less precipitation being taken up to make up a soil water deficit.

Slope and geology controls the rate at which precipitation can enter the aquifers and unsaturated zone between the soils and aquifer. Fractured bedrock accepts more percolation than intact bedrock and the ground slope controls the rate at which the meteoric water may runoff or flow downslope as interflow, if a soil layer is available. Differences in conductivity and slope would lead to differences in the rate of recharge at a given point.

Combined, precipitation amount, slope and geology controls the amount of recharge at a location, with the remainder becoming runoff. Drainages would likely be sources of large amounts of water and recharge beneath the streams.

GRD 17

Very little recharge as simulated reaches deeply into the bedrock because the low simulated permeability of the deep bedrock significantly limits the deeper circulation of recharge. BGC (2014c) does not present the simulated amount of groundwater that percolates into the bedrock, the deep groundwater system, but it should. This would reflect the contrast in conductivity between shallow and deep aquifer systems, with lower conductivity at depth preventing deep percolation. The water that remains in the shallow system discharges to surface water quickly. This critical point controls the most important results of the model simulation as well. If the deep bedrock is a little more permeable and allows more recharge to circulate deeply, the required mine dewatering could be doubled without changing the discharge to the stream very significantly.

The comparison of premining baseflows shown in DSEIS Table 4-7 is not meaningful since presumably each model used similar recharge and if the inflow to each model domain is the same, so must be the outflow.

### 9.4 Calibration

There were about 182 observed groundwater elevations used for calibration. For a model of this size, this is a reasonable number, however, there was a definite bias in their distribution. As shown on BGC (2014c) Drawing 7, the majority of sites were in drainages and only a few were on the ridges. Groundwater converges into the drainages so there is likely an upward gradient in most of the areas that are most represented in the calibration.

GRD 5

Initial calibration for most models is by a steady state simulation wherein average fluxes are simulated and average head values are matched. BGC apparently skipped this step, opting instead for calibrating based on a seasonal transient model (BGC 2014c, p 27). This is reasonable if the model best fit was compared to an observed time series of groundwater observations (and stream flows). However, the "primary calibration target at each location" was the average value of multiple observations, if there were multiple observations (BGC 2014c, p 28). Average groundwater levels may not represent any given seasonal time period, so at best this calibration technique is difficult to evaluate.

BGC (2014c) does not provide necessary details for understanding the calibration simulation:

- BGC should describe the initial conditions used for the calibration scenario.
- BGC should specify how long the calibration scenario was run.
- BGC should specify the head value used for comparison to the average observed head. Is it the value for a given time period or an average for a multitude of simulated observations?

Given that the calibration scenario description is not very useful, the graph of simulated and observed head values (BGC 2014c, Drawing 24) shows some significant bias in the calibration. About 20 of the observations plot below the -25 m envelope line on the graph and just two plot above the +25 m line. At least eight of the observations below the -25m line are wells in the Upper Greywacke formation, layers 1 through 3. The Upper Greywacke may be seen south of and on the south side of the pit underlying much of the American Creek drainage. Simulated heads are about 50 m lower than observed in this area. The gradient driving flow to the American Creek is likely simulated lower than observed. This could lead to a higher K estimate which would lead to drawdown affecting the creek less than it actually would do.

A second calibration scenario was the simulation of the MW07-11 pump test (BGC 2014c, p 29). Other than stating that the grid size was changed for the simulation (Id.), BGC provides almost no details of the test, as follows: "Model stress period lengths or time steps were not specified. It is common to define a stress period based on pumping at specific rates, but the report does not specify how or whether this was done." (Id.)

The report does not explain how calibration was competed. In short term pump test simulations, it is common to adjust storage coefficients because short-term head changes are more sensitive to storage coefficients. The report does not specify whether test statistics were
GRD 5 determined for the pump test simulations, so it is difficult to objectively evaluate these transient calibrations.

The graphs that compare simulated water levels with observed show a very poor match (BGC 2014c, Drawings 26-29). There is no apparent consistency or bias, with some simulated levels exceeding observed and vice versa (Id.). BGC (2014c, p 29) suggests that "bedrock hydraulic conductivity is heterogeneous at the scale of the pumping test". This means that the model may not be accurate with respect to the details of the simulation. However, BGC also suggests that having simulated values "within a factor of two to three of measured drawdowns at the observations wells" (Id.) suggest the K values are reasonable for the scale of the modeling. There is no logic behind this statement because missing the target by a factor of three implies the K should have been set substantially different. It indicates there is substantial room for improvement.

The second transient calibration was of the pump test run to test properties between Crooked Creek and the proposed pit. The drawdown graphs for both alluvial and bedrock wells (BGC 2014c, Drawings 30-32), including both pumped and monitoring wells, show very little agreement between simulated an observed hydrographs. However, these tests were used to set the high alluvial K and low Sy values described above. The lousy match between the

observed and simulate groundwater levels does not provide justification for the alluvial parameters, the effects of which were described above.

Based on the overall calibration summary (BGC 2014c, p 32), the following bullet points suggest problems with the calibration.

GRD 5

- Modeled K of the alluvium is generally higher than observed and that of the colluvium is low for the model scale used here (Id.).
- Modeled bedrock K tended to be lower than the observed range, especially at distance from the pit.
- There is no evidence that storage parameters were even calibrated since they do not vary among formations and because the model fit during pump tests was so poor.
- Any agreement between simulated and observed flows (Drawing 25) is spurious due to the large difference in flow rates.
- It is not appropriate to claim there was a good seasonal match. Graphs for wells MW03-02, -03, -04, -05, -06, -07, -09, -12, -13, and -15, (BGC 2014c, Appendix A) show almost no simulated seasonal effect while the observed seasonal variation exceeds a meter. Some wells, such as MW07-05, and -06, show an observed trend with time that substantially masks the seasonal trend.

## 9.5 Simulating Mine Dewatering and Pit Development

BGC (2014c) chapter 7 describes the methods used to simulate mine dewatering and pit development. The modeling has three objectives that are of interest here:

GRD 1

- Estimate the dewatering extraction rate
- Evaluate the impacts on mine dewatering and pit development on local surface water
- Estimate the rate of pit lake formation and the recovery in groundwater levels and flow conditions after dewatering

Also of interest is how development of the tailings impoundment affects flows. Other objectives specified by BGC (2014c) are for design purposes.

GRD 17

BGC simulated dewatering using MODFLOW drain boundaries, and possibly also used the well package in advance of reaching a given pit level to remove some initial water. ET was appropriately set to zero within the enlarging pit. However, recharge should have continued to have been simulated because precipitation falls within the pit and if it does not runoff, it will percolate and become recharge. Runoff from within the pit may be captured and managed, but by definition recharge is precipitation that does not runoff. If not pumped it will flow into the

GRD 17 pit at lower levels; there is really no way to “manage” precipitation to prevent recharge (BCG 2014c, p 34).

Captured streams were appropriately turned off during the simulation. During operations, there would be some backfill in the pit. The simulation included simply turning off the drain boundary to the level of the backfill and allowing the groundwater level to recover.

The bedrock properties were not altered during the operations portion of the simulation (BGC 2014c, p 35). This was justified due to the relatively short time period simulated. However, not changing the bedrock properties was an error due to the large difference in storage properties between backfill (Sy = 0.33 for closure simulations) and in-situ bedrock (Sy = 0.003, BGC (2014c), Table 7). The amount of water necessary to fill the unsaturated bedrock with Sy=0.003 is miniscule, by two orders of magnitude, compared to that necessary to fill the backfill with Sy=0.33. During the five years of operations, groundwater levels would fill in the backfill while
GRD 1 removing very little water from the model. Presumably this would be the initial conditions for simulations of the operations period. Recovery would have occurred with too little water being removed. This would decrease the simulated losses to the streams and basically cause the model to underestimate flow losses to the streams. If it allows the backfill to become saturated prematurely, the initial conditions for the closure simulation will be too high and cause the model to simulate too little water removed from the model to be stored in the backfill; this would also reduce the simulated impacts to the streams.

The modeling predicted that total groundwater extraction rate from all wells and drains would initially equal 1700 gpm, increase to 2600 gpm by year 12 and average 1600 gpm over the mine life. The simulated rate decreases to about 1500 gpm after year 20 and some groundwater recovery into the backfill begins to occur (BGC 2014c, Drawing 36). Various factors, some already discussed, could make the dewatering rate higher than simulated:

- Bedrock K away from the pit has been underestimated. This slows the flow of groundwater to the pit and minimizes the simulated dewatering.

GRD 17
- Failure to simulate recharge within the pit boundary simply ignores a source of water that will be removed as dewatering water.

Dewatering dries much of layer 1 as can be seen by the 30 foot drawdown contour encircling much of the area (Figure 11). The model cells within that area would be dry. As noted in the
GRD 1 text (BGC 2014c, p 39), drawdown in the alluvium along Crooked Creek is less than two feet. The lack of drawdown corresponds to the high K and encirclement by low K bedrock and colluvium as described above. The alluvium is effectively isolated from the effects of dewatering (Figure 11) by the model design.

The model also simulates substantial reductions to streamflow in Crooked Creek and tributaries, which would have a large effect on the flows in those streams. However, the reductions have been underestimated for reasons as described herein. Primarily, all dewatering water is prevented from discharging to a groundwater sink which in this model would be a stream. For all of the reasons that dewatering rates have been underestimated, the reductions in streamflow has also been underestimated. Additionally, dewatering effects on Crooked Creek have been underestimated due to the simulation of K and storage properties, therefore Crooked Creek flows would be decreased much more than disclosed in the DEIS.

GRD 1

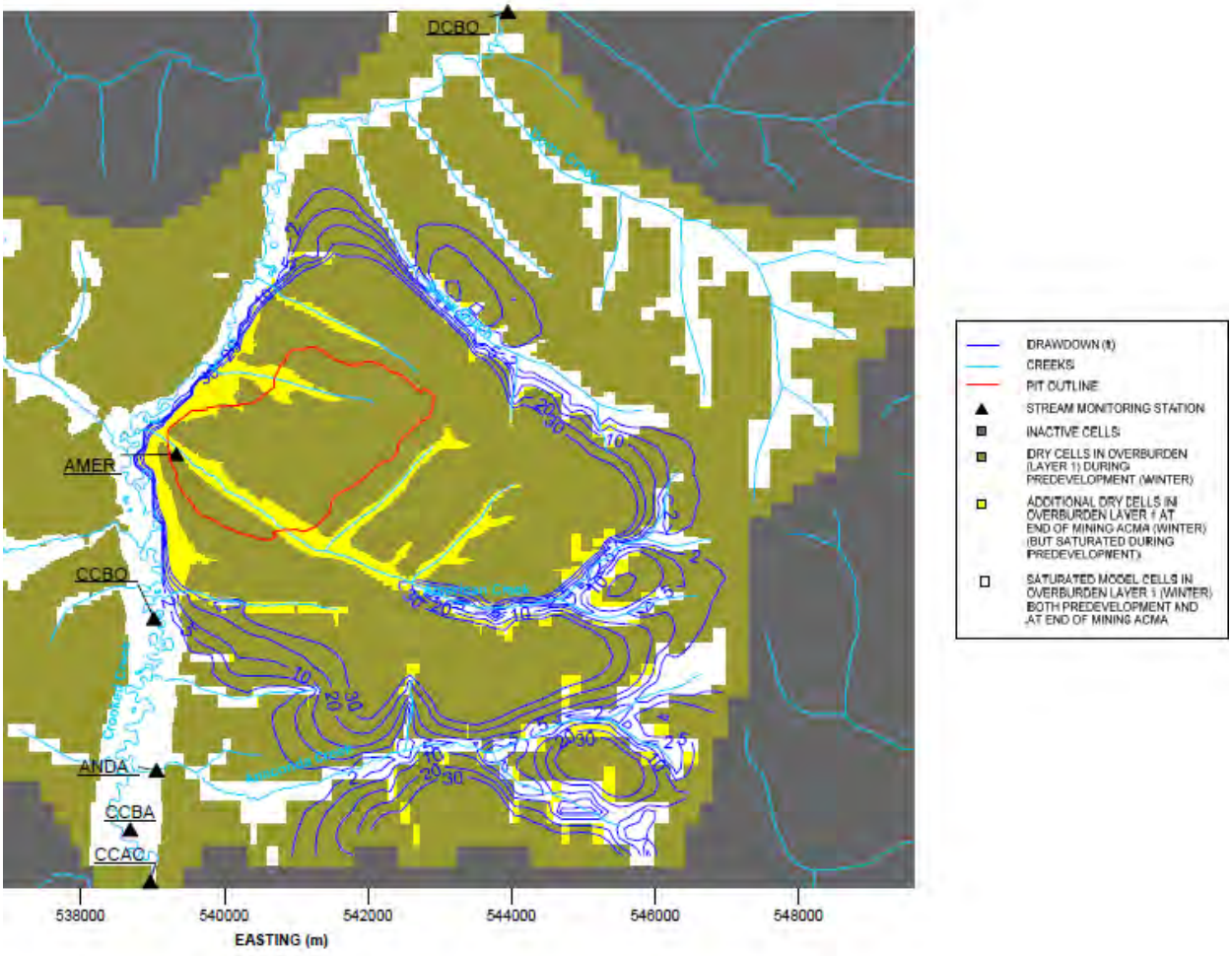


*Figure 11: Snapshot of a portion of BGC (2014c) Drawing 37 showing drawdown in model layer 1, the surficial aquifer.*

## 9.6 Simulating Pit Lake Formation

WAQ 11

BGC (2014c) used a special pit lake package to simulate the forming lake. In addition to groundwater flowing into the pit lake, there is inflow from precipitation, runoff, American

Creek flows, waste rock underdrain, contact pond water, and tailings impoundment discharge. The pit lake fills until it is just below its crest after which water would be pumped, treated, and discharged. It initially receives almost 33,000 af of excess tailings water (Lorax 2012, p 3-7), which is generally of poor quality (Lorax 2012, Table 3-3). Water from the tails and waste rock would be discharged to the bottom of the pit void "to encourage the more contaminated (i.e. denser) water to remain at depth within the pit lake and to foster chemically stratified or meromictic conditions within the pit lake" (Lorax 2012, p 3-7)). If this works as planned and the lake does not turn over, water at the bottom of the pit lake would be highly contaminated.

WAQ 11

Groundwater inflow to the pit lake will generally be of good quality compared to the inflows of waste or tailings seepage (Lorax 2012, Table 3-3). However, Lorax (2012) has not simulated different groundwater quality for groundwater entering from different levels or formations. Background groundwater quality is not homogeneous through the entire mass of rock surrounding the pit (BGC, 2011l) and inflows should not be simulated as if it is. This could affect the predicted pit lake water chemistry.

The pit lake would be almost full after 60 years. Although the pit is a sink, meaning the regional groundwater flows toward it from all directions, there is a significant groundwater outflow (BGC 2014c, Drawing 49). This outflow is to fill the backfilled waste rock and dewatered bedrock near the pit, presumably as the lake fills faster than the groundwater levels recover. The particle tracking (BGC 2014c, Drawings 50-53) does not suggest that any water would escape the pit and flow away into the groundwater, but BGC should verify this because escaping pit lake water would degrade surrounding groundwater.

GRD 6

The managed lake elevations is intended to provide adequate freeboard and maintain water levels that the groundwater would continue to discharge to the pit lake rather than creating a flow-through pit lake (BGC 2015g). The gradient is "slight" (BGC 2015g, p 2), however, which suggests that it could reverse so that pit lake water would discharge from the lake occasionally.

- The groundwater model should consider groundwater/pit lake relations when the pit fills to its crest as it could do during extreme wet conditions, as reviewed herein at section 5.2.

## 9.7 Sensitivity Analysis

A numerical model sensitivity analysis is designed to test the effects of changing various model parameters on the results of simulation. BGC (2014c) chapter 9 describes the sensitivity analysis completed for the Donlin numerical model. BGC's method is to simply make large adjustments to various factors and compare the change in the calibration and to show how it

GRD 1

changes the simulation of future conditions. I review only the sensitivity results that reveal important aspects of the model with respect to the environmental impacts of the proposed mine.

GRD 1

The model was not sensitive to raising and lowering the hydraulic K of the alluvium because the alluvium was essentially isolated from the rest of the system so that stream levels controlled the heads, as discussed above. Calibration statistics improved for three changes, decreasing bedrock K, increasing recharge and streamflow, and simulating faults as low hydraulic K faults (BGC 2014c, p 51). That these wholescale changes improved the calibrations shows the model is not unique but also suggests that the calibration as presented in BGC (2014c) is not as accurate as it could be. I argued above that bedrock K was underestimated so the improvement in calibration statistics for using even lower K suggests that some other aspect of the model is more important for matching head values. Recharge and streamflow were estimated external to the model so changing them would be inappropriate.

GRD 4

Including low K faults improved the calibration (BGC 2014c, p 51). This conceptualization suggests the groundwater system could be segmented. Details of the analysis are sparse, but the faults were only mapped in the pit area so it is likely that faults were only added in that area. This sensitivity analysis illustrates the importance of better understanding the faults and how they affect the groundwater flow.

GRD 3

- Faults could segment bedrock into higher or lower K zones better than formation maps.
- Faults could segment bedrock in ways that would allow dewatering to affect areas farther from the pit, especially if the segmentation includes areas with higher K.
- If the higher K segments extent under creeks, they could create zones in the streams that are much more affected by dewatering.

The model, and DEIS, requires much more information about the faults to be accurate.

Mine dewatering rates were sensitive to bedrock properties (BGC 2014c, p 52). Increasing bedrock K by a factor of 5 increased mine dewatering rates by 3.3 times; increasing bedrock storage coefficients by ten times increased mine dewatering rates by 1.5 (Id.).

GRD 4

High K faults could increase the mine dewatering rates up to 3.3 times depending on their location and the extent of connection with Crooked Creek (BGC 2014c, p 53). This could probably also result from the low-K faults segmenting high-K bedrock under the streams.

GRD 3

Changing bedrock K substantially affected stream flows. Reducing bedrock K reduced streamflows relative to the base case. If the model has bedrock K that is too low, as I argued above, impacts on the streams would be underestimated. Increasing bedrock K by a factor of 5

GRD 4

GRD 4

reduced winter streamflow by 86% and simulating high K faults decreased streamflows by 83% (BGC 2014c, p 54). Increasing bedrock K by a factor of 20 caused Crooked Creek to go dry by the pit (Id.). Increasing storage coefficient also reduced streamflows. The sensitivity of the model predictions to bedrock properties further indicates that the model could have grossly underestimated impacts to streamflow.

The sensitivity results regarding bedrock K verifies the points above about how low K estimates could have caused the model to underestimate dewatering, the extent of the drawdown, and impacts on streamflow.

GRD 3

Low K faults decreased the impacts that dewatering had on streamflow (BGC 2014c, p 54). This is probably due to the segmentation caused by the faults.

GRD 1

Changing alluvial K had little effect on the impacts dewatering had on streamflow (BGC 2014, p 54). This further reflects the comments above about how the alluvium under Crooked Creek is isolated from the bedrock. The isolated alluvium acts as a tub in which water is easily exchanged with the stream.

GRD 4

Pit lake refill time was also sensitive to bedrock K (BGC 2014c, p 55). The increased bedrock K causes the pit lake to fill from 14 to 30 years faster, reflecting the higher flow to the pit (Id.). Decreased K increased the fill time by about 12 years (Id.).

### 9.8 TSF underdrain predictions

The groundwater model (BGC 2014c) estimated discharge to the tailings impoundment underdrain (Figure 12). The only description of how the TSF was simulated was to note that ET and recharge was set equal to zero (BGC 2014c, p 16, 34).

GRD 8

> The TSF will be a fully-lined impoundment. Therefore, groundwater recharge to the underlying aquifer will cease within the footprint of the facility. In addition, the TSF underdrain will be installed beneath the **liner to capture groundwater discharge from the catchment and deliver it to the SRS downstream of the TSF dam**. Any seepage through the liner would also report to the SRS. SRS water will be used either as make-up water in the process or potentially treated and discharged to Crooked Creek. (BGC 2014c, p 16, emphasis added)

The DEIS describes it as follows: "The TSF would be designed with a rock underdrain that would serve two purposes: 1) capture and direct any TSF leakage to a Seepage Recovery System (SRS) located immediately downgradient of the TSF dam; and 2) collect groundwater from areas upgradient of the TSF and direct it to the SRS as TSF underflow" (DEIS, p3.6-31). The mine would obtain a water right for the diversion of groundwater by the TSF drain (DEIS, p 3.6-32).

The report does not describe the boundary used to simulate the drains, although if the underdrain is beneath the liner to capture groundwater discharge, the underdrain must be simulated as a drain in layer 1. An underdrain would allow groundwater discharging upward due to artesian pressure from undermining the TSF.

Decreased bedrock K in the sensitivity analysis increased flows to the tailings underdrain system (BGC 2014c, p 54, 55). This is because low bedrock K causes more groundwater to remain in the shallow groundwater.

> The reduction in recharge is predicted to lead to a progressive decrease in groundwater flow reporting to the foundation underdrain, from approximately 730 gpm (4,000m3/d) in Year -2 to approximately 440 gpm (2,400m3/d) at the end of mining" (BGS 2014c, p xiv). "Predicted groundwater discharge to the TSF underdrain for the post closure analysis fluctuates on a seasonal basis, and averages 370 gpm (2,000 m3/d) during the winter season, and 440 gpm (2,400 m3/d) during the summer season (BGC 2014c, p xv).

GRD 8

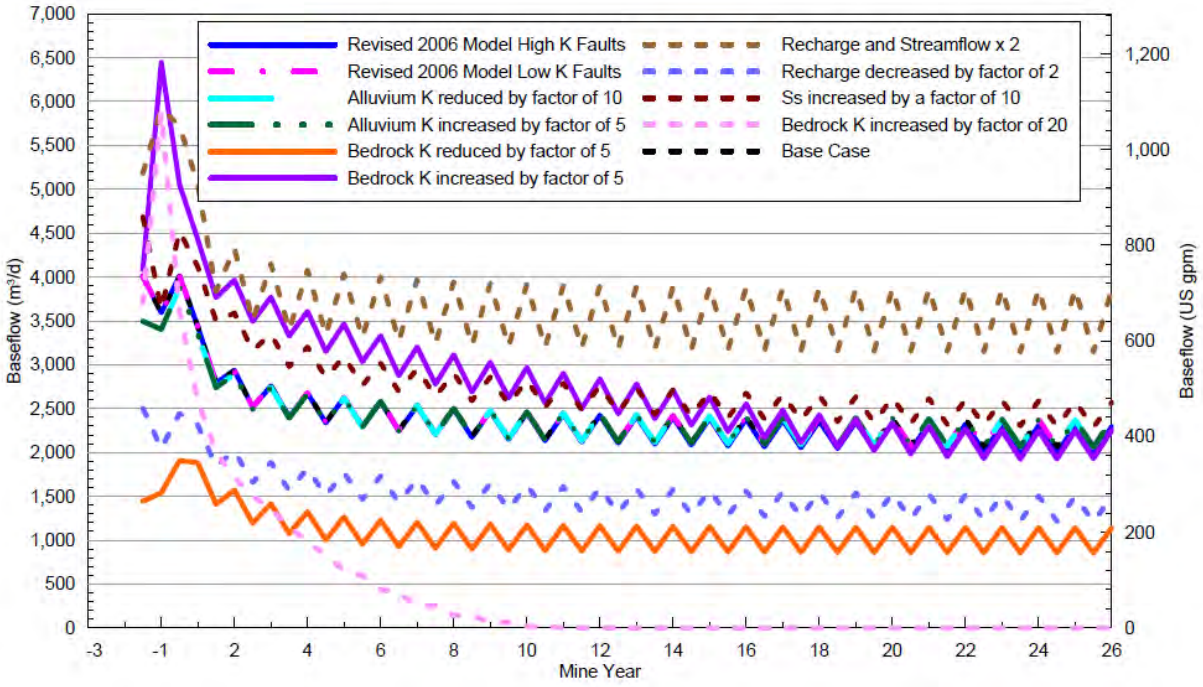


*Figure 12: Snapshot of BGC (2014c) Drawing G22 showing the discharge to the tailings impoundment underdrain for the base case and various sensitivity analysis simulations.*

## 10.0 MISCELLANEOUS

GRD 1

The potentiometric surface map (DEIS Figure 3.6-2) does not distinguish among aquifers which means there is an assumption that the groundwater pressure in the bedrock equals the water table in the overlying colluvial aquifer. It argues that "vertical gradients within the groundwater system are not large compared to the scale of the map and the overall relief of the potentiometric surface" (DEIS, p 3.6-8). A reference is to BGC 2011d. This can be an important assumption, driving recharge and discharge locations. What is meant by gradients "not large compared to the scale of the map"?

Groundwater discharge occurs only in creeks and gulches, not to wetlands away from the creeks and gulches (BGC 2014g, p 6). Permafrost is intermittent and generally limited to soils but does extend into bedrock up to 33 feet with an average of 14 feet (BGC 2014g, p 6-8). The only trends apparent in the permafrost mapping show that permafrost is more common in the drainages of American and Anaconda Creek.

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# Attachment 1

# Tom Myers CV

**Tom Myers, Ph.D.**
Consultant, Hydrology and Water Resources
6320 Walnut Creek Road
Reno, NV 89523
(775) 530-1483
Tommyers1872@gmail.com

# Curriculum Vitae

**Objective**: To provide diverse research and consulting services to nonprofit, government, legal and industry clients focusing on hydrogeology specializing in mine dewatering, contaminant transport, natural gas development, groundwater modeling, NEPA analysis, federal and state regulatory review, and fluvial morphology.

## Education

| Years | Degree | University |
|---|---|---|
| 1992-96 | Ph.D.<br>Hydrology/Hydrogeology | University of Nevada, Reno<br>Dissertation: Stochastic Structure of Rangeland Streams |
| 1990-92 | | University of Arizona, Tucson AZ<br>Classes in pursuit of Ph.D. in Hydrology. |
| 1988-90 | M.S.<br>Hydrology/Hydrogeology | University of Nevada, Reno<br>Thesis: Stream Morphology, Stability and Habitat in Northern Nevada |
| 1981-83 | | University of Colorado, Denver, CO<br>Graduate level water resources engineering classes. |
| 1977-81 | B.S., Civil Engineering | University of Colorado, Boulder, CO |

## Professional Experience

| Years | Position | Duties |
|---|---|---|
| 1993-Pr. | Hydrologic Consultant | Completion of hydrogeology studies and testimony focusing on mine dewatering, groundwater modeling, natural gas development, contaminant transport, NEPA review, and water rights for nonprofit groups and government agencies. |
| 1999-2004 | Great Basin Mine Watch, Exec Director | Responsible for reviewing and commenting on mining projects with a focus on groundwater and surface water resources, preparing appeals and litigation, organizational development and personnel management. |
| 1992-1997 | Univ of NV, Reno, Res. Assoc. | Research on riparian area and watershed management including stream morphology, aquatic habitat, cattle grazing and low-flow and flood hydrology. |
| 1990-1992 | U of AZ, Res. and Teach. Assistant | Research on rainfall/runoff processes and climate models. Taught lab sections for sophomore level "Principles of Hydrology". Received 1992 Outstanding Graduate Teaching Assistant Award in the College of Engineering |
| 1988-1990 | U of NV, Reno Res. Asst | Research on aquatic habitat, stream morphology and livestock management. |
| 1983-1988 | US Bureau of Reclamation Hydraulic Eng. | Performed hydrology planning studies on topics including floodplains, water supply, flood control, salt balance, irrigation efficiencies, sediment transport, rainfall-runoff modeling and groundwater balances. |

## Peer-Reviewed Publications


Myers, T., 2016. A modeling approach to siting mine facilities in northern Minnesota USA. *J Hydrology* 533: 277-290. Doi: 10.1016/j.jhydrol.2015.12.020

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Myers, T., 2015. Technical Memorandum – Review of Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. Prepared for Delaware Riverkeeper Network. August 24, 2015.

Myers, T., 2015. Technical Memorandum – Review of Finger Lakes LPG Storage, LLC, Proposed LPG Storage Facility. Prepared for Earthjustice, New York. January 13, 2015

Myers, T., 2015. Technical Memorandum – Review of Pennsylvania Governor's Executive Order Concerning Hydraulic Fracturing in Pennsylvania State Parks and Forest. Prepared for Delaware River Keeper, January 9, 2015.

Myers, T., 2015. Technical Memorandum – Review of Water Supply Assessment, Village at Squaw Valley. Prepared for Sierra Watch, July 13, 2015.

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Myers, T. 2014. Technical Memorandum: Review of Performance Standards, Center for Sustainable Shale Development. Prepared for Delaware River Keeper. May 8, 2014.

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## Selected Abstracts, Magazine and Proceedings Articles

Myers, T., 2014. Reservoir Loss Rates, Lakes Mead and Powell and Fill Mead First. INVITED PRESENTATION at 2014 Future of the Colorado Plateau Forum – Drought and the Colorado River. http://musnaz.org/educational-programs/public-programs/future-of-the-colorado-plateau-forums/

Myers, T., 2013. Three-dimensional Groundwater and Contaminant Flow around Marcellus Gas Development. INVITED PRESENTATION at 2013 Associated Engineering Geologists Conference, Seattle WA.

Myers, T., 2012. Mine Dewatering: Humboldt River Update. INVITED PRESENTATION at 2012 Nevada Water Resources Association Annual Conference.

Myers, T., 2012. Reservoir loss rates from Lake Powell, and long-term management of the Colorado River system. 2012 Nevada Water Resources Association Annual Conference

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## Special Coursework

| Years | Course | Sponsor |
|---|---|---|
| 2011 | Hydraulic Fracturing of the Marcellus Shale | National Groundwater Association |
| 2008 | Fractured Rock Analysis | MidWest Geoscience |
| 2005 | Groundwater Sampling Field Course | Nielson Environmental Field School |
| 2004 | Environmental Forensics | National Groundwater Association |
| 2004 and -5 | Groundwater and Environmental Law | National Groundwater Association |

**From:** Shirlee Smith
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Letter of Support
**Date:** Wednesday, May 25, 2016 8:52:48 AM
**Attachments:** Donlin Gold Project.pdf

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Good morning,
Attached is a letter of support for the Donlin Gold Project from The Aleut Corporations CEO Matthew Fagnani. If you have any questions please let me know.
Thanks, Shirlee

Aleut CORPORATION

May 24, 2016

US Army Corps of Engineers
Donlin Gold Project EIS

Dear Sirs,

I am writing today in support of the Donlin Gold project. If built, the Donlin Gold project would produce gold from a major ore-body, through a subsurface lease with the Calista Corporation and a surface use agreement with the Kuskokwim Corporation; which demonstrates support from the Regional and local Village Corporation.

The Donlin Gold project, located within the Yukon-Kuskokwim drainage, is one of the poorest regions in the United States. This project would provide high paying jobs in a region where few other employment opportunities exist. An estimated 3,000 jobs will be created during the construction phase, and between 600 to 1,200 jobs for the estimated mine life of 27.5 years.
SER 5 These jobs will have a significant and positive impact on the economy of the region and the state. Alaska's existing mines are operating to the highest standards and in a way that has the least impact on our renewable resources.

The State of Alaska has some of the most stringent regulations in regards to water standards and activities that may affect water or our fish populations. This project will provide responsible
SVE 1 economic prospects for this region and the Alaska, while also protecting the subsistence resources that the locals depend on. The State of Alaska Department of Natural Resources enforces stringent regulations overseeing mining activities statewide that effectively protect the environment, wildlife, and human health.

SER 5 This project should proceed as it will provide an economic boost to a region where few jobs exist. It has the potential to possibly lower the cost and increase the energy options to the region,
GAS 1 such as the proposed natural gas pipeline which will have excess capacity. In addition, the mine will be operated in a way that minimizes impact to any resources that locals depend on.

Sincerely,

Matthew Fagnani
CEO-Aleut Corporation

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL] Donlin Gold comment
**Date:** Thursday, February 25, 2016 6:54:43 AM

---

-----Original Message-----
From: Jesse Alexie [mailto:jesse_alexie@lksd.org]
Sent: Wednesday, February 17, 2016 10:03 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold comment

Jesse Alexie

p.o Box 45

Nunapitchuk, AK 99641

907-527-2332

jesse_alexie@lksd.org <mailto:jesse_alexie@lksd.org>

february 17,2016

U.S. Army Corps of Engineers

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Keith Gordon, Project Manager

Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil>

907-753-5710

to whom it may concern:

My name is Jesse Alexie I am from Nunapitchuk, Alaska. I am against the Donlin Gold Mine on the Kuskokwim river even the Bristol Bay Pebble Mine. I live on the Kuskokwim going into the Johnson River. I am against the mine because it will destroy our culture of life, the spawning fish in the Kuskokwim river and can kill a lot of animals like fish, big game mammals, small game mammal and the land, all the life in Alaska. It can destroy subsistence for 100 years or more, it even can kill people from the waste of 'cyanide poisoning even from the battery acid' because people depend on the river. We have a lot of villages in and around the YK-delta. There is a 50/50 chance all people in YK delta depends on fisheries. I grew up Harvesting salmon fish, pike, whitefish, blackfish, lush, smelt, this is way of life every year for my family and me also too all the people of kuskokwim river.

SUB1

PHL 16 Donlin Gold Mine can destroy the river of Kuskokwim, creating a pit the acid will come from the waste. The Acid that holds the pit can travel underground through our YK delta rivers and destroy all the spawning fisheries too. It can also Move the animals different direction. All animals and humans depend on the water we drink. The acid can kill each one of us.

TWL 1 The mine could destroy culture in alaska. There's people way of life depend on the wild life. If the Mine starts, what's there for us in Alaska. We could end up like the cities. It can stop the subsistence for 100 years or more. Just for 25 years of digging when the last great Alaska can live for thousands of years living of the land.

WILD 8 Shipping goods will go up on the Kuskokwim.The Donlin Gold will haul about 33,000 or more Diesel and Oil. If they have a big Oil spill it could destroy the land of Kuskokwim and can kill a lot of animals that are crossing the water, There is 50/50 chance all animal cross rivers, giving them diseases and we actually hunt them and eat them. What will we do if this is lost?

SUB 1 This mining is going to destroy Alaska's the richest lands. People depend on the last Alaskan frontier, the culture, the land, the fish, all the living things you names it, it's here in Alaska. Say no to mining up river of Kuskokwim even the Pebble mine of Bristol Bay they will destroy the fishes we depend on for thousands of years. Our elders said all animals will disappear slowly it is about to happen if we let them go for the gold. We all in the YK delta depends and subsistence every year.

Do not go for the Donlin Gold Mine and the Pebble Mine in Alaska. We choose thousands of year of subsistence. We do not choose 25 years of digging over millions of years of subsistence. This will happen if we accept Donlin Gold Mine, this is cyanide poisoning the waste of the rock, and ground.

sincerely

Jesse Alexie

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<Blockedhttps://lh5.googleusercontent.com/eH66yDU1ZvKOujzkRA9TK93JAa6RDfVzgJNe5qLsrka7g38oDRPXi0Pbg3waYnyjP93U09OX5OHx-aD58xGNCQEtci0lekBxeiyMCH8a85jFOOoETkamgTfUWf8ujDiA8_m-Cg0q>

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Thursday, February 25, 2016 6:56:34 AM

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-----Original Message-----
From: john alexie [mailto:alexie133sissy@icloud.com]
Sent: Wednesday, February 17, 2016 9:59 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

Margaret Alexie

P.O. Box 6606

Atmautluak, AK 99559

(907)545-4923

margaret_alexie@lksd.org <mailto:margaret_alexie@lksd.org>

February 16, 2016

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Keith Gordon, Project Manager

Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil>

907-753-5710

To Whom It May Concern:

Would you want to taste oil in your fish? I could never imagine eating salmon that tastes like oil. I am very against the Donlin gold mine. The land here is very rich. Why destroy a land where you can actually see wildlife? If Donlin did the mine where will our beautiful animals go? Our fish will die too. Our culture depends on land and natural subsistence some people are too blind to see how beautiful it is. SUB 1

I Margaret strongly disagree about the mining because it could cause the pollution that will kill the salmon. Polluting the land will ruin the Alaska wildlife. A huge oil spill will always be there no matter if they say that it will be a success, every mine has been failed before at mining. FSR 3

Mining could cause the pollution that will kill the fish. Fish are very sensitive to water. Imagine FSR 3

what it would do to the fish. When they do the mine all the fish will disappear. Imagine the people being disappointed that they killed the fish. When the fish die the people will be mad at Donlin gold.

For example, there was a huge oil spill at Valdez in March 24, 1989. A lot of fish disappeared. Animals were sick and dying at that point. It was a severe impact of suffering. There was huge disaster in Alaska, the spill is still pollutes to this day. Crude oil is still remaining on the surface under water where it isn't reachable. So can you imagine what can happen if they do the mine in this area? More land would be destroyed animals will die. A huge decrease will happen we won't be able to hunt too.

Hunting grounds would be much harder because animals wouldn't appear. Animals would go extinct even salmon!

NSB 1 SUB 1 If they mine in Alaska there will be a chance of failure. No one ever had succeeded in mining yet. They will damage the land and the wildlife would be gone. It would make a huge change to the people that do subsistence every year that gather fish and other animals.

So would you worry about money and getting paid? Money comes and goes. Then why worry about money if fish would be gone forever and never come back. Cultures will be broken. Salmon will never come back to their natural resources if mining happens. If you think Donlin would succeed try look back and see how many failures they had when Bearrick had finished mining.

Sincerely,

. Margaret Alexie .

USACE
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MAY 23 2016
AK REGULATORY

May 19, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

Dear Mr. Gordon,

I am a Calista Shareholder from Akiachak and have 2 children who will be enrolling as shareholders in the next few years. I am writing to support the Donlin Gold DEIS because we need jobs in the region. The mine will have a hiring preference for Calista shareholders and my children will have the opportunity to work at the mine. In addition, we will get dividends from the proceeds of the mine. We need this money to do subsistence as we cannot buy gas, guns and shells without money.

SER 11

The average salary for a truck driver is estimated to be around $100,000 per year. That is a lot of money and can enable us to buy a boat, snowmachine and other supplies so that we can go out and supplement our store bought food. We don't like to eat only kass'aq food because it is not our spiritual food. If we continue the way we are now, depending on welfare to exist, once the federal funds are not here anymore, we will be forced to move away to make a living for our families. I don't want that for my family.

Donlin Gold has been coming to our village for years and let us know what they are going to do at the mine. I believe it can be done safely as new technology is not the same as the old mining ways. The new regulations will safeguard our environment and I know the people working at Donlin are from the region and want to protect our environment too!

I ask that you let the Donlin Gold DEIS go forward because it will enable us to stay in our region for many years to come.

Quyana,

Melanie K Alexie

Melanie Alexie

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, Alaska 99506-0898

99506$0898 B900

**Teleconference Notes**

Project: Donlin Gold EIS
Subject: Comment received via email
Date: June 20, 2016
Initials: JE

---

Attendees:

Jessica Evans
Morris Alexie

Notes:

DATA 1 During the public comment period on the Draft EIS, the Corps received an attachment that was titled “Integrated Solid Waste Plan for the Community of Native Village of Nunapitchuk”. Jessica called Mr. Alexie to confirm that this was the intended attachment. Mr. Alexie confirmed that the attachment was correct, and that he sent it to provide to Donlin Gold and the Corps in case it was useful to them.

| | |
|---|---|
| **From:** | Evans, Jessica |
| **To:** | "cityofnunap@yahoo.com" |
| **Cc:** | Keith.Q.Gordon@usace.army.mil |
| **Subject:** | FW: [EXTERNAL] Comment toward Donlin Gold EIS |
| **Date:** | Monday, February 29, 2016 2:16:00 PM |
| **Attachments:** | Waste Management Plan Template (3).doc |

---

Morris,

The attached document was submitted as a comment on the Donlin Gold Draft EIS--but it is the Waste Management Plan for Nunapitchuk. If it was attached accidently, please feel free to send a different document.

Thanks for your interest and your comments!

Jessica

Jessica Evans
Environmental Scientist/Planner
D 1-907-261-6764
jessica.evans@aecom.com

AECOM
700 G Street, Suite 500, Anchorage, Alaska 99501
T 1-907-562-3366  F 1-907-562-1297
www.aecom.com

-----Original Message-----
From: City of Nunapitchuk [mailto:cityofnunap@yahoo.com]
Sent: Monday, February 01, 2016 3:44 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Comment toward Donlin Gold EIS

Attached are comments from Morris Alexie, resident of Nunapitchuk.  You can contact him at 907-527-2230 for any questions.

| | |
|---|---|
| **From:** | donlingoldeis, POA |
| **To:** | Craig, Bill |
| **Subject:** | FW: [EXTERNAL] Comment toward Donlin Gold EIS |
| **Date:** | Thursday, February 25, 2016 6:48:10 AM |
| **Attachments:** | Waste Management Plan Template (3).doc |

---

-----Original Message-----
From: City of Nunapitchuk [mailto:cityofnunap@yahoo.com]
Sent: Monday, February 01, 2016 3:44 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Comment toward Donlin Gold EIS

Attached are comments from Morris Alexie, resident of Nunapitchuk. You can contact him at 907-527-2230 for any questions.

# Integrated Solid Waste Plan
# for the Community of Native Village of Nunapitchuk

**September 2007**

***Last reviewed/updated on:_____***

# Integrated Solid Waste Plan
# for the Community of Native Village of Nunapitchuk

## *Compiled by:*

**Morris J. Alexie, ISWMP Coord.**

## *Additional Yup'ik and English Translations:*

**Morris J. Alexie, ISWMP Coord.**

## *Additional Special Acknowledgements:*

*We would like to thank all the Elders in our community for their valuable words of guidance. We would like to thank Sophie Chaliak EPA/IGAP Coord. and Caroline Angaiak Asst. for their volunteer time in helping with ISWM Plan, and complete cooperation towards this Plan. The whole community of Native Village of Nunapitchuk, in cooperating on our surveys, giving time to listen and commenting their concerns toward this plan. Our Waste technicians, John Jacobs and John Coolidge, help protect the community, subsistence, and health by keeping our garbage organized at our village as well as the dump. And much thanks to Lisa McGuire, who was my Coordinator from ANTHC to oversee this ISWMPlan. And to EPA for the resources for us to develop and work for a ISWMPlan.*

**September 2007**

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# 1. INTRODUCTION AND DESCRIPTION OF COMMUNITY

**Mission and Values Statement:**

It is the mission of the Native Village of Nunapitchuk Indian Reorganization Act (IRA) Council to establish and maintain a close relationship with the members of the Native Village of Nunapitchuk. To seek avenues of fundings, programs, projects and grants and develop infrastructures which will allow us to improve the quality of life of all the Native people of our Community. The IRA Council will also advocate for the preservation of our diverse culture and traditions, which make us a truly unique people. When this very way of life is threatened by inside and outside interests, it is the charge of the IRA Council to bring these issues to the forefront and champion the causes of our Native People to protect that which makes us strong. It is only by working together, protecting Ourselves, our Families, and our Children, our Land and our Environment, that we will prevail and survive as a unique people, proud and strong in both body and spirit.

The FY 2006 Agriculture Appropriation Bill (H.R. 2744 Section 753 ) appropriated $750,000 from US Department of Agriculture Rural Development to Denali Commission "*to address deficiencies in solid waste disposal sites which threaten to contaminate rural drinking water supplies".* The basic structures of this RPF was designed in FFY 2004 Omnibus Appropriations Bill ( H.R. 2673 Sec. 764 ).

This funding provides the Denali commission and its partner organizations an opportunity to identify innovative solutions to technical and logistical challenges of traditional handling of municipal solid waste (MSW). Due to remote location, climatic challenge, ground water and freeze/thaw conditions, as well as local municipal budget limitations, this is one of the most underserved arenas in Alaska's environmental and public health fields. The Denali Commission is authorized to conduct pilot projects incorporating emerging technologies to improve local management options.

This from The IHS Primary Care Provider journal, December 2006, Vol. 31, Num. 12 – IHS Child Health Notes – Infectious Disease Updates. Rosalyn Singleton, MD, MPH, Does in-home water service reduce risk of infectious disease? Nowhere has the effort to bring sanitation to homes been more difficult than in remote Alaska villages. In 2000, only 77% of Alaskan homes had in-home running water and flush toilets. Hospitalization rates were substantially higher in lower service regions compared to those in high service regions for RSV (risk ratio [RR] 3.4, 95% confidence interval [CI] 2.95-3.8), pneumonia/influenza (RR 2.5, 95% CI 2.4-2.7), skin infection (RR 1.9, 95% CI 1.8-2.1), and MRSA infection (RR 4.5, 95% CI 3.6-5.7). These data were developed by Tom Hennessy MD, Arctic Investigations Program, Centers for Disease Control and Prevention, Anchorage, AK; Troy Ritter, MPH, Environmental Health Consultant, Alaska Native Tribal Health Consortium, and Robert Holman MS, DVRD, Centers for Disease Control and Prevention, Atlanta. It appeared again in American Indian Report, February 2007, Vol. XXIII, No. 2, pg. 24, was presented in part at the 24th Annual Alaska Health Summit, Troy Ritter said," We thought these were a mistake, Those who don't have services already have significant challenges, This study really brings out to me that the quantity of water for sanitation is really important, But we see a difference in how much is used if you have to carry it [versus having the water available in your home]. You use less water, We need to educate, We never knew in the past that you could prevent pneumonia by hand washing."

The Tribal Solid Waste Interagency Workgroup (The Workgroup) coordinates federal assistance to tribes to help comply with the municipal solid waste landfill criteria (40 CFR Part 258), establish Integrated Solid Waste Management Programs and eliminate open dumps. The

Workgroup consisting of U.S. Environmental Protection Agency (EPA); the Bureau of Indian Affairs (BIA); the Indian Health Service (IHS); the U.S. Department of Agriculture, Rural Utilities Service (RUS); and the U.S. Department of Defense, solicited proposals for Tribal Solid Waste Management Assistance Project (previously called the Open Dump Cleanup Project).

Integrated solid waste management (ISWM) plans and tribal solid waste codes and regulations are an essential part in developing a tribe's capacity to sustainably manage its solid waste.

Our Native Village of Nunapitchuk community developed this plan because of our subsistence lifestyle and wanting a healthier lifestyle, as our subsistence way of life as number one priority. As you and us know, you are what you eat and will greatly connect to your health. We want to better our solid waste practices to protect our subsistence as well as our environment. Our Elders have always taught to respect our lands, so that we would always have to take and to gather in return. Elders have been our leaders from time beginning because of their knowledge and wisdom. Our air, land and water are our life – respect them as you want to be respected. Remember – you are not the only one that was given a spirit to live on this earth, there are others – Fish, Birds, Animals, Insects, and Plants.

To have a much better management of our solid wastes even we live in a harse environment, and having to be greatly affected by Global Warming. And having to work not only with our dumpsite leaks/overflows, but with our neighboring village of Kasigluk dumpsite, which also has waterways currents flowing through the middle of our Native Village of Nunapitchuk's both banks MAIN RIVER. Therefore, drastically doubling the TOXIC contaminants level of Native Village of Nunapitchuk's Good Main River. All our lagoons and dumpsite including Kasigluk dumpsite are upstream of what we want to call Nunapicuaq Good river.

This plan is intended to be a working plan, that:

- Allows initiatives and movement towards better management of our trash.
- Establish Tribal Codes and Regulations
- Fulfills the State of Alaska ADEC Solid Waste Program's expectations for a approved Solid Waste Management Plan.
- Allows for changes should capitol funding become available or other funding that would allow the development of a new landfill location and the clean up of our current site.
- Will be added to and changed at will by the Native Village of Nunapitchuk community as they determine the best management attainable by Public meeting and by majority vote.

The purpose of this ISWMP (Integrated Solid Waste Management Plan) is for a waste management system consistent with the hierarchy of waste source reduction, recycling, treatment, and disposal wherever economically feasible.

Due to the local economics and scarcity of funding for Solid Waste Management, the community is proposing this **Solid Waste Management Plan** as the beginning stages to a comprehensive waste management system within the community. This plan will eventually be one that will encompass the safe storage, treatment and disposal of all the waste streams within the community and partially self sustaining and to establish Tribal Codes and Regulations within the Native Village of Nunapitchuk.

If the solid waste management plan includes a proposal for a new Landfill, the solid waste management plan must be submitted to and approved by the department before a landfill permit application will be considered complete under 18 AAC 60.210.

We currently do not have a Burnbox at our dumpsites. Our EPA department had requested for a burnbox in 2004, but was denied. We currently have uncontrolled open burning to reduce garbage. In the future, our community is planning to request a burnbox to burn only burnable materials and is expected that a 75% or Drastically reduce the volume of our current dumpsites.

Our current solid waste sites do not have any heavy equipment to compact or cover the solid waste.

Increases in trash services and treatment (segregation, salvage, store and ship special wastes) and better management of burns is going to require additional funding and/or volunteer labor to increase overall better management of our trash generated in the Native Village of Nunapitchuk.

In this 21st century our isolated village has all the same waste generations as ALL major cities.

Alaska Native Health Board- *Rural Alaska Integrated Waste Management Reference Manual & Planning Resource Guide- 2005--* **What is Solid Waste?**

The definition of Solid Waste in the federal law known as the "***Solid Waste Disposal Act***" is a very long technical definition that is meant to include everything that is considered to be a hazardous waste. For the purpose of Integrated Waste Management Planning this is not a very good definition.

The State of Alaska defines "**solid waste"** in Alaska Statutes 46.03.900 as "all unwanted, abandoned, or discarded solid or semi-solid material whether or not subject to decomposition, originating from any source". This is a very broad definition that includes almost everything that people and businesses throw away. It includes all garbage and other non-hazardous wastes. It does not include liquid honey bucket wastes or sewage lagoon sludge.

Most Integrated Waste Management Planning and approached focus on what is commonly referred to as "**municipal solid waste"** (MSW). For purposes of solid waste management, solid waste is made up of things that you no longer use and either recycle, throw away, store, treat, dispose of, or abandon.

To make solid waste management work better in the Alaska's communities and cities, the State of Alaska has adopted an integrated approach to solid waste management. Alaska Statute 46.06.21, directs the Department of Environmental Conservation to minimize present and future threats to human health and the environment in Alaska. In 1990, the State of Alaska established a ***Rural Solid Waste Management Policy*** that instructs ADEC to issue a "letter of non – objection" for new solid waste facilities which do not meet all state regulations but are an improvement over a community's existing solid waste disposal system.

This from: www.denali.gov Website = Progam Updates
Table of Contents: **SOLID WASTE** ; April 2007
Program Manager Gene Kane : gkane@denali.gov
Progam Assistant Jodi Fondy : jfondy@denali.gov

Proper solid waste collection, processing and disposal is an essential public service. Several factors impede local delivery of solid waste service in rural Alaska. Such factors include:

- Limited rural Alaska local governments budgets;
- Community remoteness;
- Limited transportation infrastructure; and
- Alaska's sever climate.

Widespread deficiencies in rural Alaska solid waste service delivery impact Alaska's public health, environment sustainability and quality of life.
The Denali Commission partners with USDA Rural Development (RD) to fund improvements to community solid waste disposal facilities to help relieve conditions that threaten contamination of rural drinking water.
Since it's inception, the Denali Commission Solid Waste Program has received 75 proposals. Applicants have included 28 cities, 23 Tribal organizations, 4 boroughs and 7 non-profit organizations. 35 projects have been funded. Project proposals are solicited through a request for proposal process.

**Funding:**
Funding for these programs will vary according to program guidelines and funding availability.

**About the Commission (DENALI)**

Introduced to Congress in 1998, the Denali Commission is an innovative federal-state partnership designed to provide critical utilities, infrastructure, and economic support throughout Alaska. With the creation of the Denali Commission, Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities. Since it's first meeting in April 1999, the Commission is credited with providing numerous cost-shared infrastructure projects across the State that exemplify effective and efficient partnership between Federal and State agencies, and the private sector.

**Purpose**
The Denali Commission Act of 1998 defines the specific purposes as follows**:** To deliver the services of the Federal Government in the most cost-effective manner practicable by reducing administrative and overhead costs. To provide job training and other economic development services in rural communities particularly distressed communities (many of which have a rate of unemployment that exceeds 50 percent). To promote rural development, provide power generation and transmission facilities, modern communication systems and other infrastructure needs.
The Denali Commission Act also identifies "*Special Functions*" for the Commission:

We do know about the: **U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**
Public Health Service

# CDC

**C**ENTERS FOR **D**ISEASE **C**ONTROL AND PREVENTION

**History of the Community:**

Nunapitchuk ( noo-nah-PIT-chuck ) is a Yup'ik village, a sub-group of the Eskimos, from it's first settlement it was called NUNAPICUAQ, meaning small tundra land and we still do, was first

listed in the U.S. census in 1939 with a population of 121, (which we still have a copy of) a federally recognized tribe was organized in January 2, 1940, the Native Village of Nunapitchuk when the Tribal members duly voted 46 to 0, as a Territory of Alaska, the Last Frontier, at the time in accordance with section 16 of the Indian Reorganization Act of June 18, 1934 (48 Stat. 984), as amended by the Act of June 15, 1935 (49 Stat. 378). Members concluded that the most necessary first step was to strengthen the existing Tribal Government, as outlined in Public Law 93- 638, where Our Tribal Constitution was radified in 1940 in order to manage and administer Federal 93- 638 contracts according to Federal and State regulations and incorporated as a 2nd class city in 1969 at the same year activated the first electricity through AVEC. Settling of the village started with a single house made out of sod, or as the census taker said it "Sod igloo", and the only valuables they had were, houses, chairs, boats, nets, traps, dogs, reindeer, kayaks, sleds, guns, few radio's, sewing machines and outboard motors, then family tribes from surrounding area started moving in because of the abundance of food, soon after, a school facility was built, the old BIA schools where even more tribes started moving here from as far as 75 miles away. We are still heavily involved in subsistence activities for livelihood, and our Native language still predominantly spoken than the rest of the State of Alaska. Before and after the year 1946 there had been a great TB epidemic where many, many people had been affected and many of them died, and that was when the Community Health Aide program was born, around the year 1950. The 291 residents of Atmautluak Traditional Council were residents here before they relocated to their present location in 1969. We had also been in a combined city with the Kasigluk Traditional council until the year 1982.

**Demographics and Utilities:**

The number of residents is 512. There is a clinic, the Eliza Maxie-Hertz Memorial Clinic, with building a larger facility in the works, local phone building, 3 schools, 4 including the Early Headstart home visits with 30, pre-natal to 3yr olds, the RurAL Cap Headstart, attended by 21 students, Kindergarten with 18 students and ATMNS 1st-12th attended by 154 students with teachers quarters, an Indian Child Welfare Act (ICWA) Program and EPA/ Indian General Assistance Program (IGAP), a Tribal and City Office buildings, two stores, a back up electrical generator plant, 3 church's, National Guard Armory, Public Safety building, a State owned 2,500 ft gravel airstrip, with major improvements to the runway, taxi way and apron underway, Village Corporation Gas station with resale of gas, heating fuel and propane, a community hall building, 3 lagoons with 2 garages and a water treatment plant. The washeteria has two dryers, 7 washers, which are not all in good working order, a sauna, and Treated water can be obtained from there, with major improvements under way as well as a watering point for the other bank of the village. However, most residents obtain their drinking water from packing it from the river, rain catchment systems in Summer and from melted ice and snow in the winter. There are 116 houses, 9 unoccupied and 5 duplexes with 126 houses connected to tank haul/flush units, 126 houses connected to piped household water and sewer, and 5 remaining using honeybuckets. 1 lagoon which is piped is shared by the washeteria and the school with it's teachers quarters. The other lagoon next to it, is used for raw sewage from flush / haul systems, the third lagoon on the other bank of the village for raw sewage only. 2 lagoons in the main village are in the central, southern section of the village, the 3rd on the northwestern section of the other bank and all are primary treatment only, after which are pumped out with a small generator to surrounding wetlands, all 3 lagoons in the village have current flowing downstream, then is added with our primary dumpsite and Kasigluk dumpsite water and from there through the good main river of our village. All of our lagoons and the dumpsites mentioned are ALL upstream from our village. Electrical power is supplied by Alaska Village Electric Cooperative, Inc. ( AVEC), where we are

represented by a Delegate from our Tribe, phone services provided by United Utilities Inc., (UUI), local Health services by YKHC, The Yukon Kuskokwim Health Corporation, a private, non-profit corporation, is a Tribal Consortium, authorized by resolution of the Tribal councils of its member villages to provide health care services to the people of the Yukon –Kuskokwim Delta Region under the Indian Self Determination and Education Assistance Act of 1975 ( P.L. 93 – 638 ), of which Native village of Nunapitchuk is represented in its Board of Directors as Unit 6. On January 1st 1995 YKHC officially entered into our Self – Governance Demonstration Act, where YKHC is directed By the Tribes – not the Indian Health Service. We also work with the Alaska Native Tribal Health Consortium (ANTHC) which was formed in December 1997 to manage AK statewide health services for Alaska Natives, ANTHC is part of AK Tribal Health System, in which Tribes and Tribal organizations work together to achieve excellence and promote Native Self-Determination, Health and Wellness, where all AK Natives, through our Tribal governments and regional nonprofit organizations, YKHC for our region, own the consortium, ANTHC is one of 22 co-signers of the Alaska Tribal Health Compact, a self-governance agreement with the Indian Health Service, where our YKHC President/CEO Gene Peltola is one of the signatories to the AK Tribal Health System Memorandum of Understanding, along with 24 other Tribal organizations in the state, signed in 2004. We are also represented on ANTHC Board of Directors by Ray Alstrom from YKHC. And, as is the case with many upgrade projects of the washeteria, watering point for the other bank of the village, and the State owned airstrip, it is unclear if and when the original project scope will remain the same and or finish. Scope coordination is crucial in navigating the complicated granting process. The difficult logistics of moving freight to rural Alaska adds to the complex logistics needed to meet construction schedules and stay within budgets.

**Location and Climate:**

Nunapitchuk a federally recognized tribe is located in the southwest region of Alaska, and even called Western Alaska, 22 miles west by northwest of Bethel, the major hub of the surrounding area, we are in the Yukon-Kuskokwim area at approximately 60.896890* N Latitude and minus –162.456830* W Longitude ( Sec. 05, T009N, R074W, Seward Meridian ) in the Bethel Recording District. Nunapitchuk is located on both banks of the Johnson river, a tributary of the Kuskokwim river, which is the second largest river in Alaska, in being second largest, you could see how much water we are having to deal with, especially with the Global Warming affect and the fact that Native Village of Nunapitchuk lies Below the Sea Level, and to really know of Global warming, it is across the U.S. National news to list the Polar bear in the Endangered List. This from Indian Country TODAY, Vol.26, No.40, Wed., March 14, 2007, pg.A2, A truth: 'Real, immediate and devastating' by Sheila Watt-Cloutier, who had been nominated for 2007 Nobel Peace Prize, stated "Climate change brings into question the basic survival of Indigenous people and Indigenous cultures throughout the Americas." To quote the words of Hon. Julian Hunte, ambassador and permanent representative of Saint Lucia to the United Nations:"[…] the adverse impacts of climate change are real, immediate and devastating." Nunapitchuk encompasses 7.9 sq. miles of land and 0.7 sq. miles of water, lies in the lowland tundra patterned with thousands of small lakes and rivers. Native Village of Nunapitchuk is located right in the middle of BUSH Alaska. Alaska is warming and melting faster than any other place in the world, and the annual temperature has risen 3-5 degrees, and scientific data tells that warmer temperatures cause diseases to fish called "Ichthyol" and "Ichthyosis" to salmon, {Ichthyol; Compound of sulfonated hydrocarbons obtained by distillation of certain shales: used mainly in skin deseases.}: {Ichthyosis; A congenital skin disease characterized by dry, scaly or horny

formations.}, making them INEDIBLE. Nunapitchuk averages about 20 inches of precipitation, with snowfall of about 50 inches. Summer temperatures range from 80 to 30 degrees, winter temperatures run from 20 to –30 degrees farenheit without the wind chill factor. We are starting to get a lot of wet days during our winter months. There are no roads to our village. People arrive here by small planes, ATV's, trucks, and snowmachine in winter, or boat and plane in summer, very rarely by hovercraft. Freeze-up has occurred in November the last couple of years, when it usually was around October. Breakup usually occurs around May and lasts for several weeks, causing flooding in the community and dumpsite and which also always occurs during fall just before freeze-up, the level of flooding has increased in the last couple of years. Up here in Alaska our climate is hostile and our survival is also hostile. See more details on dumpsite impacts in Chapter 4.

**Additional Important Community Logistics:**

Our community is isolated and close and we must depend on each other in emergencies. We do not have extra people or departments or places to go. So there are several common events where the full community is involved. These events include:

- Search and Rescue
- Funerals (attended by full community)
- Extreme Weather
- Flooding
- Community events (Christmas, New Years, etc.)
- Running out of fuel oil
- Erosion and loss of structures
- Fires (house or surrounding lands)
- Emergency Auxillary Funds
- Subsistence activities which must be performed in a short time or the opportunity for the food is lost.

These few mentioned events take priority in our community in order to survive. Solid waste collection, backhaul opportunities, site maintenance, and community practices may be disrupted for a time period during these events. In order to write a plan that works best for our community, these realities are reflected in this plan to the extent possible.

# 2. ELDERS' GUIDANCE ON TAKING CARE OF OUR WASTES PROPERLY

**Elder Guidance:**

Our Elders have a lot of knowledge and wisdom, even though they do not have any paper to show that they have already gone through the necessary education such as a diploma or a collegiate certificate, for we have not already been worried about recycled papers, but what they do know and have gone through has been passed on from generation to generation by word.

We interviewed our Elders. They told us what we needed to do to keep our community safe and clean and protect our subsistence. Their words included rules about taking care of wastes

in the subsistence areas and also how to live life properly so that we will not have these problems. Their rules are about respect and how this will bring good opportunities and help when we need it. This plan is based on their words and explains how to carry out what they say as it relates to our wastes.

**Elders' words:**

**John A. Berlin:** Born on February 18, 1935, ph. # (907) 527-5129

- *People then didn't have toilet papers and used grass for tissue.*
- *People went just outside of houses to go bathroom.*
- *There were no trash laying around the village or surrounding tundras.*
- *There were no diapers or plastics to litter.*
- *Old food and trash are making subsistence foods scarce.*
- *These days money is everything, especially for solid waste handlers and their administrators who are watching solid wastes.*
- *Our village, dumpsites, and surrounding area started looking much better when they had funding for them.*
- *We need to ask for such and more monies.*
- *At our primary dumpsite, we need to close off the little creek entrance to have no "leaks" to our good main river.*
- *Does his own dumping, because the city is too slow and burns them.*
- *We need to educate our youth about proper ways of dumping.*

**Alexie Berlin Sr.:** Born on October 17, 1936, ph # (907) 527-5024

- *Uses secondary dumpsite.*
- *If people didn't dump on it's bank, it would look better and cleaner.*
- *Likes the secondary dumpsite, because it is located downriver and the flow is towards down river.*

**Margaret Alexie:** Born on October 2, 1940, ph# (907) 527-5612

- *Likes the edible dumpsite for it's deeper center.*
- *If the lagoons were filtered before running them off, they would be much better.*

**Evan K. Alexie:** Born on May 19, 1927, ph# (907) 527-5612

- *That, acids are very dangerous.*

- *Has been to the secondary dumpsite and has seen edibles there, that they should be thrown in proper dump.*

- *If there were boardwalks to our transfer trash bunkers, they would be much easily accessible.*

- *Was a janitor for the school before, that access to the center of dumpsites should be much easier, especially in the summer times.*

- *Back in the earlier days there were no plastics our lands were looking much better, these days there are too many different kinds of trash, especially plastics.*

- *When I use to be a council member they use to try and get monies and had village cleaned up as well as the dumpsites.*

- *Our trash haulers /workers need to get better pay for the work that they are doing.*

- *Our lagoons are good because we don't add any chemicals to them.*

- *These days the chemicals we add too them make them poisonous and dangerous.*

- *In the earlier days even our urine was a medical remedy to the sick.*

- *The thrown machines at the dumpsite are very good for parts and a Reuse Facility would be very good.*

**Ivan E. Jacobs:** Born on February 13, 1933 ph# (907) 527-5031

- At our primary dumpsite we need a better walk way to the center of the site with more solid foundations.

- We also need a burnbox so that the walkway would not get burned and that after the trash is burned the ashes would be thrown to the center of the dumpsite.

- As of now the controlled runoff from the lagoon flows down current then is added with the dump water then to the good main river.

- These days the chemicals we use from washing hands doing dishes and taking showers greatly affect our subsistence.

- We need more monies for our trash workers/haulers, the trash at our transfer bunkers would not be piling up.

- Trash these days, have lots of different contents and we need to watch what we throw in our trashbags.

- The edible dumpsite, which I see is good and I still use the site.

- The dumpsite is where used oil containers should be, because they are plastic.

- When I use to work at the Hospital, they had an incinerator where they burned all of the trash then throw the ashes out.

- Our land is TUNDRA and is comprised mostly of water and our lands like to sink.

**Elsie T. Jacobs:** Born on May 19, 1941 ph# (907) 527-5031

- We need to educate our youth about proper disposal methods, not just by word but through hands on education.

- Trash should not have such things as ammunition in them because they are regularly burned.

- If we could find out about the contents of and on the plants around the lagoons as well as the dumpsites besides the water, it would be very informative.

**Herbert Brink Sr:** Born on February 12, 1928 ph#(907) 527-5209

- We especially have to try and keep our village clean.
- We have to dump inside of dumpsite.
- We have to dump edibles in edible dumpsite not at trash site.
- Do not throw plastics and buckets at edible because wind can scatter them.
- Now sees recycling cans and they need to do more and put only recyclables in them.
- Our Forefathers had respected everything air, land, water, even campsites.
- These sayings, we don't hear no more, but some people listen and writes them down.
- It is up to the villages, to handle and keep their villages clean.
- And our Forefathers always worked with what is grown on the tundra, even underground and even grass.
- Now a days we are not taking care of the land as before.
- I never use to smell rotting food while traveling, but these days I do.
- Our Forefathers body was not as today's bodies, these days they go directly to the clinic.
- These days they have vitamin as Iron etc.
- In spring time when it melts, water is filtered by the land.
- All of Alaska's water is good to drink because it is filtered by the land.
- If added as non-Natives water, that is when it is no good to drink.

- We must never forget that we need to keep our villages clean, and we must appreciate the people who are working towards this.

- When I went to the dumpsite, I thought to myself how much the village had grown and had gotten messy with the trash.

- If IRA/City work together they could get more done.

- Now a days we need this “MONEY” for everything back then people never asked for money, still they moved houses, AVEC generators, etc. using own ones muscle with no heavy equipment, but that is not to be praise worthy.

- I like very much EPA/Solid Waste for our children, the dangers being taken away.

# 3. COMMUNITY PARTICIPATION

Community participation for the best solid waste plan is very important to us. Community disposal practices play a big part in whether our plan protects our health and environment. In addition to listening to our Elders speak, our community participation included the following:

**Community Survey:**

We carried out a community survey on concerns and suggestions. The full results are included in the appendix. This survey was conducted twice in February 2005 and in April 2006 by the EPA/ IGAP staff.

The top concerns of our residents were**:**

- Dumpsite location.
- Oil/Gas and fuel oil spill response plan.
- Management of our dumpsites, from trash spreading outside of area.
- Hazardous material and toxic wastes dumped at the dumpsite.
- Trash left around our village.

The most common suggestions were:

- The need for community education on household hazardous wastes, proper handling, disposal, and environmental issues and solutions.
- Strict control of all types of dogs in the community to prevent trash scavenging and messing up trash.
- Improper use/disposal of toxic household products such as bleach, ammonia, etc.
- Start village education and proper disposal methods.
- Erosion and trash left on our river banks, campsites, and around the village of Nunapitchuk.
- Sewer lagoon draining to our good main river.
- Construction materials from project sites that are left behind by the contractors.
- Plan and start a recycling center for cans, newspaper, cardboard, and used batteries.

**Council Meetings and Presentations:**

We held community Joint Council meeting between Native Village of Nunapitchuk (IRA), City of Nunapitchuk, and Nunapitchuk Limited where we discussed Integrated Solid Waste Management Plan, and the need for an MOU for information gathering between the 3 entities. We held the meeting on January 29, 2007 at the City offices.

We also held a General Meeting with the public, where our ISWMP Coordinator did a presentation about the current planning for our solid wastes. The City Mayor also talked about proper waste handling, management and on disposing wastes at proper dumpsites. We held a meeting on February 9, 2007 at the community hall where the public was invited to attend.

Sunday April 22, 2007 was Earth Day, and on April 23rd to 25th 2007 the EPA/IGAP held a Community Education on General Waste Management, where the three villages in unit 6 Nunapitchuk, Kasigluk, and Atmautluak attended here in our village and we had James Charles from Kuskokwim Fisheries working group, David Griso--Kuskokwim River Drainage Watersheds and Ryan Maroney – Natural Resources Conservation Services, Robert Nick—Donlin Creek and review on “Mining Conference” from Bethel, John Coolidge—City of Nunap. Trashman, on dumpsite and trash flow and Nunapitchuk ISWMP Coord. did presentations as well as our Elders who where attending and whom ever wanted to speak. At the second day the 24th EPA/IGAP and ISWMP Coord. went to the school to do presentations on waste

management and hazards on every day use on cleaners, etc., first with the elementary then the junior high and high school students.

We were also fortunate to have site visit by EPA. On July 26, 2007, Tami Fordham - Region 10 Tribal Coordinator which includes our community, Ted Jacobson -RuralCap assisting the EPA as a solid waste liason through the Senior services, Christina Colt -US EPA Reg. 10 Solid Waste and Toxics Unit Manager, Fran Stefan – Team Leader Resource Conservation and Recovery Act (RCRA) Tribal Team, Al LaTourette – Tribal Circuit Rider/Field Specialist Tribal Program, and Brek Steele LTJG U.S. Public Health Service OEH YKHC.

On August 15, 2007 we had a site visit from Doug Huntman of Ak. DEC for our region, to do a documentary on our dumpsites, taking video footage and pictures to use at conferences and training towards Solid Waste. Doug came with Kelsey Hustedt from YKHC Office of Environmental Health (OEH). They also visited Kasigluk and Atmautluak, all Unit 6. ISWMP Coord. Has been in contact with both and sent Plan to them to see.

There was another General Meeting held on September 13, 2007, where the whole public was invited to attend with a potluck after. At the meeting our EPA/IGAP Coord. Did a report, as well as the ISWMPlan Coord. On the current situation of our communities SW Plan.

We were visited on September 24th 2007, by the Lt. Governor of Alaska- Sean Parnell, DEC Commissioner- Larry Hartig and Facilities Division Director- Bill Griffith where our ISWMPlan Coord. Discussed about our solid waste plan and the situation we are in, besides the state owned airstrip which is underway, the watering point upgrades in the works, and lagoons.

**Community Solid Waste Committee:**

A Planning Committee was formed on October 7, 2004. This committee is comprised of 6 members. They represent different parts of our community. Their job was to make sure that our plan fits our community and what will work best for our community. Their concerns included:

- Construction materials on project sites that are left behind by contractors, recommended making resolution.

- Question: Should the plastic bags continue to be used by the stores or be banned and replaced with canvas (brown bags)? Plastic bags litter the village, outside the village and affect our subsistence resources (Fish & Wildlife). Recommend to work with IRA (Native village of Nunapitchuk) to make an Ordinance.

- Sewer lagoon draining to the river. Bring this issue up during the IRA/City joint meeting and also to include LKSD local ASB ( Advisory School Board ), for sewer lagoon treatment.

- Styrofoam cups and plates in the school, businesses and restaurant, recommendation is to write to them in making a resolution.

- Screened burn box. Recommended to look into IRA Council master plan and bring this issue up during the joint meeting.

The committee meets about every 3 weeks. The following people served on our committee:

- Sophie Chaliak, EPA/IGAP Coordinator
- Zechariah Chaliak Sr., IRA President
- Julia Twitchell, Village Heath Aide
- Bobby Mochin, Washeteria Worker
- Herbert Brink Sr., Elder
- Jimmy Stevens Sr. Elder

**School Presentations:**

Our Environmental Staff met with the school classes and teachers. Our Solid Waste Management Plan Coordinator also talked to the junior high and H.S. students during an Elders day on March 2, 2007. They educated the youth about:

- The Environmental Protection Agency
- Our Integrated Solid Waste Management Plan
- Keeping our community clean
- Proper Disposal of wastes and hazardous materials
- Volunteering for the whole community
- How solid waste could impact our subsistence way of life, which we currently hunt and eat for our livelihood.
- How solid waste could drastically impact our environment
- Recycling

**Community Education and Outreach:**

Subsistence camp monitors speak to the hunters at our camps. They educate them about littering and toxic chemicals in the oil and gas. We learn from them what people are

concerned about and what education they need. Our environmental staff went to homes to educate people about environmental issues. They talked to people at the stores. They also found out from our people what the big concerns were. This is what people are saying in our community that is related to solid waste management:

- Honeybucket dump is polluting our river.
- Kids and people are getting sick.
- Dumpsites are polluting our river.
- We like the recycling cans.
- Our children liked the elders teaching them at school about how not littering is better for subsistence.
- We need to close off the creek at outside section of main dumpsite.
- Too much plastic bags and litter on the tundra.

## Community Information for Solid Waste Planning

**Current Community Population:**

We have 512 people living here now, including 11 school staff that leave during the summer. Additionally, we have about 5 to 15 people who leave for commercial fishing or firefighting. On most days in the summer, about 10 to 25 people are camping overnight at fish camps. During fall hunting, we have about 15 to 30 people out hunting overnight. During winter, about 5 to 10 people are gone from the village on most days for subsistence. The average number of people gone from the village for other reasons, like visiting, shopping, and medical appointments on most days is about 3 to 8. About 3 to 5 visitors come and stay over in our village each day in the summer. In the winter we have about 60 people for tournaments and gatherings. We usually have about 2 to 5 people each year who live here during summer for construction, and 0 to 8 people for winter projects. For about 1 to 2 weeks during Spring Breakup, and 1 to 2 weeks during Fall Freeze-up, during these weeks most people stay in the village because it is dangerous to travel by boat or snowmachine, even going to the other bank of the our village.

**Average yearly community growth expected for next 20 years:**

| Table 1 Projected Population For The Next 20 Years For Community Name | |
|---|---|
| Year | Population |
| 2006 | *512* |
| 2007 | *520* |
| 2008 | *527* |
| 2009 | *535* |
| 2010 | *543* |
| 2011 | 551 |

| Table 1 Projected Population For The Next 20 Years For Community Name | |
|---|---|
| 2012 | 559 |
| 2013 | 568 |
| 2014 | 576 |
| 2015 | 585 |
| 2016 | 594 |
| 2017 | 603 |
| 2018 | 612 |
| 2019 | 621 |
| 2020 | 630 |
| 2021 | 640 |
| 2022 | 649 |
| 2023 | 659 |
| 2024 | 669 |
| 2025 | 679 |
| 2026 | 689 |

**Growth Rate Calculation Process:**

Our expected growth rate of 1.5% is based on the average growth rate we had in the past 6 years, using current population and YR 2000 US Census data. We also evaluated the growth rate between YR 1990 to YR 2000, which was similar. In the future, we do not expect any development projects that would affect our growth rate, only upgrade projects and improvements to our current developed ones. We also do not expect to see a big difference in the number of people moving in or out that would affect our rate, even though with any projects, there is mostly non-villagers who are doing the work with very little, mostly a few laborers working from our village. So we expect our growth rate to be about the same.

# 4. SOLID WASTE DISPOSAL SITE INFORMATION

**H**ealth **R**isks **A**ssociated **W**ith **O**pen **D**umps = Infectious Diseases as from clinic wastes even though needles are sent to Bethel, household pets, insects, animals. Dump Scavenging and Waste Hauling = more visits the greater health risks or injuries, more likely to be in contact with disease pathogens or breathe toxic fumes. Site Accidents = by not managing our site or monitoring what people are throwing and how they are throwing.

Our primary dumpsite has lots of water around it, and definitely is polluting our drinking water. If we see stains or colored liquids in the soil in and/or around our dumpsite then we have a *leachate* problem. **Leachate** is a liquid that is formed when rain or melted snow and ice passes through the wastes in the dumpsite. The water passes through the garbage, like a water passing through the filter on a coffee machine. The liquid enters into the soil and it keeps moving down through the soil until it reaches the water or groundwater. From there, it can flow until it reaches a well, spring, creek, lake pond, or river. When hazardous materials are placed in the dumpsite, the leachate becomes toxic or poisonous. Since leachate often contains toxic chemicals, it can become a potential threat to the environment and to Public Health if it gets into the groundwater or surface. This could / may result in:

- Unsafe drinking water;
- The spread of disease, and
- Harm to fish and wildlife.

Here in the Native Village of Nunapitchuk we have 3 dumpsites, the primary, the secondary, and the edible. All of which are solid waste to us, for we are still very much with our subsistence lifestyle. We keep our edibles separate according to our forefathers and elders teachings. We have a secondary dumpsite, which we start using when the access to the primary gets inaccessible.

As mentioned before, and we strongly stress, and are very concerned to the fullest extent that we are not only dealing with our own waste water streams, but also of our neighboring village of Kasigluk's dumpsite leaks, which has water currents going right through our Native Village of Nunapitchuk's main river, and drastically doubling the toxic contaminants of our Native Village of Nunapitchuk.

At our primary dumpsite there is another section of the site, where trash collected is also thrown. The section is outside of the fence boundary of the main section, is a similar size pond and is 3 feet deep, accessible by boat during the summer seasons through a little creek that leaks, currents flowing to the good main river, has about half the amount of trash as the main section, but no large bulky trash as refrigerators, drums, vehicles, etc.

We currently have open dumping and uncontrolled open burning on both of our dumpsites including the outside section of our primary dump, where during summer season a boat can go right up to a trash piled in the pond and is not used just by the trash collectors, but by the whole community and is set on fire also, open burning.

The ADEC had said our current unapproved open Primary dumpsite is ILLEGAL.

Open dumping refers to the depositing of solid wastes anywhere (on land or in water) other than an approved solid waste facility. Open dumps are areas where waste is disposed of without proper controls, including regular application of soil or other environmental controls. Open dumping and illegal dumping of waste are common disposal practices in rural communities and villages. In many cases there are few options for rural communities other than disposing of raw garbage into water bodies, open tundra or other areas in an uncovered fashion.

Residents are responsible for their own edible disposals, but the site needs to be moved for our Native Village is growing and the current site is not large enough and does not have any kind of filteration as more land around it or plants, it's a small island upriver from our village,

the kind that has unstable tundra ground with lots of grass all over it, the kind of land that sinks or is gone completely as time passes on. It seeps directly to our good main river.

The current equipment we use for solid waste disposals are getting very much out dated, for being in use for so many years, which are old polaris snomachine with box type freight sled made out of lumbers ( 2x4's, plywoods ) that is breaking apart for winter usage, old mariner 40hp outboard with 20 foot YK raider aluminum boat for summer. Access board walks made of treated 2x6 lumbers tend to break apart in no time, because of extreme temperatures and unstable grounds and are extended to the water to make into boat launch areas.

**Better Access.** Reduces tundra degradation, promotes waste consolidation and use of waste area separation area, and reduces peoples contact with waste.

Our dumpsites do not have any kind of heavy equipment, but our village Corporation has an old bulldozer, model D3B, which is getting very old.

The table below describes the primary features and conditions of our current dumpsites. There are additional Tables in later Chapters that discuss the site operations and maintenance, waste collection system, waste recycling, and waste burning.

This information we have on the Sanitation Deficiency System (SDS) on our primary dumpsite is from 1999.

**Community Name: Nunapitchuk**

AK16503-0007
(Nunapitchuk, Native Village of Nunapitchuk, AK)

Nunapitchuk-

| | | | | | | |
|---|---|---|---|---|---|---|
| Solid Waste Burn Bar | 41 | 3 | 1 | $78,850 | *A | $0 |
| Existing: Unapproved open dump site. | | | | | *B - | $0 |
| Proposed: Purchase and install high tech Burn barrel to reduce volume of Solid waste stream. | | | | | *C | $78,850 |

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**Total for community: Nunapitchuk $78,850**

This means our Total score was 41, deficiency level is 3 and final score is # 1.

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On July 18, 2006, Brian Lefferts, Field Environmental Health Officer from Office of Environmental Health and Engineering's (OEHE) conducted a Solid Waste Disposal Survey (SWDS) here in Nunapitchuk. A copy of the solid waste disposal report is attached. The potential improvements listed on the report are only recommendations to assist the city. The *OEHE 2000 Solid Waste Disposal Guidelines for NON-permitted Sites* were used for rreference during the survey. Please contact Brian at (800) 478-6599 with any questions or comments.

**Yukon Kuskokwim Health Corporation**
**Office of Environmental Health and Engineering**
P.O. Box 528, Bethel, Ak 99559 (800) 478-6599
**Solid Waste Disposal Report For Unpermitted Sites**

Property Owner: City of Nunapitchuk
Operator: Joseph Mochin Jr.

Survey Date: July 18, 2006
Population Served: 512

**Each marked item is explained on the attached page(s), followed by a recommendation or correction.**

**I. Site**

X **A. Design Type:** approved design, open dump

X **B. Location:** away from homes, runway, surface water

X **C. Fencing:** present, intact, upright, all garbage stored within perimeter.

X **D. Leachate Potential:** lined, standing pools inside site, permafrost

X **E. Signs:** posted

**F. Contents:** hazardous waste, animal carcasses

**G. Cover Material:** available, used

X **H. Burning:** burn box available, separation before burning

X **I. Other: ordinance**

**II. Collection**

X **A. Method:** organized collection, some self haul

**B. Collection Bins:** conveniently located, cleaned

X **C. Site Access:** road adequate in all weather conditions, access restricted to residents.

X **D. Safety:** personal protective equipment, emergency fire services

**E. Other:**

**III. Operation and Maintenance**

X **A. Solid Waste Management Plan:** developed, used

**B. Equipment:** available, maintained

X **C. Operating Funds and Fees for Service: $7 for collection bin usage**

**D. Operator Training:** designated “person in charge” disposal personnel trained

**X** **E. Recycling Program:** batteries, cans

Yukon-Kuskokwim Health Corporation, Office of Environmental Health and Engineering

**SOLID WASTE DISPOSAL SYSTEM SURVEY**

P.O. Box 528, BETHEL, AK 99559 (800) 478-6599

**System Description**

The city of Nunapitchuk uses both resident self-haul and organized collection through collection bins for solid waste disposal. The primary dump is located 1.5 miles from town towards Kasigluk in a tundra pond. The second dump is used for waste food and is located 4 miles by boat towards Atmauluak. The city currently employees one operator to haul the material from the collection bins to the main dump. It is a monthly of $7 to have access to the collection bins. Non-paying community residents are responsible for transporting their own waste to the dumpsite.

**Progress**

Derek Sakris conducted the previous survey on July 20, 2004. Since the previous survey, the IRA IGAP program has begun recycling some items in the village.

**Findings and Recommendations**

**I. Site**

**A. Design Type**

- An open dump is considered the least desirable type of solid waste site due to it's environmental health impacts.

  ***Recommendation:*** *When funds become available, a trench and fill dumpsite should be built and the open dump closed.*

**B. Location**

- The dump is 300 feet from a large body of water (one mile recommended).

  ***Recommendation:*** *Although it is almost impossible to find an area near Nunapitchuk that is more than 5000 feet from a large body of water, separation distances should be considered during the planning for the next site.*

**C. Fencing**

- The fencing around the dump was not intact in several places.

  ***Recommendation:*** *The gate should be repaired and kept in working condition. The gate should be kept closed to keep animals out.*

**D. Leachate Potential**

- The dumpsite is saturated with water and sometimes appears to be a small pond. This increases the leachate potential of hazardous chemicals.
  ***Recommendation:*** *Moving the site to land should be considered during the planning of future dumpsite.*

### E. Signs

- A sign with general landfill instructions should be placed at the site.
  ***Recommendation:*** *This type of sign can be particularly helpful in communities where residents haul their own garbage. Examples of information written on the sign include items not to be placed in the site, burning instructions/restrictions and directions for maximizing land area use.*

### F. Burning

- Currently open burning occurs at the dumpsite.
  ***Recommendation:*** *It is recommended that burn boxes or incinerators be used Along with a program to separate burnable items from non-burnable items in order to minimize the fire hazards associated with open burning.*

## II. Collection

### A. Method

- Nunapitchuk uses a self-haul as well as organized collection for waste disposal. Self-haul is the least desirable method and should be discouraged.
  ***Recommendation:*** *Emphasis should be placed on an organized collection system that allows the trained and vaccinated workers to dispose of the waste.*

### B. Site Access

- The site is inaccessible during spring break-up and fall freeze over. Residents must Pile trash up during these weeks since no other access is available to the dumpsite.
  ***Recommendation:*** *A boardwalk to the site would allow residents to access the site the entire year.*

### C. Safety

- The site operators are at higher risk of contracting a disease.
  ***Recommendation:*** *When hired, the recommended vaccinations should be given to the employees. They should have hepatitis A, hepatitis B and tetanus vaccinations. These should be available at no cost from the clinic.*

### D. Other: Solid Waste Disposal Ordinance

- There is no community solid waste disposal ordinance.
  ***Recommendation:*** *Developing a solid waste disposal ordinance, posting the Ordinance, and enforcing it is recommended to prevent dumping outside of the site.*

## III. Operation and Maintenance

### A. Solid Waste Management Plan

- The village is currently without a solid waste management plan.
  ***Recommendation:*** *It is strongly recommended that a plan be developed as soon as reasonably possible in order to protect village residents as well as the surrounding environment from the hazards of improper dump maintenance. Contact OEHE at (800) 478-6599 for assistance.*

### B. Operating Funds and Fees

- The city currently charges $7 for using the collection bins. However, not all residents are using this service. Many residents are abusing the system by using collection bins without paying for the service. Some residents are using the summer schedule where they pay to have waste hauled from May to October when the water isn't frozen. Most residents haul their own waste in the winter when they can snowmachine over the river.
  ***Recommendation:*** *A mandatory solid waste program could bring in revenue to the city to purchase a burn barrel or hire more workers.*

### C. Recycling Program

- A recycling program should be established. The IRA IGAP department is working on collecting some recyclables and used batteries. This would be valuable in reducing the amount of garbage and toxic materials going into the dumpsite.
  ***Recommendation:*** *Another aspect that should be considered is a means of safely disposing waste oil.*

This from: Public Law 86 – 121

**Annual Report for 2005**

The Sanitation Facilities Construction Program of the Indian Health Service

U.S Public Health Service
Department of Health and Human Services

Indian Health Service
Sanitation Facilities Construction Program
12300 Twinbrook Parkway
Room 610, Twinbrook Metro Plaza
Rockville, MD 20852

The Indian Health Service (IHS) Sanitation Facilities Construction (SFC) Program continues to identify and report the sanitation needs of American Indians and Alaska Natives while carrying out a Program to meet those Needs in cooperation with Tribal governments. Since the passage of Public Law 86 – 121 in 1959, the SFC Program has worked in partnership with Tribal governments to construct essential sanitation facilities.

On July 31, 1959, President Dwight D. Eisenhower signed Public Law (P.L.) 86 – 121. Under this Act, the Surgeon General is authorized to conduct essential sanitation facilities for American Indian and Alaska Native homes and Communities. The authority vested in Surgeon General by P.L. 86–121 was transferred to the Secretary, Health, Education, and Welfare (HEW), by Reorganization Plan No. 3 of 1966. The Secretary of HEW, was re-designated Secretary of Health and Human Services by Section 509(b) of P.L. 96 – 88 in 1979. The authority was delegated to the Director, Indian Health Service, by the Reorganization Order of January 4, 1988 (52 FR 47053), which elevated the IHS to a public Health Service (PHS) agency. The Sanitation Facilities Construction (SFC) Program is unusual among Federal programs because IHS personnel work cooperatively, as close partners, with Tribes in providing essential sanitation facilities to Indian communities and Alaska villages. Protecting the health of and preventing disease among American Indians and Alaska Native populations are primary IHS objectives. Improving the environment in which people live and assisting them to interact positively with that environment results in significantly healthier populations.

## The SFC Program Mission

Today, as it has for over 46 years, the SFC Program continues to provide assistance to the American Indian and Alaska Native people in eliminating sanitation facilities deficiencies in Indian homes and communities. The IHS mission is to raise the health status of American Indian and Alaska Native people to the highest possible level. The SFC Program supports the IHS's mission by providing engineering, technical, and financial assistance to Indian tribes and Alaska Native villages (Tribes) for cooperative development and continued operation of safe water, wastewater, and solid waste systems and related support facilities.
In partnership with the tribes, the SFC Program:

1. *Develops and maintains an inventory of sanitation deficiencies in Indian and Alaska Native communities for use by IHS and to inform Congress*

2. *Provides environmental engineering assistance with utility master planning and sanitary surveys*

3. *Develops multi-agency funded sanitation projects; accomplishes interagency coordination; assist with grant applications; and leverages IHS funds.*

4. *Provides funding for water supply and waste disposal facilities.*

5. *Provides professional engineering design and /or construction services for water supply and waste disposal facilities.*

6. *Provides technical consultation and training to improve the operation and maintenance of Tribally owned water supply and waste disposal systems.*

7. *Advocates for Tribes during the development of policies, regulations, and programs.*

8. *Assists Tribes with sanitation facility emergencies.*

**Tribal Involvement**

The SFC Program employs a cooperative approach for providing sanitation facilities to American Indian and Alaska Native communities. Consultation with Tribal governments is maintained throughout every phase of the construction process, from preliminary design to project completion. Operation and maintenance of these facilities by the American Indian and Alaskan Native people, with ongoing technical assistance from IHS, ensures the long-term health benefits associated with improved sanitation conditions. Under Titles I and V of P.L. 93 – 638, the Indian Self – Determination and Education Assistance Act, as amended. Tribes are managing their own SFC Program through Self-Governance compacts. In our IHS Area, our office is located at Anchorage with a Tribe of Alaska Native Tribal Health Consortium (ANTHC) with 6 other IHS Area's across the U.S. are in the Self-Governance compacts.

**Program Operations**

The Sanitation Facilities Construction (SFC) Program is part of the IHS Office of Environmental Health and Engineering. The SFC Program has established a Sanitation Deficiency System (SDS) for identifying and prioritizing with unmet water, sewer, and solid waste needs. As additional and more stringent environmental regulations regarding safe drinking water, sewer treatment and disposal, and solid waste disposal are issued, the IHS will continue providing technical support and consultation on environmentally-related issues to American Indian and Alaska Native Tribes and individual homeowners.

**The Challenge Ahead**

The number of Indian families is increasing faster than new homes are being constructed, making it difficult to meet critical sanitation needs. Another factor is the need to upgrade or replace existing sanitation facilities when their useful life is reached. More stringent environmental standards and more difficult site conditions will challenge the SFC Program as it endeavors to provide needed sanitation facilities in years to come. Standards for public water supply systems, solid waste disposal facilities, and sewer treatment facilities are continually being modified by legislation and regulation. The impact of these changes is generally most sever on small utility systems such as those serving American Indians and Alaska Natives. As a result of more stringent regulations, small systems will cost more to build and operate. In the future, the technical and managerial skills of IHS and tribe staff to design, construct, and

operate needed sanitation facilities in an environment with more fiscal and regulatory challenges will be tested. A true partnership among Tribes, Congress and IHS is needed if we are to meet these challenges successfully.

**Anchorage Area / DSFC**
**1901 South Bragaw Street, Suite 200**
**Anchorage, AK 99508 – 5928**
**Ph. (907) 729- 3540**

**Table 2 Solid Waste Site Features And situation**

| Feature | Current Description | Changes Planned? |
|---|---|---|
| **Land Ownership** | The land where the dumpsites are located are owned by the City. | |
| **Dumpsite Location** | The primary dump is located **0.89** miles Southwest from town edge, **1.24** miles from nearest school, **1.80** miles from Airport, GPS coordinates to entrance of primary are 60*52.883' N and 162*28.807' W, -secondary dump is 2 miles Southeast of town, GPS 60*51.715' N and 162*24.908' W,- Edible site about 1.7 miles North, GPS 60*51.705' N and 162*24.897' W | Eventually, we'd like to move the location further away, at least one mile. This is part of our long-term planning. |
| **Dumpsite Operation Responsibility** | The city is responsible for operations and the Tribe provides their Environmental Department to assist in environmental planning. | We'll review often. |
| **Summer Dumpsite Access** | The accesses are in fair condition. They are 2x6 treated lumbers. People travel to the dumps by boat in summer. From boat launch areas people enter the dumps, there is a boardwalk that they follow into the dumps. | The Nunap. EPA is looking into Geoblocks. To try at the primary dumpsite. |
| **Winter Site Access** | In winter, people travel to the dumpsites by snowmachine and ATV. They enter the primary site from the North, the secondary from West, and the edible from south. | During winter the access to dumps are good, but need to consolidate from gate on in to the center. |
| **Wind Direction** | The wind blows from the dumpsite into town some of the *time*. | Mother Nature. |

## Table 2 Solid Waste Site Features And situation

| Feature | Current Description | Changes Planned? |
|---|---|---|
| **Site Size** | The primary dumpsite is about 1 acre, secondary about ½ acre, edible about 50 ft by 75 ft. There is also some dumping along the summer access path, beginning about 50-100 feet from the dump. | Dumpsites size become smaller in size and farther from water with burnbox with new site. |
| **Site Shape** | The primary dumpsite is shaped like a long circle. Its width is about 300 feet, and it is about 600 feet long, about 75% of the dump area is covered by piled waste, because of the outside section of fence where accessible by boat. The rest is ground, center is a pond. Secondary site is @ 200 ft by 500 ft @ 20% covered with pond as whole center, also shaped like long circle. Edible dump shaped like oval all 50 by 100 ft covered. | Make dumpsite shape much smaller with burnbox. |
| | | |
| | | |
| **Type of site management** | Open dumping on surface. Open burning with No Burnbox. | Acquire burn box use trenches to fill with ashes, funds to implement. |
| **Heavy Equipment used at Dump** | We do not have any heavy equipment.<br>Our village corporation has a bulldozer, which we finally get to use, depending on Funds Available | Acquire heavy equipment not only to compact and trench, but use to make a new site. Funds to acquire. |
| **How often wastes are consolidated or compacted** | We consolidated Twice on 3 dumpsites by hand laborers during fall seasons with year 2004 last. And with the Corp's dozer during winter in 1989. | Acquire heavy equip. and use on new site to regularly consolidate. |
| **How often wastes are covered** | Zero times each year. Only snow covered during winter season. | Do study to occasionally cover wastes, type to cover material. |
| **Operator/Technician Staff** | We have 2 waste technicians who work alternating shifts at 18 hours each week. Their duties are: collecting garbage, open dumping, burning on surface at dumpsite. | Give necessary training to techs and operator on safely working on site. Necessary requirements shots, materials, etc,. |
| **Burning wastes** | We burn our wastes by Open burning. It is lit on fire by the waste technician. The wastes that are burned include all trash taken to the dump. This includes regular trash brought by households and regular trash brought by collection service, schools, or businesses. Large items like drums, appliances, vehicles are not burned. | Acquire burnbox to burn burnable materials after screening to reduce volume of site. Funds to add hours and man power to do screening and train a tech. |
| **Salvage Pad/Area** | An area of about 30 feet wide by 70 feet long is used by people to find usable items. It is located in the northeast corner of the dump. The type of salvageable wastes here are vehicle parts, snomachines, ATV,s, appliances..etc. | Flyers and signs to let community coming and going from salvage about Safety First, make fencing around area. |

## Table 2 Solid Waste Site Features And situation

| Feature | Current Description | Changes Planned? |
|---|---|---|
| **Additional Waste Segregation at Site** | There are no additional segregation. NONE. Community is already segregating their edibles at a different site. | Designate area of site for people to leave hazardous material, if brought to site, flyers and signs. |
| **Recycling Shed/Area** | We currently don't have a recycling shed, however we have a community building which our EPA/IGAP are renting and people can drop these items mentioned there, near the tribal office. People drop off the following items: Aluminum pop cans, fluorescent bulbs, small portable batteries. | To still encourage community to recycle, get it in full swing, acquire storage space, acquire can crushers to help encourage, flyers and education. Funding to push forward. |
| **Dumpsite Age** | The Primary dumpsite started in year 1982, and the secondary year of 1985. | To start anew, new dump new life, to better manage our site, and community. Funding to implement. |
| **Fencing** | A wind fence going around each dumpsite, are starting to break apart in some areas of each site. And there is no kind of fencing in the outside section of the primary dumpsite pond, NONE | Have fencing, need to build more for salvage and other metals brought to sight and fix existing fencing. Funding to implement. |
| **Types of Wastes that Are Now at the Dump** | | |
| **Residential wastes:** | Cardboard, paper, plastics, tin and aluminum cans, diapers, Styrofoam, old or broken household items like furniture, toys, clothes, rugs, appliances, dishes, glass, tires, ATV's, sno-machines (parts that are not salvaged), computers, TV's, small batteries, tires, and all types which BIG cities have these days. | To start screening and burn the burnables and separate hazards, to encourage community to separate from residential hazards and recyclables. Flyers and educate, council make ordnances. Funding to get fully aware. |
| **School wastes:** | Cardboard, computers, Styrofoam plates and cups, Cans, old equipment, paper, copiers used ink, and all school types. | Council make ordnances to follow of what is acceptable at site, educate. Reduce the use of Styrofoam, open both sides of cans, not to throw inks, computers, to notify of hazards. |
| **Store Wastes:** | Cardboard, paper, fluorescent lights, old broken furniture, empty plastic oil containers (tons of them), all store types. | Make ordnances of what's acceptable at site, to notify of hazards, reduce plastic bags, styrofoams, disposable plastics. |
| **Utility wastes:** | Antifreeze, transformers, old equipment, used oil, batteries, fluorescent lights, tires, all utility types. | Make ordnances, to strictly monitor on hazards, of what's acceptable at site, record keeping. |

## Table 2 Solid Waste Site Features And situation

| Feature | Current Description | Changes Planned? |
|---|---|---|
| **Construction Project Wastes:** | Pipes, demolition, insulation, asbestos from old torn-down buildings, drywall, cardboard, electrical wires and electrical equipment, old plumbing, broken-down heavy equipment, fluorescent lights, concrete, all types of construction wastes. | Ordnances to charge for site use, to penalize for not following. Strict monitoring, record keeping esp. hazards, excess amounts of wastes. |
| **Honeybucket Wastes** | The raw sewage lagoon is next to the piped lagoon in the main village, located in central southern most section, on the other bank it is at northwestern section and is the only one. | Make ordnances to where honeybuckets go, to make flush units to 5 or few remaining, get funds for healthier environment. |
| **What goes into the burnbox that shouldn't:** | We Do Not Have No Burnbox. | To acquire badly needed box to start burning wastes more safely and greatly reduce volume at site, to train tech., of what goes in burn, get funding to implement all towards safe burning. |
| **Additional Seasonal Factors that affect dumpsite maintenance or collection or access**. (Note common events that happen during the seasons.) | | |
| **Winter (from November through mid April)** | Days below –20 F, it is dangerous for our operator to work for more than 2 hours because we don't have a warming shed there. Below –35, equipment will not work. Also, it gets dark outside the hours of 10am and 3pm. People will not go to the dump in storms, or generally when it is below –30 with wind chill, and they will pile up their garbage outside or in Arctic entry ways. Snow piles up over wastes by end of December. Wastes are hard-frozen and cannot be moved or consolidated much between mid-October and May. | To consolidate with heavy equip., when accessible, usually when construction is feasible for our geographical area. Funds.. |
| **Summer (from mid-June to end of August)** | Early summer, easily accessible due to a lot of ponding from Breakup. The tundra is mucky and any equipment can't be used or it will be stuck. If there was any Equipment to use. | Best time to consolidate mostly by hand for now, depending on new site, use heavy equip. Good time to ready for closure. Funds.. |

**Table 2 Solid Waste Site Features And situation**

| Feature | Current Description | Changes Planned? |
|---|---|---|
| **Fall (from September to mid-November)** | Early fall time people must hunt all types of game. Fall time is good for using heavy equipment because the wastes are stiff not hard and there is little snow, the ground is hard enough for equipment to not be stuck. If there were any Equipment to use. Our dumpsites and village floods for about 3 weeks and freezes up flooded. And it is a good time to consolidate by hand laborers, and do minor maintenance to dumpsite access and fencing, Depending ON FUNDING. Trash pile up at transfer stations and outside of homes when waiting for ground and water to get hard enough to travel on. | To closely monitor the trash bins which tend to pile up, flyers to keep bins in an organized manner. Educate. Funds.. |
| **Spring (from mid-April to mid-June)** | Just before Breakup is a good time for site maintenance with the ground still frozen, with warmer weather and longer light. Breakup is a dangerous time to access the dump because we cannot use a boat or snowmachine and trash also start piling up during this period. This period lasts about 2 weeks. Our dumpsites and town floods for about 3 weeks. | Consolidate and monitor bins in village, if maintenance needs get ready, plan. Funds.. |

**Dump site Photographs**

The following pictures show the dumpsite and its key features.

# 5. CURRENT SOLID WASTE MANAGEMENT PROGRAM AND PRACTICES

**Waste Collection Program:**

We have solid waste trash transfer stations which are located around our community, the transfer stations are located a couple of feet from our river banks, to make our transfer of garbage from the community to boat then dumpsite more easier for our trash technicians to handle, for they do more hands on handling compared to a dump truck with minimal handling of wastes. The transfer stations are 2 feet to 10 feet away from our main river and they are not built to seal any kind of leachate. Our EPA/IGAP department have had necessary training to be able to do water quality testing on and around our community.

During fall freeze-up and spring thaw is when everybody in the village is unable to travel, even between the other bank of the village and main village. During these both times trash collection is halted and disrupted for a time, they pile up at the transfer stations and by residents homes, also during these times dogs start tearing trash bags apart with the help of crows and with the unpredictable winds become an unsightly mess within the community. Our equipment for waste collection, which every waste collection programs in the world need are getting very much out Dated, getting to occasionally break down and halting the collection in the community until our only equipment we have gets to be repaired, especially the mechanism parts, which are a snowmachine for winter and an outboard for summer usages, because of the harse environment that we live in and the difficult seasonal conditions we have to face and go through. Our trash collectors have to handle garbage 3 times in the summer season and 2 times in winter time, compared to a city dump truck with minimal hands on handling. Residents bring garbage to transfer stations from there the hands on handling starts for our collectors, in summer 1st from the transfer to the boat, 2nd from boat to wheel barrow, 3rd from wheel barrow finally to the garbage destination and still open dump and open burning. In the winter, 1st from transfer station to a man made freight sled, 2nd from sled to center of dumpsite. All at a very lowest rate compared to cities wages.

**Table 3 Waste Collection Program**

| Item | Description |
|---|---|
| **Number of Transfer Station services, including any private services that an individual offers:** | 1 |
| **Operated by:** | City of Nunapitchuk |
| **Average of households that use the service each month.** | 114 |
| **Total number of households in village** | 124 |
| **Estimated average number of households who self-haul some or all of their garbage to the dump at least three times per month.** | 10 households |
| **Estimated number of people each week who use the dump per for salvaging parts or other goods.** | 10 people. |
| **Fee charged for Transfer Station services. (if more than one service, list fees for each service)** | $7 per month for households<br>$30 per month for most businesses and offices |

**Table 3 Waste Collection Program**

| Item | Description |
|---|---|
| **Fee charged for salvaging parts** | $0 |
| **How fee is collected** | Households are supposed to pay their bill ahead of time. They are sent out by mail. |
| **Any discounts or other ways for households to receive collection service?** | No discounts. |
| **Besides the fees collected, what other money is used to pay for the collection service?** | From the whole operation of the City, including Pull Tab (Rippies). |
| **How often garbage is collected:** | Three times per week |

***Waste Collection Resources Section:***

| Topic | Link |
|---|---|
| Exploring and evaluating collection systems: ANTHC/ANHB SWM Guide Workbook 4 | View pages 401-430 of this document http://www.zender-engr.net/anhbguide/4.pdf |
| Waste collection on SWAN | http://www.ccthita-swan.org/Planning/1B_waste_collection.cfm |

On our flush/haul systems we constantly have to keep the heat tape on so that they do not freeze when the temperature starts to reach freezing, which is for most of the year up here in Alaska, and each household with flush /haul system pays for their own electricity as well as haul service fees.

During extreme winter months water/sewer collectors carry blowtorches, because hose connections tend to freeze-up, or bring the whole equipment into the City garages to thaw out or do maintenance on them. Also, they always have to change their equipments to better suit the current seasonal conditions of their accessibility to flush/haul tanks and deliveries to homes and lagoons. Again, depending that the equipment being used are in operational conditions.

**Table 4 Sewage Collection And Disposal (Honeybucket And/Or Flush-Haul)**

| | |
|---|---|
| **How are honeybuckets disposed? (Bunkers, lagoon, slough, ponds, etc.)** | The few honeybuckets are usually dumped at the lagoon. |
| **Is there a collection service offered?** | No |
| **What is the fee for honeybucket collection or bunker maintenance?** | Zero $0.00 |
| **How many households pay the fee each** | None |

| Table 4 Sewage Collection And Disposal (Honeybucket And/Or Flush-Haul) | |
|---|---|
| **month, on average?** | |
| **For Tank-haul, what is the fee for Tank-haul of water?** | $28 per 100 gallons haul.<br>$33 on weekends. |
| **Can people haul their own water to their holding tanks?** | Yes. From packing it from the river during summer and ice picking during winter. |
| **About how many tank-hauls are purchased each month, total for the town?** | We have 126 tank-haul houses. About 105 tank-hauls are purchased. |
| **What is the fee for hauling the sewage/used water?** | $28 per 100 gallons haul.<br>$33 on weekends. |
| **About how many flush hauls are paid for each month, total for the town?** | About 111. |

**Site Operation and Maintenance:**

We hire laborers who by hand consolidate wastes, that tend to pile up near the river/water and boat launch areas during summer months, moving them inside the dumpsite and clear a path when we are able to afford it, which our last time was in the fall of 2006 and use our village Corporations bulldozer to consolidate the dumpsite, depending the equipment is operating and is able to make it to the dump, this happened last in about the year 1989. We plan to have a major cleanup again as soon as we are able to get enough safety gear, oil and gas, and funds to do this. Our environmental staff goes out to the dump once each summer to look for lead-acid batteries to remove them. As mentioned before our trash collectors or Trashman as we call them, do open dumping and open burning due to no burnbox at the dumpsite and outside fence boundaries in a section accessible by boat in summer, where there is a pile of trash that trashman touches with boat and throw trash on top of existing pile and open burns the trash, this accessible through a little creek, which being very much accessible by boat has currents flowing to our good main river. As mentioned before we are not having to deal with our own dumpsite, but our neighboring village of Kasigluk's dumpsite also, which it's water currents also flow right through our Native Village of Nunapitchuk.

**Table 5 Summary Table For Site Operation And Maintenance**

| Program Feature | Description |
|---|---|
| **Operation Type** | Basic monitoring by waste technician, RARE consolidation. |

**Table 5 Summary Table For Site Operation And Maintenance**

| Program Feature | Description |
|---|---|
| **Certifications or trainings?** | **Waste collector: None**<br>**Waste operator: None**<br>**Environmental staff:** ITEP Solid Waste Management, IGAP Grant Management, HAZWOPER, water quality |
| **Available Local Cover Material for Dumpsite?** | No, no gravel or silt source. |
| **How Often Cover Material is used, or wastes buried:** | No type of any cover materials.<br>No type of Waste Burying. |
| **Cover material is not used, because:** | We don't have the money to afford operating heavy equipment, and we can't operate the equipment during summer because it gets stuck, and it is hard to find cover material. |
| **Heavy Equipment:** | Only bulldozer in the village, owned by Corporation.<br>Model # D3B is getting to be very old, but still operating. |
| **Heavy Equipment Operation Limitations:** | Our village Corporation has a bulldozer. It is the only one in town and is also used for different projects. We have no qualified mechanic in town. |
| **Heavy Equipment Uses (Past and Current Uses):** | ▪ *The dozer is used only to push wastes together, but last time was about 2 years ago.*<br>▪ *We use the dozer to move big junk metal from the village to the dumpsite.* |
| **Heavy Equipment Seasonal Limitations** | The times we can use it are before Breakup and after Freezeup. The ground and water must be hard enough so it does not get stuck or sink, and the wastes underneath the top are frozen solid or covered with snow. |
| **Equipment Storage:** | Our village Corporation stores their dozer in a man made shed built by carpenters using lumber. |
| **Estimated Cost to repair heavy equipment needed for dumpsite:** | To repair the dozer: $45,000 for needed start-up, lube, maintenance and Labor.<br>To repair the Bobcat: Unknown at time. |
| **Additional Waste Operation Information that is important** | It is really the summer months that we need a waste consolidation the most. We have no way to access with heavy equipment and don't want to keep them at the site due to vandalism. The access way to dump gets very messy and gets difficult to dump trash inside the gates. In winter it is easier to access the dump and it doesn't smell as bad**.** |

***Site Operation Resources Section:***

| Topic | Link |
|---|---|
| Improve operation of dump or waste collection | http://www.ccthita-swan.org/Planning/1improve_operation.cfm |
| Solid waste training | http://www.ccthita-swan.org/Tutorials/training.cfm |
| Reducing health and environmental risks | http://www.ccthita-swan.org/main/health_risks.cfm |
| Making your dump safer | http://www.ccthita-swan.org/pdf/MakingYourDumpSafer.pdf |
| Rural Landfill Design and Operations | http://www.ccthita-swan.org/main/rural_landfill_dec.cfm |
| Protecting communities through PASTE | http://www.ccthita-swan.org/pdf/PASTE.pdf |
| Comparing Solid Waste Management Options: ANTHC/ANHB SWM Guide Workbook 5 | http://www.zender-engr.net/anhbguide/5.pdf |

## Table 5 Waste Burning Practices

| Feature | Current Description | Any Planned Changes? |
|---|---|---|
| **Is burning waste a normal way to manage some or all of your wastes?** | *Yes,* in order to keep our dumpsite in as minimal capacity as possible, and keep from being windblown. | Not soon. Maybe get a clean burning unit if funds become less expensive to buy and operate. Review often to try and acquire very much needed equipment at this very time |
| **How many households burn waste in barrels in town?** | Not many, depends on time of year. About 2. | Want to completely phase out all in-town burning due to health risks and danger to our children. |
| **Do businesses burn any wastes in barrels that are in town?**<br><br>**What wastes are burned by them?** | Store(s): None<br>Office(s): None<br>School: None<br>Clinic: None<br>Electric Utility: Used oil in a oil burner, looks like a closed barrel with electrical vent.<br>Water Utility: None<br>Other: None | Want to get the Electric Utility to stop burning their used oil in town and to purchase a used oil burner. |
| **Is waste burned on the ground at the Dump*?* Who lights the fire?** | Waste technicians after garbage collection. Some times residents light their dump on fire, maybe 1 or 2 times each week. The School and Corporation store light their own wastes on fire. | Want a burnbox and tech. to use. We will ask other Villages with similar logistics and ground to find out which is best design and make try our own. |

### Table 5 Waste Burning Practices

| Feature | Current Description | Any Planned Changes? |
|---|---|---|
| **Burnbox Information** | | |
| We currently have no type of Burnbox at our dumpsites and in our village, our EPA department had requested for and was denied in the year 2004, we will be looking into more details on burnbox's. And hope to aquire in the near future. | | |
| | | |
| | | |
| | | |

**Burnbox or Incinerator.** Reduces presences of insects and animals that carry diseases, reduces volume, reduces potential for contracting diseases from solid waste, reduces animal attraction, and stops uncontrolled fires, it is spring time as of now and it is hot, with hardly any snow or ice this year and is looking to be very dry this summer.
Health risks can greatly be reduced with a burn box by = operating it hot, burn on days when wind is away from the village, prohibit community from going to the dump on burn days, limit burning to papers, cardboards, wood and burnable items, not burning hazardous wastes no matter what! Maintaining burnbox by emptying properly, keeping ashes from piling up and vents clear, rust-proofing structure, fixing any damage on it that is visible.

It has been reported in the news that Alaska had been listed # 1 as the most toxic emission state, out of the whole United States, largely due to mining. And we can expect to top the list in the future as well, because as we are making this plan, there are more mining proposals in the works for in the state of AK, including our own regional corporation "CALISTA" which has begun, despite much controversy to mine for GOLD, where they will be using lots and lots of cyanide process, up river from the second largest river in the State, the Kuskokwim, which we are a tributary of. And still in the local news that there is some company that is bringing in equipment up to the Kiseralik river to mine for Gold, where we definitely know that salmon go and spawn, and still upriver from a lot of communities and the State of Alaska regulators say that there needs no public meeting yet on this action already being done. And we are not including thousands of communities, cities, boroughs, and municipalities that burn their solid wastes out of necessity. Most surprising is that after Donlin had gone full swing on it's mining effort, they are finally in the works for a permit. We are very curious on how the Health Impact Statement (HIS) on mining will turn out and the Environmental Impact Statement (EIS) being done.

***Burning Wastes Resources Section***

| Topic | Link |
|---|---|
| Where to locate our burnbox | http://www.ccthita-swan.org/Tutorials/burnbox.cfm#13<br>http://www.zender-engr.net/docs/Burnbox.pdf |
| Burning regular trash | Chemicals contained, what to do as alternative, health risks, tips on safer emissions http://www.ccthita-swan.org/pdf/open_burning.pdf |
| Burning, general tips | http://www.ccthita-swan.org/pdf/burning_wastes.pdf |

| | |
|---|---|
| Health effects from burning trash | http://www.zender-engr.net/docs/health_effects_burning_trash.pdf |
| Burnboxes, incinerators | http://www.ccthita-swan.org/Planning/2C_burning.cfm, |
| What type of burnbox does my Village need? | http://www.zender-engr.net/docs/Burnbox.pdf |
| Explore and evaluate waste combustion alternatives: ANTHC/ANHB SWM Guide Workbook 4 | View pages 529-540 of this document http://www.zender-engr.net/anhbguide/4.pdf |

**Wind Analysis for Waste Burning:**

As mentioned, we do open burning to try and minimize the volume at our dumpsites due to no burnbox, never the less, it is still waste burning, so we tried to find the most predominant wind directions at/of our community, note that there are two dumpsites that we are strongly trying to stress that are located closely to our Native Village which both currently have open burning. After looking into some sources, we contacted Dr. Peter Q. Olsson, and after discussion via phone about the closest place to get a more accurate data, we chose Bethel, the closest major hub located 26 air miles east from our community which should be a good substitute for the winds we experience locally on average for the month and annual. We very much appreciate and thank the best he could do for a wind analysis record.

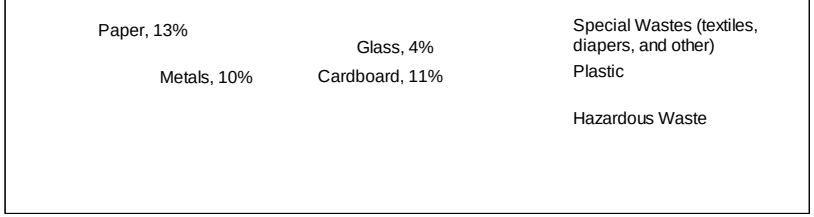
Station BETHEL Airport, AK. (PABE)
All directions are where the wind blows FROM.

| Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NNE | NE | NNE | N | S | S | S | S | S | N | NNE | NNE |

ANNUAL
NNE

Dr. Peter Q. Olsson, e-mail <olsson@aeff.uaa.alaska.edu>
Alaska State Climatologist, Alaska State Climate Center
Chief Scientist, Alaska Experimental Forecast Facility
University of Alaska Anchorage
2811 Merrill Field Drive
Anchorage, AK 99501 voice: (907) 264-7449, fax: (907) 264-7444

This wind record has been very, very informative too us, not just for burning purposes, but that the matter of fact, that Donlin Creek Gold Mine will be located exactly Northeast from our Native Village of Nunapitchuk, so we will need your support in banning cyanide use in Alaska. For Mercury is released to the air through the process and can and does travel with mother nature, and will not be the only spread, but with the ever migrating birds, which could help even spread the toxic to where ever they are flying.




# 6. HOW MUCH WASTE IS GENERATED

To determine our community's waste generation rate to our best possible extent, we carried out a survey on pounds of trash generated by per house in our community, were 21 households were asked on the estimate of pounds thrown each day, totaling out to 363 pounds on each ones estimation. The residential waste generation rate was found to be 3.92 pounds/person/day. Note that this survey was taken during the winter season/months, and that there is more wastes generated in the summer months compared to winter times. And we DID NOT include our 2 schools with lunch programs, 2 stores, Corp. restaurant, post office, washeteria, clinic, city and IRA offices, and construction wastes when happening. So with this estimate we went:

Total lbs / total h.h. = lbs per h.h.
363 / 21 = 17.29

Per h.h. x total houses = total lbs per house
17.29 x 116 = 2005.64

Total lbs per house / # residents = lbs/person/day
2005.64 / 512 = 3.92

lbs/person/day x days a yr = lbs/person/ year
3.92 x 365 = 1,430.8

lbs/person/ year x # residents = total lbs/ community/ year
1,430.8 x 512 = 732,569.6

732,569.6 / 2000 = 366.28 tons per year / community
366.28 / 52 = 7.04 tons per week
7.04 / 7 = 1 ton per day

This from **Alaska Native Health Board** 2005 *Rural Alaska Integrated Waste Management Reference Manual & Guide.*

In rural communities, individuals produce an average of **6** pounds of waste per day.
Our community has **512** people then we actually are producing **3,072** pounds per day, **1,121,280** lbs per year = **560.64** tons year.
Decision-Makers guide to Solid Waste Management, U.S. EPA., November 1989. "Waste stream data represent only a snapshot – data depend on the particular community where they are collected and the time which they are collected. The quantity and type of waste found on a community's waste stream can vary by season."

Source: "Changing Waste in Changing Times: Solid Waste and Natural Resource Issues in Rural Alaska."
**Why Manage Solid Waste?** ……Alaska residents produce almost twice as much garbage as the national average. The average daily rate of garbage generation on the United States is 3.6 pounds per person. In Alaska, that rate is about 6.5 pounds per person. The ultimate solution for village residents is to reduce the amount of waste produced. Meanwhile, careful management is needed to prevent pollution.

Since the community of Nunapitchuk was established in the late 1930's, the residents were not aware of the solid waste issues and the kinds of waste they were dumping to the dumpsites. Since our EPA/ IGAP program started, only a handful of residents have become aware of types of wastes that they are bringing to the dumpsites, and with this Integrated Solid Waste Management Plan (ISWMP) in the making, the knowledge about our wastes is growing as a whole community. The Native Village of Nunapitchuk needs funding, other than EPA/ IGAP and ISWMP, to educate the residents of Nunapitchuk for better management of the waste stream and the effects to our land, water, subsistence resources and most importantly, human health.

The Nunapitchuk Tribal Council applied for "General Environmental Community Clean-up Grant" from EPA/ IGAP, to bring the big wastes to the dumpsite from within our village. This proposal was awarded and this one year project was implemented on October 2005. The plan was to bring old and abandoned snow machines, outboard motors, empty old 55 gallon drums, cars, trucks, refrigerators, freezers, stoves, boats etc., where they will be fenced in and drained of their hazardous and toxic contents when the weather gets warm and we are able to get a technician, we will be looking for recycling companies who will accept in the future. The problem we see and will face is the FREIGHT.

The outcome of this project is that Nunapitchuk is a safer place to live from hazardous and toxic wastes that will leak from these wastes and effecting human health, subsistence resources and our environment, and that eye soaring and dangerous wastes especially for our children, the future generations is being removed from within our Native village.

On behalf of our future generations, we thank the EPA/ IGAP for giving us the opportunity to clean up the Native Village of Nunapitchuk and making it a safer village to live at. Again, Thank-You for letting us be part of your Programs and Projects.

**SEE TABLE BELOW FOR CLEAN-UP RESULTS**

**Special Wastes Taken Out Of Our Community to dumpsite**

| Column A | Column B | Column C | Column D |
|---|---|---|---|
| **Waste** | **How many of these wastes taken to the dumpsite:** | **Average Weight of Single Item in pounds (lbs)** | **Estimated Total weight of wastes taken to dump (=Column B x Column C)** |
| Lead-acid batteries | 60 | 40 lbs | 2,400 lbs |
| | | | |
| | | | |
| | | | |
| Aluminum skiff (exc. Engine): | 20 | 1000 lbs | 20,000 lbs |
| Engines: | 31 | 1000 lbs | 31,000 lbs |
| Atv's: | 7 | 800 lbs | 5,600 lbs |
| Sno-gos: | 37 | 1000 lbs | 37,000 lbs |
| Cars and Trucks: | 20 | 5000 lbs | 100,000 lbs |
| | | | |
| Refrigerators and freezers | 35 | 250 lbs | 8,750 lbs |
| Stoves, Washers, Dryers | 20 | 200 lbs | 4,000 lbs |
| Old metal scraps | 100 | 30 lbs | 3,000 lbs |
| Empty 55 gallon drums | 80 | 50 lbs | 4,000 lbs |
| Old furnace fans | 1 | 15 lbs | 15 lbs |
| Old freight sleds | 1 | 150 lbs | 150 lbs |
| | | | |
| **Total wastes** | | | **215,915 lbs** |

Our community was very fortunate to do a community wide clean up from the whole months of August and September 2007 and giving us an opportunity to practice the Best Management as Possible towards our solid wastes again this fall, a 2 month project with funds from our EPA/ IGAP, where I ISWMPlan Coord. Was a Supervisor with 2 laborers, doing a similar clean up plus working towards our solid waste as making signs, building another access way to our primary dumpsite at the same time trying out new materials of Geoblocks for access, making fencing, cleaning up 2 buildings, 1 an old rotting church and 1 burned up house which were being left and becoming a danger to the whole community, collecting lead batteries, hauling bulky items with a signed permission from owners and at the same time finishing up on our solid waste management plan for our community. We were able to get a lot done during our 40 working days on this Unmet Needs 07, Environmental Community Clean-up. We are very thankful and grateful for the opportunity to better our health, subsistence, and our living environment, and in practicing best management as possible. On our new access way we are trying out Geoblock units which are open-celled light-weight plastic material, measuring 20-in x 40-in x 2-in, has been used topsoil/vegetative infill for in our case as access trail, is supposed to support heavy loads and protect the vegetative root zone within its cells, in our case no infill was used. We found out about this new material from Ryan Maroney-Natural Resource Conservation Service USDA out of Bethel and was here to instruct in construction.

**Table 6 Table On Estimating Special Waste Generation Rates And Storage Space Needed**

| Waste | ***Column A*** About this many households have at least one of the item: | ***Column B*** Average number that these households own | ***Column C*** Average number of yrs before the waste item will need to be discarded | ***Column D*** **(=AxB ÷C)** Total number generated each year | ***Column E*** How many total of these wastes do businesses have? | ***Column F*** **(=E÷C)** Total average number each yr discarded from business, schools, offices, utilities. | ***Column G*** **(=D+F)** Total from households and businesses | ***Column H*** Average Weight of Single Item in pounds (lbs) | ***Column I*** **(=G x H)** Estimated Total weight generated | ***Column J*** Estimated % that is **not** salvaged for parts or reused | ***Column K*** Estimated total weight each year generated that is not salvaged for parts or reused **(=I x J)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead-acid batteries | Boat: 83 | 0.7 | 2 | 29.1 | 3 | 1.5 | 30.6 | 40 lbs | 1,224 lbs | 100% | 1,224 lbs |
| | Atv's: 63 | 0.5 | 3 | 10.5 | 5 | 1.7 | 12.2 | 12 lbs | 146.4 lbs | 100% | 146.4 lbs |
| | Sno-gos: 65 | 0.52 | 3 | 11.3 | 3 | 1 | 12.2 | 12 lbs | 146.4 lbs | 100% | 146.4 lbs |
| | Car or Truck: 10 | 0.08 | 4 | 0.2 | 0 | 0 | 0.2 | 40 lbs | 8 lbs | 100% | 8 lbs |
| Total Lead-acid Batteries | | | | | | | | | | | **1,524.8 lb about 67% of this weight is lead)** |
| Aluminum skiff (exc. Engine): | 178 | 1.4 | 8 | 31.15 | 5 | 0.63 | 31.78 | 1000 lbs | 31,780 lbs | 100% | 31,780 lbs |
| Other boats: | 10 | 0.08 | 20 | 0.04 | 0 | 0 | 0.04 | 2000 lbs | 80 lbs | 100% | 80 lbs |

## Table 6 Table On Estimating Special Waste Generation Rates And Storage Space Needed

| Waste | ***Column A*** About this many households have at least one of the item: | ***Column B*** Average number that these households own | ***Column C*** Average number of yrs before the waste item will need to be discarded | ***Column D*** **(=AxB ÷C)** Total number generated each year | ***Column E*** How many total of these wastes do businesses have? | ***Column F*** **(=E÷C)** Total average number each yr discarded from business, schools, offices, utilities. | ***Column G*** **(=D+F)** Total from households and businesses | ***Column H*** Average Weight of Single Item in pounds (lbs) | ***Column I*** **(=G x H)** Estimated Total weight generated | ***Column J*** Estimated % that is **not** salvaged for parts or reused | ***Column K*** Estimated total weight each year generated that is not salvaged for parts or reused **(=I x J)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Atv's: | 61 | 0.5 | 5 | 6.1 | 11 | 2.2 | 8.3 | 800 lbs | 6,640 lbs | 90% | 5,976 lbs |
| Sno-gos: | 190 | 1.5 | 5 | 57 | 6 | 1.2 | 58.2 | 1000 lbs | 58,200 lbs | 80% | 46,560 lbs |
| Car or Truck: | 10 | 0.08 | 20 | 0.04 | 0 | 0 | 0.04 | 2000 lbs | 80 lbs | 95% | 76 lbs |
| Heavy Equipment | N/A | N/A | 20 | N/A | 1 | 0.5 | 0.5 | 10,000 lbs | 5,000 lbs | 100% | 5,000 lbs |
| ***Household*** refrigerators and freezers | 333 | 2.64 | 25 | 35.16 | | | | 250 lbs | 8,790 lbs | 100% | 8,790 lbs |
| ***School/Store*** refrigerators and freezers | | | 20 | | 23 | 1.15 | | 1000 lbs | 1,150 lbs | 100% | 1,150 lbs |
| Wood Stoves, Cooking Stoves | 152 | 1.21 | 20 | 9.21 | 6 | 0.3 | 9.51 | 200 lb | 1,902 lbs | 97% | 1,845 lbs |

## Table 6 Table On Estimating Special Waste Generation Rates And Storage Space Needed

| Waste | ***Column A*** About this many households have at least one of the item: | ***Column B*** Average number that these households own | ***Column C*** Average number of yrs before the waste item will need to be discarded | ***Column D*** **(=AxB ÷C)** Total number generated each year | ***Column E*** How many total of these wastes do businesses have? | ***Column F*** **(=E÷C)** Total average number each yr discarded from business, schools, offices, utilities. | ***Column G*** **(=D+F)** Total from households and businesses | ***Column H*** Average Weight of Single Item in pounds (lbs) | ***Column I*** **(=G x H)** Estimated Total weight generated | ***Column J*** Estimated % that is **not** salvaged for parts or reused | ***Column K*** Estimated total weight each year generated that is not salvaged for parts or reused **(=I x J)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Washers, Dryers, | 117 | 0.93 | 20 | 5.44 | 13 | 0.65 | 6.09 | 200 lb | 1,218 lbs | 98% | 1,194 lbs |
| Fluorescent tube lights in homes | 52 | 7.5 | 1.5 | 260 | See below | See below | 260 | 4 ft tube=0.7 lb | 182 lbs | 100% | 182 lbs |
| Fluorescent tube lights in offices | N/A | N/A | 1.5 | N/A | 2,036 4 ft tubes | 1,357 | 1,357 | 4 ft tube=0.7 lb | 950 lbs | 100% | 950 lbs |
| Tube twist BULBS | 52 | 3.9 | 1.5 | 135.2 | N/A | N/A | 135.2 | Twist bulbs = 0.3 lb | 40.56 lbs | 100% | 40.56 lbs |

| Table 7 Important Additional Wastes With Different Estimation Methods | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Disposable Diapers** | Number of babies in village that use disposable diapers: 47 | Number of diapers each day for each baby: 6.2 | Number of diapers each day: 291.4 | Number of diapers each year: 106,361 | | N/A | 106,361 total from households and businesses. | Average weight of full diaper = 0.4 lb | Total Weight: 42,544.4 lbs | |
| **Used oil** from vehicles (household and businesses) | Number of households: 271 | Average number of vehicles per household (boats,atvs snowmachines): 2.2 | How often old oil is drained on purpose and new oil put in: 5 times each year for each vehicle | Average number of quarts that are drained per vehicle: 3 | Number of quarts drained each year by houses: = 8,943 qts | Total number of vehicles for businesses = 18 | Average number of times per year that old oil is drained per vehicle = 7 | Average number of quarts that are drained per vehicle: 3 | Number of quarts per drained per year businesses: 378 | Total quarts each year that are drained: 9,321 |
| **Antifreeze** (from vehicles) | Number of households: 271 | Average number of vehicles per household (boats,atvs snowmachines): 2.2 | How often old oil is drained on purpose and new oil put in: 2 times each year for each vehicle | Average number of **quarts** that are drained per vehicle: 4 | Number of quarts drained each year by houses: = 4,769.6 qts | Total number of vehicles for businesses = 18 | Average number of times per year that old oil is drained per vehicle = 2 | Average number of quarts that are drained per vehicle: 4 | Number of quarts drained per year for businesses: 144 | Total **quarts** each year that are drained: 4,913.6 |

## Table 8 Estimation Of Aluminum Cans, Plastic Bottles, Styrofoam, And Cardboard For Recycling Or Waste Reduction/Banning Purposes

| Recyclable Material: | How Many pieces the stores order each year: | About how many households bring in or order their pop cans directly: | Average number of these households bring in each year: | Total posted or brought in from households each year | Number posted or directly shipped to businesses other than stores (e.g. school): | Total estimated number: | Total pounds per year: | Total potential revenue per year: |
|---|---|---|---|---|---|---|---|---|
| **Aluminum Cans *(not cases)*** | Store 1: 180,976 cans<br>Store 2: 13,248 | 4 | 96 cans | 1920 | School year: 6,600 cans | 202,744 cans | 6,758.13 lbs | $1,351.63 |
| **Plastic Bottles** | Store 1: 9,456 btls<br>Store 2: 288 btls | 0 | 0 | 0 | 3,076 btls | 12,820 | 1,025.6 lbs | $0 |
| | | | | | | | | |

We currently do not have any development projects going on, but as mentioned before we are slated for some construction in the near future. We would use the table below to estimate construction wastes.

**Table A: Construction and Demolition Waste Numbers Researched for New Construction, Renovation, and Demolition in lbs (pounds) per sq ft**

| | Residential (lbs/sq ft) | Non-residential (lbs/sq ft) |
|---|---|---|
| **New Construction** | 4.38 | 3.89 |
| **Renovation** | Varies | 17.67 |
| **Demolition** | 115 | 155 |

***C&D Waste Resources Section:***

| Topic | Link |
|---|---|
| Information about writing C&D waste ordinances | http://www.ccthita-swan.org/pdf/construction_and_demolition.pdf |
| Sample ordinances | http://www.zender-engr.net/ordinances.htm |
| C&D waste information on ADEC's site | http://www.dec.state.ak.us/eh/sw/Guidance/Building%20Demolition%20%20Renovation%20and%20Construction%20Projects%20-%20final.doc |
| EPA's Tribal Waste Journal on C&D waste 2006 | http://www.epa.gov/epaoswer/non-hw/tribal/pdftxt/twj-5.pdf |

# 7. RECYCLING, REDUCING, AND REUSING PROGRAM

Elders have always recycled and their grandmothers and grandfathers did and their grandmothers and grandfathers did. This was something that everyone in the community did. Then around the 1960s and 1970s people starting making a lot of trash that came from the stores and Bethel. We did not have a way to recycle all the new wastes. Elders say we got lazy and wasted things because these things were new to us. Now we are learning that there are ways to recycle some of these wastes and we have started following our Elders' advice about not wasting. We also know that many of these wastes are harmful to us, so we are trying to reduce our use and also to keep them out of our dump and our camps. But, we currently are in need of storage for all that we are very much trying to do and get in full swing, as storage for aluminum recycling, separate storage for hazardous and backhaul materials. All of our current efforts and our procedures are detailed in the Table below.

**General description of program's most important accomplishments/aims:** Our first recycling waste was aluminum cans in 2004. Now we are collecting lead-acid batteries and household batteries and fluorescent tube lights. We currently do not have a recycling shed, but our EPA/ IGAP collect the mentioned at their office rental, the community hall building. We are educating the community about why it is important to drop-off their batteries. We are trying to reduce the use of plastic bags. We are trying to reduce plastic bottles by encouraging stores to buy aluminum or glass instead, and reuse plastic bottles by using them to store household batteries.

**Table 9 Wastes That Are Currently Collected Or Dropped-Off For Recycling, Backhaul, Storage, Or Reuse Programs**

| Waste | How collected or separated? | What for? | Where it is stored? | Is it shipped out? How often? | Who takes it? | Where does it go to? |
|---|---|---|---|---|---|---|
| **Aluminum cans:** | Dropped off at EPA office rental or in containers around town. | Recycling for money, respect for our land and for communities where new aluminum is mined and their environment is being harmed. | In the red 4x8 lumber box near the EPA office rental. | Not yet. | | Bethel Recycling Contact #: 543-7072<br><br>Contact: Bill Burnard |
| | | | | | | |

## Table 9 Wastes That Are Currently Collected Or Dropped-Off For Recycling, Backhaul, Storage, Or Reuse Programs

| Waste | How collected or separated? | What for? | Where it is stored? | Is it shipped out? How often? | Who takes it? | Where does it go to? |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Cardboard:** | Reused by households a lot. We save some to line the lead acid batteries. | Cardboard used by homes for cutting boards, store, subsistence foods, clothing, misc. items, wood stoves and plates. | | | | |
| **Food Wastes** | On each household. | Feed to dogs and to throw at Edible dump | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| **Household (small ) batteries** | Public encouraged to drop off at EPA rental office. | To send out. | In plastic bottles. | Not yet. | | |
| **Lead-acid (Vehicle) batteries** | Started in 2005, at EPA , IRA storage shed, getting to have no space. | Working on first ever backhaul. | IRA storage shed in fish totes 13”W x 23”L x 15”H | SOON | | ABSN Village energy efficiency program |
| **Used oil** | Not in full swing | | | | | |
| **Antifreeze** | Nothing yet | | | | | |
| **Vehicle fluids that are not oil** | Nothing yet | | | | | |

**Table 9 Wastes That Are Currently Collected Or Dropped-Off For Recycling, Backhaul, Storage, Or Reuse Programs**

| Waste | How collected or separated? | What for? | Where it is stored? | Is it shipped out? How often? | Who takes it? | Where does it go to? |
|---|---|---|---|---|---|---|
| **Computers** *(all electronics contain unsafe metals when burned)* | School sends to district offices. | | | | | |
| **T.V.s** | Nothing yet. | | | | | |
| **Other electronics** | Nothing yet. | | | | | |
| **Fluorescent lights** *(These contain mercury and phosphor powder)* | LKSD **MOA** EPA to collect | For Backhaul | EPA, IRA storage shed | Yes, on 3rd time | ATS flies it. Contact # 543-3654 | ABSN Village energy efficiency program |
| | | | | | | |
| | | | | | | |
| **Scrap Aluminum (boats, etc.)** | Nothing yet | | | | | |
| **Junk vehicles** | Store at dump salvage area | Backhaul in future | Section at dump | | | |
| | | | | | | |
| **Freon from appliances** | Nothing yet. | | | | | |
| **Unused hazardous materials like paints, cleaners, degreasers, lube oil, disinfectants, sprays, mosquito repellents, insect killers, mold removal, weed killers** | Nothing yet | | | | | |

***Recycling, Reducing, and Reusing Resources Section***

| Topic | Link |
|---|---|
| Recycling info on SWAN | http://www.ccthita-swan.org/Planning/2D_recycle.cfm |
| Examples of village thrift store/recycle facilities: | http://www.ccthita-swan.org/main/reuse.cfm#thriftstore |
| Evaluating and comparing solid waste management methods including recycling, reducing, composting etc. ANTHC/ANHB SWM Guide Workbook 4 | http://www.zender-engr.net/anhbguide/4.pdf |

**Table 10 Recycling Equipment Description, Status, And Plans**

| Item | Description | Own Now? | Will purchase in next year with existing funds | Want to have in next 5 years | Plan later than 5 years when we are ready or have the need for it. |
|---|---|---|---|---|---|
| **Recycling Shed to store wastes for later backhaul?** | We use IRA 8'x10' storage shed, Not large enough for two. | No | ASAP, Don't have funds now. | Yes | Yes |
| **Storage bags for Aluminum Cans** | ALPAR bags | Yes | N/A | N/A | N/A |
| **Recycling Baler?** | Sized for us, to use for cans, plastics | No | ASAP, Don't have funds now | Yes | Yes |
| **Reuse-Share Shed** | | | | | |
| **Connex or** | | | | | |

## Table 10 Recycling Equipment Description, Status, And Plans

| | | | | | |
|---|---|---|---|---|---|
| **Shed to store hazardous wastes for safety** | | | | | |

## Table 11 Recycling Management Program

| Item | Where can people drop off their wastes? | Who is in charge of this program? | Where do we plan to have drop-offs? | |
|---|---|---|---|---|
| **Aluminum can recycling** | At EPA RENTAL office, or at the 8 containers around town | EPA / IGAP | We need facilities, buildings to fully start to get in full swing. | |
| **Newspapers** | We don't recycle these yet. | | | |
| **Cardboard** | We encourage people to reuse for cutting boards and to roll as logs | | | |
| **Plastic Bottles** | We don't recycle these yet. | | | |
| | | | | |
| **Used oil** | Nothing yet. | | | |
| **Vehicle Batteries** | EPA RENTAL office | EPA/IGAP | Community encouraged to bring to EPA office or notify to pick up. | |
| **Computers, TV's** | Nothing yet. | | | |
| **Household Batteries** | EPA RENTAL office | | Community encouraged to save in plastic bottles and bring to EPA office. | |

## Table 11 Recycling Management Program

| Item | Where can people drop off their wastes? | Who is in charge of this program? | Where do we plan to have drop-offs? | |
|---|---|---|---|---|
| **Printer cartridges** | Nothing yet | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Recycling Revenue and Payments**

We have not yet sent out for recycling.

**Backhaul Program**

The EPA Coord. is currently working on their 1st ever backhaul, after getting information on Battery Recycling from the SWAN website and made a copy of it, EPA followed the procedure to get the lead batteries ready for backhaul.

## Table 12 Wastes To Be Backhauled Within Five Years

| Waste item | Estimated amount to be backhauled (count or weight) | Where are the items being stored? | Estimated date for backhaul |
|---|---|---|---|
| Refrigerators | Nothing yet | Dumpsite | |
| Junk cars | Nothing yet | Dumpsite | |
| Miscellaneous scrap | Nothing yet | Dumpsite | |

**Table 12 Wastes To Be Backhauled Within Five Years**

| Waste item | Estimated amount to be backhauled (count or weight) | Where are the items being stored? | Estimated date for backhaul |
|---|---|---|---|
| metal | | | |
| Batteries (lead acid) | 6 fish totes 15”Wx23”Lx15”H | Since no facility yet, at IRA 8’x10’ shed. | SOON |
| Computers | Nothing yet | | |
| Other e-waste | Nothing yet | | |
| ?? | | | |
| ?? | | | |
| ?? | | | |

# 8. HAZARDOUS WASTES

We know that hazardous wastes can be harmful to us, and our environment, so we are trying to reduce our use and also to keep them out of our community, dump and our camps. We are now collecting lead-acid batteries and household batteries and aluminum cans and fluorescent tube bulbs. We are educating the community about why it is important to recycle or proper disposal of hazardous wastes, but we need more fundings, so that we could be able to make periodic flyers to better get to the whole community, such as posting through out the community and regularly send through the local post office to households. We also need the storage spaces for each of, recycling and to safely store the hazardous material that we are encouraging the community to bring to the safe haven for the betterment of the community, environment, subsistence, health, and our dumpsite.

**Table 13 Table For Hazardous Wastes And Some Reasons Why They Harm Our Community**

| Waste | Where/how it is disposed now | Why it is harmful |
|---|---|---|
| **Medical Wastes** | Sharps are sent to YKHC. Other medical waste is burned by the operator | Diseases from medical waste can be spread by contact with soiled bandages, sharps etc. |
| **Disposable Diapers** | At the dump in trash bags | Has a lot of germs from the poop that people can step on and track back to homes. If burned, there are many chemicals which are irritants if they are breathed and can cause illnesses if they are at a high level. And we know that kids urine are highly toxic than an adults. |
| **Plastic bottles, PVC pipes, and Styrofoam** | Most of it is burned with the household trash. | Causes dioxins and furans and hurts to ozone which can cause climate change. Smelling a lot of the smoke or eating the settled ashes over a long time might cause illnesses, including cancer. This is why operator must always wear a mask and burning should not be done if wind blows into town all the time. |
| **Household (small ) batteries** | Public NEEDS to be fully educated to bring to EPA rental office. | |
| **Lead-acid (Vehicle) batteries** | Same as small batteries. | Acid is very dangerous |
| **Used oil** | Nothing yet | Can be their for long time |

## Table 13 Table For Hazardous Wastes And Some Reasons Why They Harm Our Community

| Waste | Where/how it is disposed now | Why it is harmful |
|---|---|---|
| **Antifreeze** | Nothing yet | Contains dangerous ingredients |
| **Vehicle fluids that are not oil** | | I know of my uncle who lost all his hair on his head after getting dripped under car. |
| **Computers** | | Contain unsafe metals when burned |
| **T.V.s** | | Same as computers |
| **Other electronics** | | Same as computers |
| **Fluorescent lights** | | Contains mercury and phosphor powder |
| | | |
| | | |
| | | |
| | | |

***Hazardous Wastes Resources Section***

## List of Hazardous Waste Resources

| Topic | Link |
|---|---|
| Household and lead-acid batteries | http://www.zender-engr.net/battery.htm |
| General info on hazardous waste training, identification, and starting a program | http://www.ccthita-swan.org/Planning/haz_wastes.cfm<br>http://www.ccthita-swan.org/Tutorials/haz_wastes.cfm , |
| Household haz wastes | http://www.ccthita-swan.org/pdf/household_haz%20_feb05.pdf ,<br>Some more home cleaning recipes: http://www.ces.ncsu.edu/depts/fcs/housing/pubs/fcs3682r.html , For a simple tour through a house's hazardous products and identifying alternatives (a great site!): http://www.checnet.org/healthehouse/virtualhouse/index.asp |
| ANTHC/ANHB SWM Guide Appendix 3 Household Hazardous Waste Guide | http://www.zender-engr.net/anhbguide/App3.pdf |

**Table 14 Table For Hazardous Waste Recycling And Staging For Future Backhaul**

| Item/Task | Do we have this? | Who operates it? Who is in charge? Where is it? | Do we want this in the next five years? What are the details of what we want? | |
|---|---|---|---|---|
| **Place for people to drop-off?** | Need | EPA/IGAP rental office | | |
| **Used Oil Burner? Who operates?** | Need | | | |
| **Totes for storage of lead-acid batteries?** | Need | EPA/IGAP | 6 more totes | |
| **Antifreeze Recycler?** | Need | | Not enough made. | |
| **Freon Removal?** | Need | | | |
| **Fluid Pumps for Draining Cars?** | Need | | | |
| **Connex for storage and eventual backhaul?** | Need | | | |
| **HAZWOPER Certified Technicians** | Need | | | |
| **Spill Response Kit** | Yes | Village Corporation has for it's Gas Station | NEED for whole village | |
| **Hazardous Waste Plan, including operational steps** | NEED | | | |
| **Clinic Medical Waste Plan** | Not in village | YKHC | Yes | |

## Entities in the Community and what Types of Hazardous Wastes They Produce

Below is a table with amount and type of hazardous materials and wastes generated or handled by entities in our community. We are not including what community members buy from outside our community, and as we all know this is a four stroke technology Era and they require tons of oil just to maintain them, the different equipments used by all the residents and entities in our community and what the contractors bring with them during constructions, so motor oil estimate could be tripled. And motor oil or any oil based requires a container and those mostly quart size plastic containers are everywhere, for they are disposable anywhere and everywhere and we did not count all computers or electronic types used every day these days.

**Table 15 Annual Hazardous Waste/Material Generation, Storage, And Disposal In Nunapitchuk, Estimated From Spring 2007 Waste Survey.**

| Generator | Hazardous materials reported | Maximum amount used or stored yearly | Comments |
|---|---|---|---|
| **Hardware Store** | Motor oil | Motor oil: 3,200 gal./ yr | 3,200 gallons of oil are ordered every year. |
| **Clinic** | Medical waste | | Needles put in red container and sent to Bethel. |
| **School** | Oil, antifreeze | Motor oil: 2 drums not in use yet.<br>Antifreeze: 6 gal. left | Oil and Antifreeze are ordered every 3 years, because they use AVEC power, only during outages use own generator. |
| **Back-up Light Plant** | Lube Oil | Going to switch to synthetic oil, 55 gal. will arrive this summer and be stored in Kasigluk | Since year 2006, we only have a back-up generator, power plant was moved to Kasigluk heights. |
| **Tank Owners** (Number of tanks and capacity of each): | | School (2 @ 67,000 gals.); City (15,000 gal); Corp. store (123,000 gal); National Guard (1,000 gal); | School, City, Nat'l Guard on heating fuel, Corp. store 75,000 gal. Is gas. |
| **Observed hazardous material drums** (55-gal) | | *By School*: 25 gal. Propylene Glycol<br>Village Safe Water: 110 gal. Propylene Glycol | School switched to non-toxic Propylene Glycol and orders 110 gal. a year. |
| **Town population** (including homes and businesses) | (Unreported): Small batteries, household cleaning products, motor lubricants, thermometers | Lead-acid batteries: approx. 60 - 80 batteries are in use.<br>Motor oil: Approx. 2,500 gal/yr | **Motor oil discarded yearly**: Assuming 450 snowmachines, ATVs, and boats used in Nunap., approx. 2,500 gal/year of motor oil are discarded (at dump or burned in steam baths). An additional 20 - 100 gal leak into ground or river during vehicle operation.<br>**Batteries**: Assuming a 5 yr life, approx. 222 lead-acid batteries, **containing approx. 1,524.8 lbs of lead,** are discarded on the ground, but public encouraged to bring non-damaged to EPA. |

| Table 15 Annual Hazardous Waste/Material Generation, Storage, And Disposal In Nunapitchuk, Estimated From Spring 2007 Waste Survey. | | | |
|---|---|---|---|
| **Generator** | **Hazardous materials reported** | **Maximum amount used or stored yearly** | **Comments** |
| | | | **Other household hazardous wastes:** Approximately **0.2 tons** per year. |

# 9. OLD/CLOSED DUMPSITES

We do not have any old / closed dumpsites, however in the early years both our village and Kasigluk use to share the same dumpsite, which Kasigluk is now currently using. In about the year of 1983 we started using our current primary dumpsite, not long after, we made a secondary dumpsite, because of the inaccessibility we were facing during freeze / thaw seasons to our current primary site, of which we are still finding more obstacles that we are having to face with our current primary site. We are very much hoping to get an old/closed site in the near future, and very much hope that we are not too late to start anew, with the awareness we are getting to know towards our solid waste.

*For information about how to close dumpsites, see CCTHITA / Zender Environmental "Guide to Closing Waste Disposal Sites in Alaska Villages" at http://www.ccthita-swan.org/main/site_closure.cfm*

# 10. ADDITIONAL RELATED WASTE CONCERNS FOR SUBSISTENCE

Before we had gotten aware of environmental issues to this extent, our elders had always informed us how not to try and harm our lands, waters, to take every measure to not leave anything that would harm our lands and subsistence, because of how we should be in harmony with what gives our very substanence to live. How we should not litter anywhere we were at, home or out tundra, at subsistence campsites, to bury whatever we were about to leave behind, for we are still nomatic in how we try to obtain the foods we have eaten from time beginning, but now a days traveling from one place to another takes no time, even to space or breaking the sound barrier, so you could see that we are not just rowing, using the wind, currents, pulling the boat along side of shore or the sled, or constantly using dogs, which we constantly had to feed also in order to travel, having to portage land, just to get to where the abundance of food was located at. I know that growing up I occasionally heard on the radio, CB at first then came a more powerful VHF, to communicate with one member or the whole community, all at the same time, on proper ways to handle and dispose of food, how not to abandon subsistence equipment that had been set out, how not to try and litter, besides the other important news that had to be heard by the whole community. So, as of today, we are getting to know how much hazardous "things" that are out there, or as in our case, are using for these very information, that we are getting to use every single days of our lives, which is probably why our elders are getting fewer these days than how many we use to see in our earlier days. As you might know already, we didn't ever use that was not biodegradable itself from time beginning, anything that we used or wore went back to mix with the land, or eaten when famine struck the lands. Our subsistence food have already been affected, James Charles had said that he personally had seen a deformed head of a pike fish during our Community Education and we all know of the lead poisoning of birds from the shells we buy from the stores and only a matter of time when the bird flu or Avian flu will get here. And we are starting to have to buy licenses and duck stamps to hunt what we have, and eaten from time beginning, and we know this only pertained to sportsman coming here for fun. And after all this time, of our subsistence way of life, I still hear, over our radio station for the western Alaska, the KYUK am station, Yup'ik talk line, which has specifically made known that the talk line is for our younger generations benefit, as well as obstacles facing our region, that our state of Alaska does not recognize our subsistence way of life, that it is, as with non-Native way, that it is not written down. Not to mention from all the mining activity about to go full swing all over our area. And with anything be it politics or just plain living a life, knowledge is everything, so education is the key to let people understand any waste/hazardous related concerns out there, after congress had said how important education was, and letting education suffer these days, we still could educate through other avenues.

This from: Copyright 1996, Lower Kuskokwim School District, Curriculum/Bilingual Dept.
Text developed by Yup'ik Language Leaders, Graphics by Cara Brunk

**Yup'ik Values – Yupiit Alerquutait**

Humor - Ilaliurutlerkaq
Hard Work - Calirpagyaraq
Family Roles - ilakellriit Caarkait
Successful Hunter – Nukalpiarullerkaq
Love for Children – Kenekluki Mikelnguut
Knowledge of Family Tree – Nallunritlerait ilat
Knowledge of Language – Nalluvkenaku Qaneryaraq

Respect for Nature and Animals – Qigcikluki Nuna Ungungssit-llu
Respect for Elders and Others – Takaqluki wall'u Qigcikluki Tegganeret Allat-llu
Knowledge of Yup'ik Names – Nallunritlerkait Yugtun Aternek
Domestic Skills – Yuungnaqutem Cayarain Nallunritlerkaa
Sharing/Helping – Cikirtaarutaqluni / Ikayurtaarutaqluni
Responsibility to Culture – Qaunqellerkaa Piciryaram
Community Wellness – Nunat calritnarkellrat
Cooperation – Ikayurtaagutleq
Spirituality – Ukvengqelleq
Humility – Ellmikutuulleq

KNOWLEDGE OF OUR ELDERS MUST BE TAUGHT TO
OUR CHILDREN THROUGH YUP'IK VALUES.

ELDERS STRENGTHEN AND SUPPORT WHAT WE TEACH.

**THEIR POWERFUL WORDS NEVER DIE.**

Source: "Changing waste in changing times: Solid Waste and Natural Resource Issues in Rural Alaska." **Why Manage Solid Waste?**

Rural communities depend on the earth's resources for subsistence. Our Alaska Native lifestyle has always emphasized the importance of taking care of the environment, because we live so close to the land. It is to our advantage to maintain healthy, diverse and undamaged land and ecosystems. Native Alaskan communities have customary rules for treating the land and the ecosystem. These rules have been past on through the generations: "Do not waste," "Take what is needed," "Treat the animals with respect." among many, many others.. We do believe and our forefathers have seen and gone through them, that if these rules are followed then the land will continue to provide. Subsistence people are the original conservationists (although we do not use that word), because our lives depend on maintaining those natural resources.

**We must know our risks.** Safeguards community health, prevents subsistence areas from being contaminated or impacted, and helps the environment. We must test nearby water sources that are used without treatment be it traditional sources or community wells for heavy metals, E. coli or fecal coliform. And is encouraged that testing should be done after flooding or big rains to determine maximum risk of contamination and even during times for minimum risk of contamination.

# 11. REVENUES AND COSTS FOR SHORT TERM AND LONG TERM SOLID WASTE PRACTICES

Amendments to the Denali Commission's enabling legislation.
Updated 9/25/2005
Denali Commission Act of 1998.
**PL 105 – 277 42USC3121.**

SEC. 304. DUTIES OF THE COMMISSION.
(2) (B) provide for a comprehensive work plan for rural and infrastructure development and necessary job training in the area covered under the work plan.

The costs of collecting and disposing of solid waste have increased substantially for most communities over the past ten years. This trend can be linked to a number of factors, including rising wages, equipment costs, increasing quantity of waste, increasingly environmental requirements, record high oil prices, and the war in Iraq. Similarly, capital costs also have become a problem due to the need to construct new landfills and maintaining them at a time when communities are competing for scarce resources and funding. Partly responsible for this trend is the need for communities to conform to new federal and state regulations, the development of community waste management systems, and the need to meet community demands for safe and clean waste management. In addition, many communities are finding their financing decisions tied to the need to pay for closing unapproved open dumpsites and maintaining new sites with burnboxes, which have to have a trained technician and a landfill operator to monitor the whole dumpsite, plus all the hazardous certifications needed to maintain the sites. Capital financing may be accomplished using a number of alternatives, including waste management revenues, and grants. Congress is increasing the freight rate by .12 cents per pound or a 40% increase on bypass freight, so it's going to cost more for needed bulky items such as flour, sugar, etc., just to get to our isolated village. The lower 48 states look up to us and believe we are rich, because of the oil that comes out from Alaska, when cost of living is tripled compared to them, gas prices are too tripled in price per gallon and fuel prices have from 1999 to 2005 increased by 99% compared to them also. We pay taxes, does that make us less American Natives? We all know how it's like to be misunderstood. Sometimes the results are good for a smile. Other times it's no laughing matter.

**Table 16 Current Or Near-Future Annual Operation And Maintenance (O & M) Costs For Solid Waste.**

| Item | Unit Cost | Units | Quantity | Annual Cost |
|---|---|---|---|---|
| **Personnel** | | | | |
| | | | | |
| Solid Waste Collection, Labor - 2 person 1 wk on 1 off each, 18 hrs per week for 10 months, dropping off wastes at correct dump site location. Note - Breakup and Freeze up we have self-haul to dump only, no collection but pile up at transfer stations), | $10.08 | hour | 720 | $7,800 |
| Administration, (4 hrs per month, $12.30/hr ) | $12.30 | hour | 40 | $492 |
| **Fringe,** inc. FICA, workmen's comp, benefits | $1,221.85 | lump | 1 | $1,221.85 |

| Table 16 Current Or Near-Future Annual Operation And Maintenance (O & M) Costs For Solid Waste. | | | | |
|---|---|---|---|---|
| **Item** | **Unit Cost** | **Units** | **Quantity** | **Annual Cost** |
| | | | | |
| | | | | |
| | | | | |
| **Other** | | | | |
| Fuel for boat, sno-go, equipment operation at site, 18 gals per week (last yrs price $4.50 gal. just rec'd new shipment of fuel, it will rise. ) | $4.50 | gallon | 333 | $1,498.50 |
| | | | | |
| Other equipment repair, maintenance and replacement fund, set-aside funds | $100 | Lump Sum | 1 | $100 |
| Repairs and maint. (bldgs) | $200 | Lump Sum | 1 | $200 |
| **Supplies** | | | | |
| | | | | |
| Postage Supplies | $117 | Lump sum | 1 | $117 |
| | | | | |
| **Total annual O & M expense** | | | | **$11,429.35** |

The below Table reflects our planned annual program expenditures.

**Table 17 Long-Term Annual Operation And Maintenance (O&M) Costs For Solid Waste**

| Item | Unit Cost | Units | Quantity | Annual Cost |
|---|---|---|---|---|
| **Personnel** | | | | |
| Solid Waste Site Operation and Maintenance, Labor 1 burn tech. 12 hrs wk at 47 wks screen and light burnbox. | $10.08 untrained<br><br>$16.00 trained | hour<br><br>hour | 564<br><br>564 | $5,686<br><br>$9,024 |
| Landfill operator ---------- | ---------- $17.50 | ---------- hour | ---------- 80 | ---------- $1,400 |
| Solid Waste Collection, Labor, 2 people, 1 wk on 1 off, 21 hrs per week 47 weeks per year (when site is accessible), placing in burnbox when appropriate. | $10.08 | hour | 987 | $9,950 |
| Administration, (4 hr per month, | $12.30 | hour | 50 | $615 |
| **Fringe,** inc. FICA, workmen's comp, benefits | 10.34% | lump | $21,000 | $2,172 |
| **Travel and Training** | | | | |
| Training, (e.g. HAZWOPER, RALO, SWMP, Forum on Environment) | $1,000 | Lump sum | 1 | $1,000 |
| **Other** | | | | |
| Fuel for boat, sno-go & equipment operation at site, 30 gals per wk | $5 | gallon | 1,400 | $7,000 |
| | | | | |

**Table 17 Long-Term Annual Operation And Maintenance (O&M) Costs For Solid Waste**

| Item | Unit Cost | Units | Quantity | Annual Cost |
|---|---|---|---|---|
| Other equipment repair, maintenance and replacement fund, Outboard for collection, 18 hr per week for 22 weeks, Snowmachine, 18 hr per week for 25 weeks (no collection for 5 weeks due to break up) | $2 | hour | 846 hrs | $1,692 |
| | | | | |
| **Supplies** | | | | |
| Safety gear needed each year | $250 | Lump sum | 1 | $250 |
| Office Supplies | $120 | Lump sum | 1 | $120 |
| | | | | |
| **Total annual O & M expense** | | | | **$33,223** |

## Current Annual Revenues for Solid Waste

The below Table lists the current revenue sources for our solid waste program.

### Table 18 Current Annual Revenue For Solid Waste Program

| Item | Annual Revenue |
|---|---|
| Household fee 77 households @ $7. per month winter – 69 houses = 5,376.00<br>summer-8 houses added = 336.00 | $5,712 |
| Business fee for 1 businesses, $30 per month About 1 service a year. | $30 |
| School, Dumps own TRASH | $0 |
| Offices in community | $0 |
| EPA IGAP funds | $0 |
| City funds | $0 |
| Construction Project waste tipping fees | $0 |
| Equipment rental fees to outside projects | $0 |
| Revenues from recycling aluminum cans | $0 |
| Other Grant Revenues or Funding Sources | $0 |
| **Total annual revenues for solid waste** | **$5,742.00** |

## Long-Term Annual Revenues for Solid Waste

The below Table reflects our revenue sources for our planned program changes

### Table 19 Revenue Sources For Planned Solid Waste Program Improvements

| Item | Annual Revenue |
|---|---|
| Household fee 77 households @ $10 per month | $8,470 |
| Business fee for 4 businesses (2 Stores, clinic, post office), $60 per month | $2,640 |
| School, (2)$70 per month | $1,540 |
| Offices (3) $50 per month | $1,650 |
| EPA IGAP funds<br>Will be looking for IGAP funds | $5,500 |
| City funds | $5,000 |
| Construction Project waste tipping fees, $200/yard at 20 yards of non-salvageable material per year average of landfill life<br>Planning to implement in future. | $4,000 |
| Equipment rental fees to outside projects, $450/d for 14 days average per year.<br>Will be looking into to rent. | $6,300 |
| Revenues from recycling aluminum cans<br>Not in full swing yet, will be looking closely | $0 |
| Additional funding sources?? | |
| **Total annual revenues for solid waste** | **$35,100** |

***Solid Waste Costs and Revenues Resources Section***

| Topic | Link |
|---|---|
| Exploring and evaluating collection systems: ANTHC/ANHB SWM Guide Workbook 4 | View pages 401-430 of this document http://www.zender-engr.net/anhbguide/4.pdf |
| Financial situation and future availability of funds<br>ANTHC/ANHB SWM Guide Workbook 3 | View pages 303-309 of this document http://www.zender-engr.net/anhbguide/3.pdf |
| Landfill program costs<br>ANTHC/ANHB SWM Guide Workbook 4 | View pages 519-526 of this document http://www.zender-engr.net/anhbguide/4.pdf |
| Funding your SWM Program | http://www.zender-engr.net/anhbguide/App6.pdf |
| Evaluation form for proposed alternatives<br>ANTHC/ANHB SWM Guide Workbook 5 | View pages 556-566 of this document http://www.zender-engr.net/anhbguide/5.pdf |

# 12. NEEDS FOR SOLID WASTE IMPROVEMENT

We are worried about our water and soil contamination from our dump, because people drink water from downstream of it, the community gathers fish and animals from our river, from as large as a shee fish to small as a black fish minnow. Birds and ducks feeding on and from the run off waters from our dumpsites, we live close to the dumpsites about 1.25 miles from our community. Not only do we subsist on live foods, but also gather plants, greens from around our vicinity. The air quality could greatly be improved also by getting a clean burning unit, not only for the surrounding communities, but for the whole hemisphere. For we had mentioned that Alaska has topped the list as #1 emission state out of the whole U.S. There are no lines or continuous shallow permafrost under dumps, our dumps are way less than 500 feet from surface water, water is definitely flowing from our dump into our surface waters, water is able to go through the tundra soils. Our flush haul lagoons runoffs as said are all upstream from our village and are mixed with dumpsite water and then right through our village on down stream, all kinds of chemicals have been thrown to our dumpsites before we had gotten fully aware of hazards, used oil as well as containers have been thrown there, all kinds of machines, used appliances, vehicles are thrown there without being drained, batteries of all sorts have and were being dumped, as of today there has never been checking or closely been monitoring of our dumpsites. I have inquired about the colon cancer from YKHC, for colon has to do with digestive track, and there has been 2 colon cancer related deaths so far and I know of a number of people who are going to the hospital to check on or be treated for colon problems, so far I have heard it is hereditary. With the improvements, we would start charging fees to contractors and not have to let our residents pay for their profits, on our waste stream and operation of our solid waste. Drastically minimize the hazards that are not being handled properly, the dumpsite management, our waters, environment, subsistence, and most importantly, our quality of life, especially our health.

It is important to consider the environmental impacts when developing any projects. According to the U.S. Army Corps of Engineers 2000 Flood Hazard Data Report, flooding is evident. The flood of 1972 is used to represent the 100 year base flood elevation. There was a flood in 1946 after a major break-up, but predated existing buildings, could not be measured. A wide variety of fish and wildlife are present around Nunapitchuk. Moose, brown and black bear, caribou, and various waterfowl are present. Whitefish and salmon migrate into the Johnson River near Nunapitchuk as with pike, shee, and bourbots. Some residents hold commercial fishing permits for salmon and herring roe. Poor fish returns since 1997 have significantly affected our community. Nunapitchuk is surrounded by the Yukon Delta Nat'l Wildlife Refuge. There are no known endangered species habitats within our area. Vegetation around our area consists of low growth and moist tundra. With any development projects, coordination with State Historical Preservation Office will be necessary once a specific location is identified for possible impacts on historical properties. There are no designated Wild and Scenic Rivers near this area per AK Dept. of Natural Resources and the Bureau of Land Management. Nunapitchuk is located within Cenaliulriit Coastal Resource Service Area. There are no officially-designated wilderness area near Nunapitchuk.

Village Safe Water (VSW) provides grants and engineering assistance to small communities for water, sewer, and solid waste projects. Often, these projects require the construction or improvement of roads or boardwalks. Funding is competitive, and application is by completed questionnaire. Questionnaires are typically available in August and due October 1. Projects are scored in November, and once appropriations are passed, the grant money is available in July of the following year.

VSW's website (http://www.state.ak.us/dec/dfco/dec_dfco.htm#Village) offers a variety of information about planned projects and the application process, including tips for a successful application.

Communities seeking DEC-VSW funding should:

1) Fill out the appropriate VSW questionnaire. There is one for capital projects and one for plans and studies. The questionnaires are available at http://www.state.ak.us/dec/dfco/fco_vsw.htm. Applicants can access a PDF/F version of the questionnaire at this site.
2) Contact the village's Remote Maintenance Worker (RMW) to help answer any questions about our current water and sewer system. A directory of RMW's is available at http://www.state.ak.us/dec/dfco/rmw_direct.htm.
3) Submit the application and required documentation by the deadline.

Program Contacts for Nunapitchuk VSW primary: Lynn Marino 269-7602
Secondary project engineer: Matt Dixon
Remote Maintenance Worker: Anthony Watson 543-6428
ANTHC Region (RM): W (Dixon)

Mike Lewis, 269-7616 (Ak Municipal Water, Sewerage, and Solid Waste Matching Grant program)

Program Manager, _____
Facility Construction & Operation, Village Safe Water
Department of Environmental Conservation
410 Willoughby Avenue, Suite 303
Juneau, Alaska 99801
Tele: 907-465-5137
Fax: 907-465-5177

**Soils and Topography:**

Nunapitchuk is located in the southeast portion of a major physiographic division of Alaska termed the Yukon-Kuskokwim Lowland; a vast delta formed by two rivers, located on both banks of the Johnson River, our community is surrounded by stream connected lakes. The general geology of the area consists of older coastal deposits of interlayered alluvial and marine sediments composed of silt and sand, and Holocene floodplain alluvium deposited by the Kuskokwim River. This lowland area is generally underlain by moderately thick to thin permafrost indicating the presence of predominantly fine-grained deposits. Typically, maximum depth to the permafrost is absent around large water bodies.

Nunapitchuk is subject to significant erosion of the river banks. Although the village lies in seismic zone two, there is no damage due to earthquakes or tsunamis in the general vicinity.

Nunapitchuk is located in the Transitional Climatic Zone. This climate is somewhat more Maritime than Continental, which tends to temper daily temperature extremes.

**Table 20 Needs For Solid/Hazardous Waste Improvement**

| Item | What it would be used for | Why it's important for the community | Approximate Cost www.ccthita-swan.org | Ideas for how to obtain it (grants, funding sources etc.) | | What is the priority for this item? *(1 = critical, 2 = high, 3 = medium)* |
|---|---|---|---|---|---|---|

## Table 20 Needs For Solid/Hazardous Waste Improvement

| Item | What it would be used for | Why it's important for the community | Approximate Cost www.ccthita-swan.org | Ideas for how to obtain it (grants, funding sources etc.) | | What is the priority for this item? *(1 = critical, 2 = high, 3 = medium)* |
|---|---|---|---|---|---|---|
| **Burnbox** | To burn trash to greatly reduce waste volume for a population size of 200 to 700 people burnbox | The burnbox will help improve our dumpsite and reduce risks to people visiting the dump as well as uncontrolled burning | $100,000 plus $25,000 for shipping for a model # 7 Burnbox | Denali Commission 2006/7 grant. Open dump grant. | | **1** |
| **Totes** | To store and ship batteries | Will help reduce the amount of lead from entering our water and land | $300 plus $75 shipping per tote | IGAP funds | | **3** |
| **Connex** | To store hazardous wastes and recyclables for safety and needed storage shed | Will help reduce the amount of hazardous chemicals getting into our land and water and protect subsistence and the environment | $5500 and we arranged free shipping with the barge company | IGAP funds | | **2** |
| **Dozer** | To improve dump, do maintenance, keep volume at minimum, Rent when needed for revenue | The dozer will help us improve our dumpsite and reduce contact of wastes at the dump as well as maintaining the site, make trenches to fill with ashes and to backfill | We want to buy a good used dozer so the costs are less. | Open dump grant | | **2** |
| | | | | | | |
| **Parts for fixing heavy equipment** | To get the equipment up and running again | Will keep necessary , needed equipment operational | | Open dump Grant | | **2** |

## Table 20 Needs For Solid/Hazardous Waste Improvement

| Item | What it would be used for | Why it's important for the community | Approximate Cost www.ccthita-swan.org | Ideas for how to obtain it (grants, funding sources etc.) | | What is the priority for this item? *(1 = critical, 2 = high, 3 = medium)* |
|---|---|---|---|---|---|---|
| **Safety gear** | To protect the dump operator when working with wastes | Protect human health and safety from hazardous risks | | | | **2** |
| | | | | | | |
| **Recycling Baler** | To reduce volume of recyclables for storing and shipping | We are strongly educating community on recycling and will need the storage space | | | | **2** |
| **Fencing** | To block public access at the dump and help prevent windblown litter to fix the exsisting fencings | Better sight and keep animals out and minimize danger to community | | | | **3** |
| **WOTEC (used oil blender)** | To filter used oil into new oil that can be used by our community | Needed during this 4 stroke era, and all machines in village use oil | | | | **3** |
| **Used oil burner** | To burn used oil | Used oil everywhere these days and it lasts for a long time and very harmful to human and environment as with it's container | It would pay for itself in the long run, if obtained | | | **2** |
| **Freon removal equipment** | To safely remove Freon from appliances and ship it out for recycling | Very harmful to all, human health and to environment for refrigerants are everywhere | Would cost more to fly in tech. than to train local remover | | | **2** |
| **Antifreeze recycling unit** | To filter used antifreeze into new antifreeze that can be used in our community | Is a hazard to health and environment | | | | **3** |

## Table 20 Needs For Solid/Hazardous Waste Improvement

| Item | What it would be used for | Why it's important for the community | Approximate Cost www.ccthita-swan.org | Ideas for how to obtain it (grants, funding sources etc.) | | What is the priority for this item? *(1 = critical, 2 = high, 3 = medium)* |
|---|---|---|---|---|---|---|
| **Vehicle fluid draining pumps** | To drain fluids (brake, fuel, antifreeze etc.) from vehicles so the vehicles can be shipped out and recycled as scrap metal | Vehicles are metal and last for a long time and are large to see and tend to stay at one spot if not done any with them and are increasing in numbers | | | | **3** |
| **Drum crusher** | To reduce the volume of empty 55-gal drums at the dumpsite and community | Mostly a container of choice for remote communities lots of them piling up at the dumpsite | | | | **2** |
| **Oil filter crusher** | To crush and drain oil filters for recycling | Is used by all oil required | | | | **3** |
| **Composting bins** | To start small-scale composting projects for solid wastes | Will greatly reduce health risk and to the environment | | | | **3** |
| | | | | | | |
| **Can crushers** | To put in households to reduce the volume of cans for storing and shipping for recycling and handling | Even it's getting expensive from a remote area, it's what funding agencies want to see | Need funding for materials or to buy ready made crushers | | | **2** |
| **Glass crushers or palletizes** | To pulverize glass to a material that can be used for art projects, glasphalt trash reduction, cover material | Will be dangerous to kids, when broken and lasts for long time like plastic keep trash from being wind blown | | | | **2** |

## Table 20 Needs For Solid/Hazardous Waste Improvement

| Item | What it would be used for | Why it's important for the community | Approximate Cost www.ccthita-swan.org | Ideas for how to obtain it (grants, funding sources etc.) | | What is the priority for this item? *(1 = critical, 2 = high, 3 = medium)* |
|---|---|---|---|---|---|---|
| **ALPAR bags for community litter cleanup** | Free bags (shipping not included) for community cleanups | To have a cleaner environment and health | | | | **3** |
| **Engineering design for new landfill** | For Best management process as possible with a new site | Our exsisting dumpsite is unapproved and very dangerous to human health with a deficiency level of 1 | | Denali, EPA, Open dump grants, etc. | | **1** |
| | | | | | | |
| | | | | | | |

# 13. NEW COMMUNITY SOLID WASTE GUIDANCE FOR PROTECTING HEALTH AND SUBSISTENCE

These rules are based on the Elders' Guidance on protecting our subsistence and respecting each other and keeping healthy. Please see Section 2 for a full list of Elders' guidance. Using our Elder's wisdom about what we should do, we researched the best ways to change community practices so that we can follow Elders' words. We used our own experiences in the past years to determine what will work best for our community. We worked with other communities and learned from them what works well too by talking to them at conferences,

**In Town**

Separate edibles and throw in edible dump, notify EPA of any hazards or spills, use the transfer stations to dump any trash, do not litter in town, bring to EPA that is asked to be brought to them for safety reasons as batteries etc., be aware of any rules towards our dumps, trash, any news from EPA dept., councils, and community.

**At Dump**

Do not throw what is not said to be thrown, separate hazards to one side, follow what the signs say, if going to dump think safety first, be aware of hazards while at dump, notify EPA of any dangerous leaks from dump, public encouraged not to go to the dumpsites, only authorized personnel, separate any bulky items brought to site. Use best management as possible.

**Subsistence Camps**

Try not to litter anywhere especially out in the tundra, waters, either dig or bring home trash, we must respect what gives us food for survival and must be in unison with our environment.

**All Places**

We must listen to what our elders have been teaching and telling us of how we must respect one another as well as our land, and put them in our minds and try to follow what they have so thankfully, that they love us so to be teaching us wisdom and knowledge to follow while on this earth.

***Ordinances, Resolutions, and Enforcement Resources:***

| Topic | Link |
|---|---|
| Ordinances, Resolutions, MOU's, and MOA's, including Tribal law traditional resolutions | http://www.zender-engr.net/ordinances.htm |
| Developing Codes, Laws & Regulations ANTHC/ANHB SWM Guide Appendix 8 | http://www.zender-engr.net/anhbguide/App8.pdf |

# Comment Form

**The Corps welcomes your comments on the Draft Environmental Impact Statement. If you'd like to mail your comments, please feel free to use this form. Write your comments below then fold this page in thirds so the mailing address shows. Additional pages can be inserted. Remember to affix first class postage. You can also email your comments to POA.donlingoldeis@usace.army.mil, or fax them to (907) 753-5567.**

Important topics for comments would include:

- *Comments and questions about the accuracy of information in the Draft EIS.*
- *Comments and questions about the adequacy of methods or assumptions used.*
- *New information to be considered in preparing the Final EIS.*
- *New reasonable alternatives or revisions to current alternatives.*
- *Additional measures to reduce impacts (mitigation).*

All things being equal, temporary and possible. To help or to hurt.

Level access to information is essential to make good decisions. We are here only for our short life. And with God all things are possible. A people that know where they have been are a people that know where they're going.

TWL 3

A healthy environment, Wise use of clean energy and a stable economy makes a people live a good life. I am for alternative 1: No action.

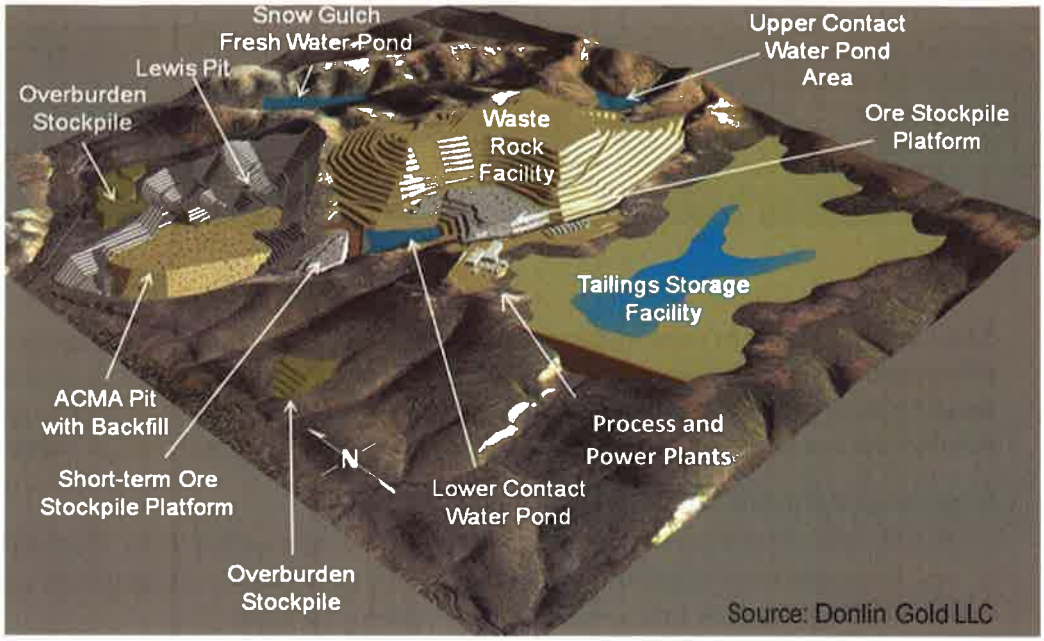
All other alternatives do not help the air, water, land and the animals. Our ancestors thought of us when they used the resources. We in turn need to protect, conserve be good stewards. Quyana

Nicholai Alexie, Kwt. AK.

## Layout of Proposed Mine Site

The image to the right illustrates the eventual layout of a proposed gold mine, ten miles north of the community of Crooked Creek on the Kuskokwim River in southwestern Alaska, for which the US Army Corps of Engineers is preparing an EIS. The project, proposed by Donlin Gold, LLC, includes a natural gas pipeline and transportation and components. You may use this mail-in form to submit comments.

For more information, please visit:
www.DonlinGoldEIS.com




(fold here)

(To mail, fold below blue line. Photo: Dave Cannon)

from:

US Army Corps of Engineers
Donlin Gold Project EIS

Please place first-class postage here.

Keith Gordon
Regulatory Division
US Army Corps of Engineers
CEPOA-RD-Gordon, PO Box 6898
Joint Base Elmendorf Richardson, AK
99506-0898

**From:** almond@alaska.net
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin mine
**Date:** Saturday, April 30, 2016 4:35:53 AM

---

I have just read about the Donlin gold mine and proposed pipeline - a scar on the wilderness over three hundred miles long! And the historic Iditarod Trail would be affected severely!

NEP 1

Clearly this project needs more study and more time for public comments.
Please extend the deadline so more people can be aware of the magnitude of this project.

Gary Almond
Homer, Alaska

Alicia Ambery
4021 Iona Cir
Anchorage, AK 99507

$0.48 5
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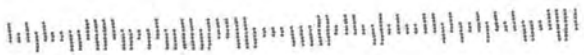
Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska
District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

99506$0898 B900



USACE
RECEIVED
MAR 2 1 2016
AK REGULATORY

To Mr. Gordon, US Army Corps of Engineers:

As a lifelong Alaskan and the daughter of a placer mining family, I would like to express my FULL support of the Donlin Gold Project, Alternative TWO

I had the opportunity to visit the Donlin Gold Project site in 2014. The commitment to local hire & environmental stewardship was incredible. I was so impressed with how above & beyond Donlin Gold went was like nothing I had ever seen before. They are truly a model example for "doing it right."

A moment from that visit to the site that I will never forget was leaving. We were fortunate enough to fly home with Mr Bill Beiber, who worked for Donlin for many years and is to thank for much of the local hire success. It was Bills last flight/day with Donlin. Every employee on site most of which were Native Alaskans from the region, hugged Bill goodbye & lined the runway as we flew away. It was an incredibly touching moment and speaks volumes to the relationships they have built & partnerships they have created with regional leaders. It's wonderful for a project to encourage folks to voice their concerns so Donlin can make a better project.

SER 4

In such a tough time for the State of Alaska, it is imperative that we diversify our economy & provide good paying jobs for people that want them. In one of →

SER 4

the poorest regions in the state. It will be an incredible economic opportunity

Again, thank you for the opportunity to express my support for Donlin Gold EIS Alternative TWO.

Please let me know if you'd like to discuss further or have any questions.

Thank you!

Alicia Amberg
alicia.amberg@hotmail.com
907-230-1292

| | |
|---|---|
| **From:** | Matt Ellsworth |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Project Environmental Impact Statement (EIS) |
| **Date:** | Tuesday, May 31, 2016 2:57:23 PM |
| **Attachments:** | Donlin Gold EIS.pdf |

Dear Mr. Gordon, please accept the attached comments **RE: Donlin Gold Project Environmental Impact Statement** (EIS) from the American Exploration & Mining Association.

**Matthew Ellsworth**
Government Affairs Manager
American Exploration & Mining Association
Office: 509-624-1158, ext. 15
Blockedwww.MiningAmerica.org

American Exploration & Mining Association

10 N Post St. Ste. 305 | Spokane WA 99201-0705
P. 509.624.1158 | F. 509.623.1241
info@miningamerica.org | www.miningamerica.org

May 31, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

**Submitted via EMAIL: POA.donlingoldeis@usace.army.mil**

**Re: Donlin Gold Project Environmental Impact Statement** (EIS)

Dear Mr. Gordon,

The American Exploration & Mining Association ("AEMA") is pleased to provide these unique comments in support of Alternative 2 of the Donlin Gold Project Environmental Impact Statement (EIS) released for public review and comment.

After reviewing the EIS, AEMA believes this project has been thoroughly analyzed. The EIS recognizes the robust mitigation measures in place to ensure that the project will have a net positive effect on not only the watershed in which it is located, but others in Alaska as well. Donlin Gold is committed to developing a safe and environmentally and socially responsible project that provides jobs for families in the Yukon Kuskokwim region and the State. This project has been consistent in its transparent communications, respecting subsistence and cultural values and creating business opportunities that benefit the Calista and Kuskokwin Corporations and Alaska economy.

PAA 7

AEMA opposes Alternative 3B which would replace the proposed natural gas pipeline with a diesel pipeline. Alternative 3B would result in a more substantial permanent footprint including the need to maintain an access road and air strips during operations. Access roads and air strips for the natural gas pipeline are only needed on a temporary basis during construction. The presence of an access road has the potential to increase competition on subsistence resources in vicinity of pipeline. Also, the potential environmental consequences from a diesel spill are greater than from a natural gas leak, and an unnecessary risk. ***We ask you to reject Alternative 3B***.

PAA 46

AEMA also opposes Alternative 5A that would replace the proposed slurry tailings storage facility impoundment with a dry stack facility. A dry stack facility would increase fugitive dust emissions creating unnecessary and unavoidable hazards. Additionally, the feasibility of a dry stack approach is questionable due to its high costs and technical and operational challenges. A dry stack of this size is unproven in the sub-Arctic climate such as this site. The Army Corps of Engineers has an obligation to approve alternatives on 'the best available science,' none of which is conclusive to this proposed Alternative at this time. The closest example of current dry stack facilities in Alaska are 20 times smaller than a Donlin dry stack and in a much different climate and environment. This is an inappropriate comparison to the proposal. ***We ask you to reject Alterative 5A.***

American Exploration & Mining Association is a 121-year old, 2,100 member national association representing the minerals industry with members residing in 42 U.S. states (including Alaska, six Canadian provinces or territories, and 10 other countries). AEMA is the recognized national voice for exploration, the junior mining sector, and maintaining access to public lands, and represents the entire mining life cycle, from exploration to reclamation and closure. Our broad-based membership includes many small miners and exploration geologists as well as junior and large mining companies, engineering, equipment manufacturing, technical services, and sales of equipment and supplies. More than 80% of our members are small businesses or work for small businesses. Most of our members are individual citizens.

Respectfully submitted,

Laura Skaer

Laura Skaer
Executive Director

LES/mge

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica |
| **Subject:** | FW: Donlin Gold Draft EIS comment |
| **Date:** | Wednesday, March 30, 2016 10:21:52 AM |
| **Attachments:** | AEDC Letter Comments on Donlin Gold Project EIS 03.28.2016.pdf |

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Wednesday, March 30, 2016 6:23 AM
To: Craig, Bill
Subject: FW: Donlin Gold Draft EIS comment

-----Original Message-----
From: Bill Popp [mailto:bpopp@aedcweb.com]
Sent: Monday, March 28, 2016 9:58 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

To whom it may concern:

Please see the attached letter of comment.

Sincerely,


Bill Popp

President & CEO

Anchorage Economic Development Corporation

510 L Street, Suite 603, Anchorage, AK 99501

Direct (907) 334-1206 | Main (907) 258-3700

AEDCweb.com <Blockedhttp://www.aedcweb.com/> | AEDC on Facebook <Blockedhttp://www.facebook.com/AEDCweb> | Twitter: @AEDC <Blockedhttp://www.twitter.com/AEDC> | AEDC on LinkedIn <Blockedhttps://www.linkedin.com/company/aedc>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AEDC
Anchorage Economic
Development Corporation

March 28th, 2016

Mr. Keith Gordon
Project Manager
Donlin Gold Project EIS
U.S. Army Corps of Engineers

Re: Comments on Donlin Gold Project EIS

Dear Mr. Gordon:

I write today to express the support of the Anchorage Economic Development Corporation (AEDC) for the construction and operation of the Donlin Gold mine project in the Crooked Creek region in southwest Alaska. It is our belief this project can be
SVE 1 safely constructed and operated in a manner that protects key aspects of the local environment while economically benefiting the citizens and communities of both Southwest and Southcentral regions of Alaska.

Alaska has demonstrated that by using state of the art mining technologies and methodologies in projects located throughout Alaska, environmental concerns can be addressed and the ecosystem protected while developing mineral resources that greatly benefit the regions those projects are located. Projects like the Red Dog Zinc Mine, Greens Creek Silver Mine, Ft. Knox Gold Mine, Pogo Gold Mine, and Usibeli Coal Mine.

These projects generate hundreds of jobs and tens of millions of dollars in local economic activities in regions that would otherwise suffer economically if these projects did not exist. The Donlin Gold project offers this significant opportunity not only to the
GAS 5 region in which it will be located, but will also offer significant benefit to the Cook Inlet region by providing a significant new buyer of natural gas on a consistent, year-round basis.

GAS 5 The result is the creation of thousands of jobs in both regions, with a corresponding investment of billions of dollars in both the mine site, natural gas infrastructure in the Cook Inlet Region and the new natural gas pipeline that will ultimately serve the energy needs of both regions. Cost effective energy for the mine site, and a more competitive energy market for the Cook Inlet Basin. And an added benefit of significantly more environmentally friendly energy source for the mine project than alternatives such as diesel.

AEDC
Anchorage Economic
Development Corporation

AEDC supports the development of the Donlin Gold Project as a vital step towards significant new economic opportunities to Alaskan communities in the Southwest region while adding expanded economic benefits to the communities of the Southcentral region.

Sincerely,

Bill Popp
President & CEO

Board of Directors

**Michelle Anderson**
*President*
Ahtna, Inc.

**Thomas Mack**
*President*
Aleut Corp.

**Rex Rock, Sr.**
*President and CEO,*
Arctic Slope Regional Corp.

**Gail Schubert**
*President and CEO*
Bering Straits Native Corp.

**Jason Metrokin**
*President and CEO*
Bristol Bay Native Corp.

**Andrew Guy**
*President and CEO*
Calista Corp.

**Gabriel Kompkoff**
***Chair***
*CEO*
Chugach Alaska Corp.

**Sophie Minich**
*President and CEO*
CIRI

**Aaron Schutt**
*President and CEO*
Doyon, Ltd.

**Elizabeth Perry**
*CEO*
Koniag, Inc.

**Wayne Westlake**
*President and CEO*
NANA Regional Corp.

**Anthony Mallott**
*President and CEO*
Sealaska Corp.

**Julie Kitka**
*President*
Alaska Federation of Natives

ANCSA REGIONAL ASSOCIATION
Bringing Together Regional Corporation Presidents and CEOs

PO Box 240766 • Anchorage, AK 99524 • **907 339 6052**

April 22, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
COPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

On behalf of the ANCSA Regional Association, we are writing in support of the Donlin Gold Project and the Applicant's Proposed Action. Our corporations are owned by over 117,000 Alaska Native people and were formed under the Alaska Native Claims Settlement Act of 1971 (ANCSA). The ANCSA Regional Association exists to promote and foster the continued growth and economic strength of the Alaska Native Regional Corporations on behalf of their shareholders. The Board of Directors includes one representative from each of the 12 Alaska-based Native Regional Corporations as well as the Alaska Federation of Natives. These members represent the highest level of each corporation's management.

In addition to expressing support for the applicant's proposed action, we would like to also endorse the letter submitted by the ANCSA Resource Managers (attached). Donlin will provide far reaching benefits to Alaska Native people throughout the state, precisely the type of self-determination that was envisioned with the passage of ANCSA. We recognize both Calista's and The Kuskokwim Corporation's support for the project as the land owners. We appreciate that Donlin has worked with them to ensure subsistence resources and the subsistence way of life in the entire project footprint are a primary consideration. We recognize that by providing economic opportunities and jobs for shareholders and residents of the region, subsistence opportunities will be maintained and Alaska Native cultures will ultimately be preserved.

TWL 4

Thank you for the opportunity to submit comments. Should you have further questions, please contact our Executive Director, Kim Reitmeier at kim@ancsaceos.org or 907-339-6052.

Sincerely,
ANCSA REGIONAL ASSOCIATION

Gabriel Kompkoff
Chair

cc: ANCSA Regional Association, Board of Directors

## Smith, Neal

**From:** Craig, Bill
**Sent:** Friday, April 22, 2016 1:13 PM
**To:** Bellion, Tara; Evans, Jessica; Smith, Neal
**Subject:** FW: Support of Donlin Gold Project
**Attachments:** image001.jpg; Donlin_USACoE_042216-signed.pdf; ARM Donlin EIS Comments.pdf

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Friday, April 22, 2016 12:42 PM
To: Craig, Bill
Subject: FW: Support of Donlin Gold Project

-----Original Message-----
From: Reitmeier, Kim [mailto:Kim@ancsaceos.org]
Sent: Friday, April 22, 2016 12:11 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Cc: 'Jeff Foley' <jfoley@calistacorp.com>; Jason Brune (jbrune@ciri.com) <jbrune@ciri.com>; Andrew Guy (aguy@calistacorp.com) <aguy@calistacorp.com>; M Carey (mec@kuskokwim.com) <mec@kuskokwim.com>; Allred, Cindy <Cindy@ancsaceos.org>; Imm, Teresa <timm@asrc.com>; Keja Nokomis Whiteman (knw@kuskokwim.com) <knw@kuskokwim.com>
Subject: [EXTERNAL] Support of Donlin Gold Project

Mr. Gordon,

On behalf of the ANCSA Regional Association, we submit the attached letter in support of the Donlin Gold Project and the Applicant's Proposed Action. In addition to expressing support for the project, we would also like to endorse the letter submitted by the ANCSA Resource Managers (also attached).

Please feel free to contact me if you have any questions.

Thank you,

Kim

Kim Reitmeier
Executive Director

ANCSA Regional Association

PO Box 240766, Anchorage, Alaska 99524
p 907.339.6053 | c 907.952.0027| f 907.339.7477

Board of Directors

**Michelle Anderson**
*President*
Ahtna, Inc.

**Thomas Mack**
*President*
Aleut Corp.

**Rex Rock, Sr.**
*President and CEO,*
Arctic Slope Regional Corp.

**Gail Schubert**
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*CEO*
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**Wayne Westlake**
*President and CEO*
NANA Regional Corp.

**Anthony Mallott**
*President and CEO*
Sealaska Corp.

**Julie Kitka**
*President*
Alaska Federation of Natives

ANCSA REGIONAL ASSOCIATION
Bringing Together Regional Corporation Presidents and CEOs

PO Box 240766 • Anchorage, AK 99524 • **907 339 6052**

April 22, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
COPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

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Sincerely,
ANCSA REGIONAL ASSOCIATION

Gabriel Kompkoff
Chair

cc: ANCSA Regional Association, Board of Directors

April 30, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
COPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

RE: Comments for the Donlin Gold Project EIS

Dear Mr. Gordon:

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Because of the size of the Donlin project, and because it is located on land owned by ANCSA Native Corporations, the project is expected to make substantial long-term contributions to the regional economy. During the projected 4-year construction period, a workforce of more than 3,000 would draw a collective annual payroll of roughly $375 million. During 27 plus years of operation, an average of approximately 900 (*year-round*) employees would receive a direct payroll of about $100 million per year. Additionally, an estimated $60 million of indirect and induced payroll would be generated (McDowell Group, 2012). Moreover, under the revenue-sharing provisions of ANCSA

Sec. 7(i) and 7(j), Alaska natives across the state stand to benefit from Calista Corporation's development of its mineral estate.

Per NEPA regulations and as the lead agency in the case of the Donlin EIS, the US Army Corps of Engineers is obligated to consider socioeconomic impacts during its analysis. We firmly believe that, in the case of the Donlin Project, the potential for positive economic impact is more than a simple criterion by which the Corps should review the project. Consistency with ANCSA, the legislation that chartered, empowered, and protects the interest of aboriginal land owners, is a far weightier criterion than simple economic benefit. The Donlin Gold Project as proposed by the applicant will provide measurable and long-lived economic opportunity that currently does not exist and likely never will exist unless the project is developed. The magnitude and scope of the project are described in the DEIS with respect to employment, revenue, taxes and royalty payments and other socioeconomic parameters. The relevant section in Chapter 4 of the DEIS states:

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SER 2

Although current socioeconomic data for YK-Delta are provided in the EIS, the challenging nature of the local and regional economies and the potential for lasting significant positive impacts are overlooked. Calista owns other mineral lands in the region, but after decades of exploration, only Donlin appears to have world class economic potential. This project provides the one opportunity for economic development that simply does not exist in any other form or industry in the region. When developed, the project will have economic impact on par with that experienced by NANA shareholders, the Northwest Arctic Borough and the remainder of the Alaska economy that derives benefits from the Red Dog Mine. The Red Dog Project has been and continues to be the major economic driver in that region and has positively changed the lives of many, directly and indirectly. Given the current and foreseeable economic conditions in Alaska, to characterize the socioeconomic impact of the Donlin Gold Project, whether direct, indirect or cumulative, as anything but major remains a gross and misleading understatement of its potential benefit to the region and to Alaska. Successful Red Dog and Donlin projects represent fulfilment of the intent of ANCSA, to the benefit of all Alaska Native Corporations and their shareholders, not measured only in dollars or jobs for shareholders but as survival and health of their cultures. The Corps is strongly encouraged to consider the project's positive socioeconomic impacts in a more realistic framework and recognize the magnitude of such extraordinary opportunity.

SER 24

The NEPA process for the Donlin Gold Project was initiated in 2012, seventeen years after the current operators began exploring the Donlin property for gold. The DEIS fails to recognize the positive social and economic benefits that have characterized the project throughout that period and which will likely increase multifold. Following initial job turnover rates of 300 percent, and owing to the patience and commitment of the operator, 90 percent shareholder hire was achieved in later years. Local workers were trained as heavy equipment operators, drillers, driller's helpers, cooks, bakers, carpenters, mechanics and a long list of other occupations for which few job opportunities formerly existed. Ultimately, during peak exploration activity, shareholder payrolls

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Throughout the 20 years of exploration, environmental studies and project design, the operators have continuously undertaken exhaustive community outreach efforts to educate, listen to concerns and adapt to the needs of the residents and the region. Concerns about impacts to subsistence, the Kuskokwim River and lifestyle have been voiced throughout this process. Consequently, the project design has undergone substantial modifications to address and mitigate these concerns. Design modifications include a natural gas pipeline to power the ore crusher, mill, oxygen plant, autoclave and camp facilities. This major modification will eliminate large numbers of barge sets and significantly reduce the risk of petroleum product spills on the Kuskokwim River as well as minimize air emissions by relying on natural gas instead of liquid petroleum products for power generation. Similarly, the reduced barge traffic will reduce interference with subsistence fisheries and other river borne activities. The mine is designed to minimize areal impacts, thereby limiting disturbance to land borne subsistence. The mine's location has seen intermittent mining activity for 100 years and the proposed mine footprint has never been an area of high subsistence values due to terrain and lack of water accessibility. Transportation and communication practices during barging will avoid river bottom impacts that might interfere with fish spawning or migration and will accommodate local river activities including fishing, hunting and freight transportation. The continuing list of design features that mitigate environmental risks is inherent to every component and detail of the project.

Furthermore, throughout the project history, Donlin has established itself as a good neighbor and shown genuine concern for the well-being of employees, their families and local communities. Donlin Gold LLC continues to encourage and support healthy life style, safe outdoor practices, education, vocational training and supports community activities and scholarships. They assisted in backhauling and safe disposal of hazardous waste from Kuskokwim River communities. When Crooked Creek flooded in 2011, Donlin evacuated residents to Donlin Camp where they received food and shelter. Donlin assisted in the renovation of churches in Crooked Creek and Chuathbaluk. They are a Principal Partner in sponsorship of the Iditarod which positively impacts many Alaska communities and provides inspiration and role models for young and old, across Alaska and in the Lower forty-eight states. Donlin is an active supporter of the ANSEP program which trains and encourages Alaska Native youth to pursue careers in science and engineering. The list of community engagement activities by Donlin goes far beyond these social efforts.

Ultimately, economic development of this large project will help fulfill the broader goal of self-determination by allowing TKC and Calista shareholders to significantly participate in the world

economy. Calista has been active and involved as a participant in the development of its land and the mineral resources at Donlin Creek. Not only will Calista, TKC and other ANCSA shareholders benefit from the project, but this project will provide a singular opportunity to satisfy the intent of ANCSA in the Calista Region, to the benefit of all Alaska Native Corporations and the struggling state economy.

ARM and its participating ANCSA Corporations support and encourage the Corps to permit Alternative 2, the Applicant's Proposed Action. ARM believes that the Proposed Action is designed to minimize environmental and negative social impact and will provide long-lasting socioeconomic benefit to not only ANCSA Shareholders and descendants but the State and all its residents.

Thank you for the opportunity to comment on this important project and Environmental Impact Statement.

Sincerely,

Teresa Imm, Sr Vice President
Resource Development
Arctic Slope Regional Corporation
***On behalf of the ANSCA Regional Managers***

Cc: Joe Bovee, Ahtna Corporation
Melvin Smith, Aleut Corporation
Matt Ganley, Bering Straits Native Corporation
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June McAtee, Calista Corporation
Josie Hickel, Chugach Alaska Corporation
Jason Brune, Cook Inlet Regional Corporation
Jim Mery, Doyon Limited
Tom Panamaroff, Koniag Inc
Lance Miller, NANA Regional Corporation
Michele, Metz, Sealaska Corporation
Kim Reitmeier, ANCSA CEO's

April 30, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
COPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

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Michele, Metz, Sealaska Corporation
Kim Reitmeier, ANCSA CEO's

US Army Corps of Engineers

# Donlin Gold Project EIS

Hadley Andrew **Comment Form** 3-2-16

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Important topics for comments would include:

- *Comments and questions about the accuracy of information in the Draft EIS.*
- *Comments and questions about the adequacy of methods or assumptions used.*
- *New information to be considered in preparing the Final EIS.*
- *New reasonable alternatives or revisions to current alternatives.*
- *Additional measures to reduce impacts (mitigation).*

NSB 1

How does this project help? Does it take years, months, days to built? I think you guys should build it Because you guys might help.

## Layout of Proposed Mine Site

The image to the right illustrates the eventual layout of a proposed gold mine, ten miles north of the community of Crooked Creek on the Kuskokwim River in southwestern Alaska, for which the US Army Corps of Engineers is preparing an EIS. The project, proposed by Donlin Gold, LLC, includes a natural gas pipeline and transportation and components. You may use this mail-in form to submit comments.

For more information, please visit:
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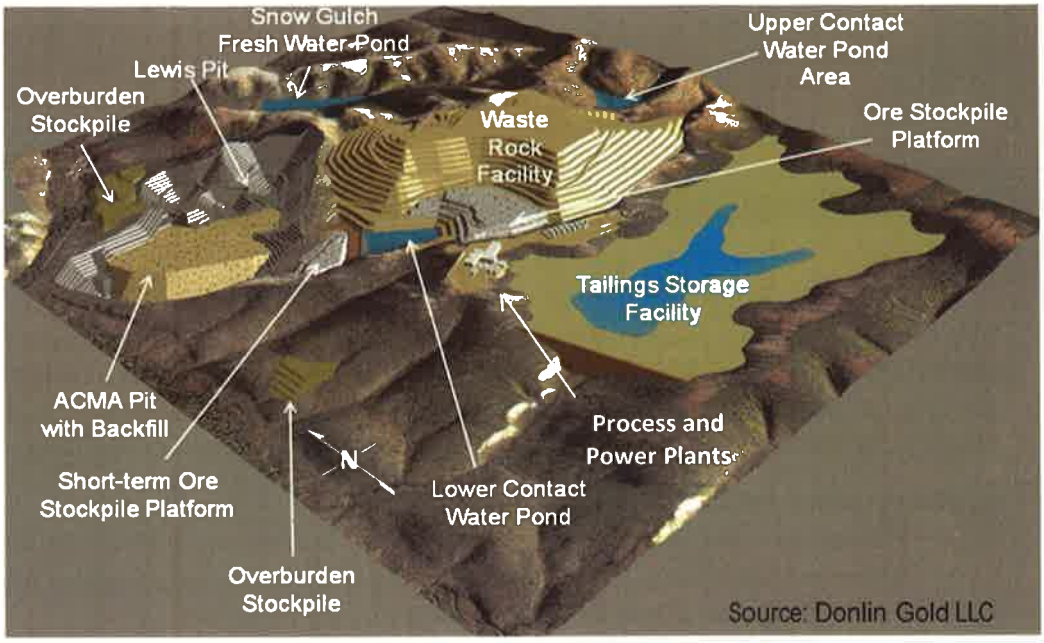


(fold here)

from:

US Army Corps of Engineers
Donlin Gold Project EIS

Keith Gordon
Regulatory Division
US Army Corps of Engineers
CEPOA-RD-Gordon, PO Box 6898
Joint Base Elmendorf Richardson, AK
99506-0898

Place first-class postage here.

US Army Corps of Engineers

# Donlin Gold Project EIS

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My name is John W. Andrew, 71 yrs old, representing ~~Kwethluk~~ City of Kwethluk / Kwethluk Joint Groups

Pick & Shovel should operations & exploration companies don't make a dent. Past destructive mines in our area - Red Devil Mine, NYAC mine Tuluksak destroyed 45-50 miles of Salmon spawning bed & Platinum Mines - all had short financial benefit to the area only to a few — (NO Actions) = Major Concerns

(1) 300 miles of natural gas line, (+ diesel fuel)

FSR 2 (2) Excessive barge traffic that have potential for Hazardous Chemical + Fuel and Oil Spills

FISH 4

Village of Crooked Creek • Native Village of Napaimute • Native Village of Chuathbaluk • Native Village of Aniak • Knik Tribe • Akiak Native Community

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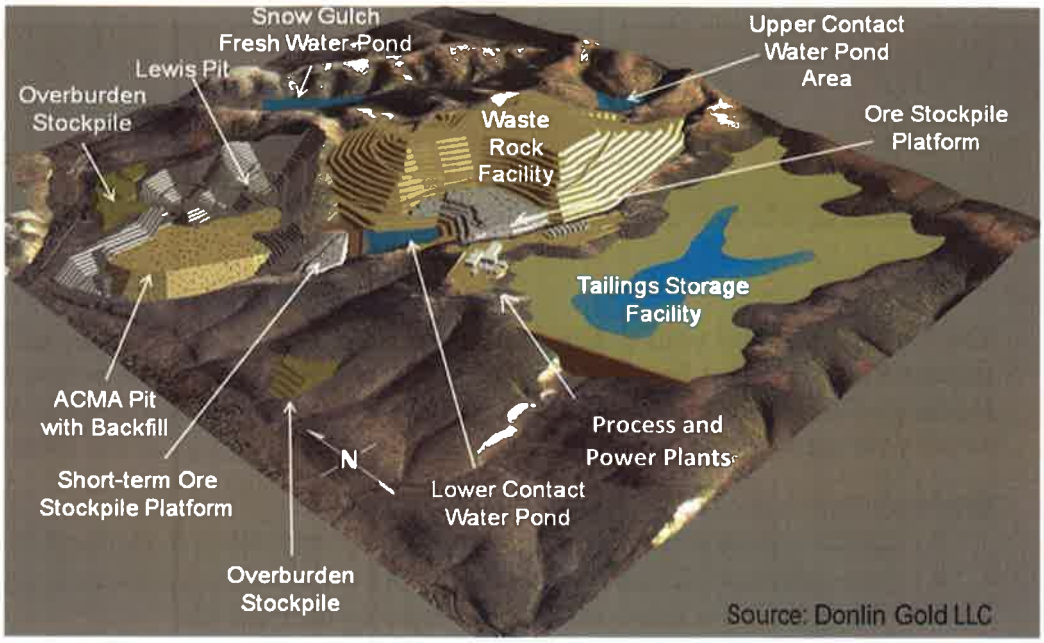


(fold here)

(To mail, fold below blue line. Photo: Dave Cannon)

Keith Gordon
Regulatory Division
US Army Corps of Engineers
CEPOA-RD-Gordon, PO Box 6898
Joint Base Elmendorf Richardson, AK
99506-0898

from:

Donlin Gold Project EIS
US Army Corps of Engineers

Place first-class postage here.

| | |
|---|---|
| **From:** | donlingoldeis, POA |
| **To:** | Evans, Jessica |
| **Cc:** | Isaacs, Jon; Craig, Bill; Bellion, Tara; Newman, Sheila M POA; McClendon, Judy L RAO @ POA |
| **Subject:** | FW: [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, August 09, 2016 9:39:08 AM |

Jessica,

Please add these comments.

-----Original Message-----
From: Melvin Andrew [mailto:mpandrew@msn.com]
Sent: Tuesday, May 31, 2016 1:15 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

My name is Melvin Andrew and I live in Manokotak, AK. I am a Calista shareholder and Kwik, Inc. shareholder.

The importance of sustainability has reverberated in recent years and has echoed even more show in our traditional way of life. Our culture depends on our ability to survive changing to climate, environment, terrain, and yes; economy. Our ancestors have improvised, adapted, and overcome and have passed this down with a record of surviving in such harsh situations and environment.

We are faced with myriad of challenges in today's economy. Subsistence is the key economy that drives each community in western Alaska, especially the Yukon/Kuskokwim area that extends up the mighty rivers; Yukon and Kuskokwim.

However, with this adopted way of life that weaved in our culture, we have to find a common denominator to offset the increasingly difference in our numerator.

SVE 1 Donlin Gold will certainly create impacts in our environment and our imbedded desire and inherited value to keep our waters and land clean. Yet there is proven methods and ways to keep our environment safe to a certain level that will be acceptable to all, especially those who depend on it.

We can look that this potential economy driver to the region from one side of the spectrum, but it is wise and prudent to see it with the whole spectrum of life. Life as we know it today.

SER 11 A subsistence way of life cannot succeed without the successful acceptance of a westernized way of economy. Fuel, boats, outboards, rifles, nets, and even management costs money. Of course, when a huge potentially positive factor sets in; negative issues are also looked at and mitigated. Mitigation improves, eliminates, and reduces many negative impacts, but more over, it creates an acceptable alternative and option to it.

The importance for due process to any large project takes time and detailed investigation, survey, and exploration. Then repeat it again.

I know Donlin has done that and with perserverance have proved their years of exploration that this project is doable and will benefit the region economically while protecting our most valuable resource; water and land.

SVE 1 I believe the benefits outweigh the impacts and possibly enhance the fisheries and economy of the region.

I support Donlin Gold's application for permits to go ahead with construction of the mine and long-term economic drive that will enhance our subsistence way of life.

**From:** Nelson&Natalie Angapak
**To:** donlingoldeis, POA
**Cc:** appanuuz@yahoo.com
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Tuesday, May 31, 2016 11:26:48 AM

TO WHOM IT MAY CONCERN:

Section 12(B) of PL 92-203, otherwise known as the Alaska Native Claims Settlement Act of December 18, 1971 (ANCSA), mandated the village corporations to select their first round land selections on or before December 18, 1974. Accordingly the Crooked Creek's ANCSA Corporation, after due liberation by its Land Selection Committee elected to select the area now known as Donlin Creek gold prospect. The Land Selection Committee discussed, among other things, the possibility of the development of the gold prospect whether or not they select the area where Donlin Creek gold prospect is. They wondered if this area was developed, would it be developed just like NYAC mined the mine down river from the village. How do I know this? During the implementation of Section 12 of ANCSA, I served as Deputy Director of the Land Department of Calista Corporation. One of my key responsibilities was to assist the village corporations located within the Calista Region to fully select their allotted ANCSA land entitlements based on their enrolled number of shareholders; I worked closely with the land selection committee of Crooked Creek during the last three months of 1974 leading to December 18, 1974 village land selection deadline.

The Land Selection Committee of Crooked Creek, in the end, elected to select the area where the Donlin Creek gold prospect is located. The committee concluded that if this area was going to be mined, among other things,

1. they would have a better opportunity and stronger voice on how this prospect is developed,
2. how this would create meaningful employment opportunities for the people of Crooked Creek, the people of Upper Kuskokwim and the Calista/AVCP region as a whole,
3. employees of the mine, if the area is developed, would have an opportunity to earn meaningful salaries for the employees.

Among the concerns raised was the potential of environmental harm to the area where Donlin Creek is now located. This is a valid concern and must be considered by the developers of the mine.

There are lessons that the developers of this mine must take into consideration. Lessons learned by the developers of Red Dog Mine must be studied by the developers of the Donlin Creek potential. Some of the lessons that must be taken into consideration include but are

not limited to:

SER 16

1. The developers of the mine must have an outreach program to the people living in Crooked Creek, upper Kuskokwim and the Calista/AVCP region to attract potential employees living in these areas. The shareholders and the descendants of the Calista Corporation and The Kuskokwim Corporation must be given preferential treatment over all other potential employees when it comes to employment opportunities at Donlin Creek. The Calista/AVCP/The Kuskokwim regions have the greatest number of unemployment in the State of Alaska, perhaps in the United States of America. Giving preferential treatment for the people of the region over all other potential employees when it comes to employment opportunities at Donlin Creek will greatly improve this situation.

SER 9

2. The developers of the mine must pay the employees, and in particular, the Alaska Native employees of the region with high enough wages such that their lives and living conditions will improve. To wit, pay the employees with high wages that will attract people of the region so that they will pursue employment opportunities at the mine.

SER 13

3. The developers of the mine must consider and implement training opportunities for its employees so that upward movement for its employees will exist; to wit, be promoted upwards into managerial positions from lower positions.

SUB 18

4. One of the greatest lessons from the Red Dog Mine that Donlin must consider is that the Alaska Natives have customarily and traditionally are subsistence fishing and hunting people. During the early days of Red Dog Mine, the managers of the mine noted that during certain times of the year, the Alaska Native employees of the mine were either gone or a large percentage of them asking for leave about the same time during the year. Unfortunately, this, to my limited understanding, let to some of these people being laid off for their absences. The Red Dog Mine managers eventually learned that subsistence hunting and fishing was so important to the Native people of the NANA region that they begin to take into consideration this aspect of the Alaska Natives. I learned this while I served as an employee of the Alaska Federation of Natives. Donlin must also take into consideration.

My comments are limited to potential positive opportunities that Donlin Creek will have for the people of Crooked Creek, The Kuskokwim Corporation and the Calista/AVCP region. It is likely that others may have addressed reasons why the mine should not be developed because of the potential negative impacts for the region. This is fine, however, the potential positive impacts of the mine development must also be given and taken into consideration as this project moves forward.

Nelson N. Angapak, Sr.

# ANIAK
## TRADITIONAL COUNCIL

**Resolution 2016-09**

**A Resolution in Support of the Responsible Development of the Donlin Gold Proposed Project and Opposing YKHC Resolution**

**Whereas,** the Aniak Traditional Council is a federally recognized governing body for the Native Village of Aniak; and

**Whereas,** the Aniak Traditional Council Tribal Members has maintained a subsistence lifestyle for many years; and

SER 5 **Whereas**, the Aniak Traditional Council recognizes the need for economic development within the Kuskokwim region and surrounding area; and

**Whereas,** the Aniak Traditional Council Residents have been provided with the Donlin Gold Proposed Project informational meetings to review and comment since its discovery in 1995 and been a co-operating agency since 2014; and

**Whereas,** the Aniak Traditional Council did not Authorize the YKHC Board of Directors to act on its behalf; and

**Whereas,** the YKHC Board of Directors are Elected by the Tribal Councils of each of the 58 federally recognized Tribes in the YKHC service area, the Board of Directors is the chief policy-making body of the corporation, exercising all control, management and supervision of only YKHC business; and

SER 5 **NOW THEREFORE, BE IT RESOLVED,** the Aniak Traditional Council Supports the Environmentally Responsible Development of the Donlin Gold Proposed Project: and

**NOW IT BE FURTHER RESOLVED**, the Aniak Traditional Council does not Recognize the YKHC Resolution 16-04-04 to oppose the Donlin Gold Proposed Project because YKHC did not consult with any of the 58 Tribes from which it is formed and YKHC is only Authorized to Act on behalf of the 58 Tribes in Negotiating with the Federal Indian Health Service to provide health care services under Title III of the Indian Self-Determination and Education Assistance Act of 1975.

**CERTIFICATION**

**This Resolution was passed by the Aniak Traditional Council of which a Quorum was established, with the vote of** 4 **yes and** 2 **no and** 1 **abstentions, on this** 19th **day of May, 2016.**

Jeanette Hoffman, Chief

Bruce Morgan, 2nd Chief

P.O. BOX 349 • Aniak, AK 99557 • 907-675-4349 • 907-675-4513 fax • aniaktribe88@yahoo.com

**Asa'carsarmiut Tribal Council**
**P.O. Box 32249**
**Mountain Village, Alaska 99632**

**(907) 591-2815 Telephone**
**(907) 591-2811 Facsimile**

USACE
RECEIVED
APR 22 2016
AK REGULATORY

April 14, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. 6898
JBER, Alaska 99506-0898

RE: Asa'carsarmiut Donlin Gold EIS Input

The Asa'carsarmiut Tribal Council during several council meetings with the final meeting on April 11, 2016 discussed the Donlin Gold EIS.

SVE 2 The council understands the need for more economic opportunities within our Great State of Alaska. However, the council believes it should not be at the risk of negatively impacting our lives, our health, our land, our culture and our subsistence way of life. There is no absolute assurance that the tailings dam will not break.

CLIM 5 The impacts of climate change was our main reason of why we do not believe that the Donlin Gold project will always be safe. The storms that our region have been experiencing due to climate change have grown larger where major catastrophes could affect the mine and then the wind or water could transport the dangerous minerals within our region. The council also stated,

DAM 2 the number of incidents regarding tailing mines have doubled, thus there is no sure way to feel safe that the Donlin Gold project should be open.

TWL 3 In addition, our council leaders have met with people living within the mine site and they have described that the mine would not benefit our land & culture, as we believe in respecting our lands and to disrupt it would go against our culture, especially for those people living closer to the mine site.

In closing, tailing mines fail, as described by experience from other people living within other mine areas. If you have any questions, please do not hesitate to contact myself at the address and telephone number above. Good day to you.

Sincerely,

James C. Landlord
First Chief

Cc: Calista Corporation Board of Directors
Yukon River Intertribal Watershed Council
AVCP Natural Resources Department

Asa'Carsarmiut Tribal Council
P.O. Box 32249
Mountain Village, AK 99632
(907) 591-2814 (907) 591-2815

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RO-Gordon, P.O. Box 6898
JBER, Alaska 99506-0898

99506$0898 B900

RECEIVED
MAY 1 1 2016
AK REGULATORY

April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15

Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

Donlin Gold has also demonstrated a notable commitment to the environment. Donlin has 16+ years of extensive studies focused on creating an environmentally and socially responsible project; and has purposefully designed its project to reduce the overall footprint of the mine and diminish any social impacts it may have on the YK region. Proposals such as building a natural gas pipeline have been developed in an effort to minimize barge traffic on the Kuskokwim River. Furthermore, a specific route for the pipeline has been selected to minimize disturbance to known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

IDIT 1

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

LAND 1

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Signature

Anika Ashby
Print Name

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL]
**Date:** Thursday, February 25, 2016 6:57:58 AM

---

-----Original Message-----
From: Michael Asicksik [mailto:michael_asicksik@lksd.org]
Sent: Wednesday, February 17, 2016 10:14 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL]

Mikey Asicksik
P.O. Box 62

Tununak, Ak 99681

michaelasicksik@gmail.com <mailto:michaelasicksik@gmail.com>

February 17, 2016

U.S. Army Corps of Engineers

Blockedwww.poa.usace.army.mil <Blockedhttp://www.poa.usace.army.mil/>

Keith Gordon, Project Manager

Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil>

907-753-5710

To whom it may concern:

My name is Michael Asicksik and I grew up in a Yup'ik culture in Tununak, on a coast where salmon is the most important food source. I help catch fish for these food sources every summer in Tununak to fill my parents freezers so my family and I could survive throughout the winter.

I am against Donlin Gold mining because there could be a risky chance of oil leakage. That's not the only reason why I'm against Donlin Gold mining. The miners are going to tear up the wildlife land just for gold and money. The Barrick Gold owns this company and it is a gold mining corporation. The mining project could harm the wildlife forever and endanger the animals around the area which could lead to not having subsistence food for our future generations.

SUB 1

ANIL 11

First of all, Donlin Gold is sending oil barges to the Kuskokwim River. Oil leakage is severely risky. Oil leakage affects animals and plants because the oil has chemicals that are poisonous. Oil leakage can also affect organisms from internal exposure or inhalation and external exposure through skin and eye irritation. For example, this is just like having a lot of trash in the ocean and animals suffocating from the plastic that wraps around them. Then, sooner or later, they die.

Secondly, the mining companies just have jobs of tearing up land for gold and money and not only for money they also tear up land for fun. They also take advantage of their job too because it just doesn't

matter to them. The Donlin Gold mining project shouldn't develop a mine pit that's more than five hundred feet deep because when they are done mining they're just going to leave the pit alone to have it "recover".

HAB 1 The miners aren't just tearing up any land, they're tearing up a wildlife environment and a huge chunk of it, an environmental ecosystem where our salmon spawn. The wildlife could be harmed forever and be endangered. The oil spill that could happen could also cause deforestation (extinction) and release

FSR 3 toxic into the soil and water. The effection still continues even after the toxic is removed.

These are the reasons why I am against the Donlin Gold mine. I want our salmon to not be

FISH 10 endangered by the oil because I love salmon. I honestly think tearing up the land and wildlife to put a mine pit wouldn't be such a great idea cause when they're done what animals will come back? I know our salmon wouldn't if oil leakages happen.

Sincerely,

Michael Asicksik

**From:** Isaacs, Jon
**To:** DonlinEISAR
**Cc:** Bellion, Tara
**Subject:** FW: Letter of Support
**Date:** Friday, May 27, 2016 9:52:06 AM
**Attachments:** AES-HCC Donlin Gold EIS.pdf

---

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Thursday, May 26, 2016 5:25 PM
To: Isaacs, Jon; Bellion, Tara
Subject: FW: Letter of Support

-----Original Message-----
From: Werning, JoAnn [mailto:JoAnn.Werning@asrcenergy.com]
Sent: Thursday, May 26, 2016 4:12 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Cc: Blasingame, Wade <Wade.Blasingame@asrcenergy.com>
Subject: [EXTERNAL] Letter of Support

Please see attached

JoAnn Werning
Accounting Manager | HCC
ASRC Energy Services-Houston Contracting Company, Inc.
3900 C Street, Suite 602
Anchorage, AK 99503
Desk: 907-339-6283 | Cell:

One Crew, One Journey

Honoring the values of our founders as we develop the future.

ASRC ENERGY SERVICES
Houston Contracting Company, Inc.

May 26, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

Submitted via email to: *POA.donlingoldeis@usace.army.mil*

Dear Mr. Gordon:

Thank you for providing ASRC Energy Services - Houston Contracting Company, Inc. ("AES-HCC") the opportunity to submit the following comments in response to the Donlin Gold Project Environmental Impact Statement process. This environmental review process is a matter of substantial importance to AES-HCC.

AES-HCC is a wholly-owned subsidiary of ASRC Energy Services, LLC whose parent company is Arctic Slope Regional Corporation ("ASRC"). ASRC is one of the thirteen Native regional corporations established by Congress under the terms of the Alaska Native Claims Settlement Act ("ANCSA"), Pub. L. No. 92-203, 85 Stat. 688 (1971), *as amended*.

The successful development of Donlin Mine is critically important to the ASRC family of companies and our shareholders. Under the revenue-sharing provisions of section 7(i) of ANCSA, ASRC and our shareholders, and Alaska Natives throughout the State of Alaska, will share significantly in the economic benefits of the project. By way of example, in fiscal year 2014, NANA Regional Corporation reported received $143.2 million in net proceeds from the Red Dog Mine and distributed $93.7 million to other Alaska Native Corporations, Kikiktargruk Inupiat Corporation ("KIC"), and at-large shareholders. Since 1989, NANA has paid more than $705.5 million to other regions, KIC, and at-large stakeholders under sections 7(i) and 7(j) of ANCSA. The Economic Benefits of Alaska's Mining Industry, Alaska Miners Association, Inc., January 2015, available at:

http://www.agcak.org/NewsTidbits/MiningEconomicImpactBrochure4-3-15.pdf.

LAND 1

In enacting ANCSA, Congress highlighted the need to "provide for the real economic and social needs of Natives ... with maximum participation by Natives in decisions affecting their rights and property." Alaska Native Corporations are for profit corporations, whose purpose is to provide benefits to Alaska Native shareholders. As the Ninth Circuit Court of Appeals has recognized, "Congress intended...that those Native corporations that did select land for its economic potential would be able to develop that land and to realize that potential".

ASRC ENERGY SERVICES
Houston Contracting Company, Inc.

LAND 1 Under ANCSA, Alaska Natives gave up claims to aboriginal lands in exchange for rights to select land in their traditional areas. Whereas most of Calista Corporation's lands were selected by the village corporations for subsistence resources, Calista and The Kuskokwim Corporation ("TKC") intentionally selected Donlin Creek lands for their mineral endowment and the potential to generate economic opportunities and employment in the region, together with other perceived benefits to Calista and TKC shareholders.

The Donlin project is expected to make substantial long-term contributions to the regional economy. During the projected 4-year construction period, a workforce of more than 3,000 would draw a collective annual payroll of roughly $375 million. During 27 plus years of operation, an average of approximately 900 (year-round) employees would receive a direct payroll of about $100 million per year. Additionally, an estimated $60 million of indirect and induced payroll would be generated (McDowell Group, 2012).

In closing, AES-HCC states support for Alternative 2 – "Donlin Gold's Proposed Action" of the Donlin Creek EIS to develop a goldmine in Southwest Alaska on land leased from Calista Corporation, an ANCSA corporation, as well as to develop the affiliated access road, natural gas pipeline, and other affiliated infrastructure.

Sincerely,

ASRC Energy Services – Houston Contracting Company, Inc.

Wade Blasingame
President & GM
AES-Houston Contracting Co., Inc.
3900 C St., Ste. 602
Anchorage, AK 99503

## Smith, Neal

**From:** Craig, Bill
**Sent:** Monday, April 18, 2016 2:21 PM
**To:** Smith, Neal; Bellion, Tara; Evans, Jessica
**Subject:** FW: [EXTERNAL] Resolution 16-03-69
**Attachments:** scan0194.pdf

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Monday, April 18, 2016 1:23 PM
To: Craig, Bill
Subject: FW: [EXTERNAL] Resolution 16-03-69

This is one that bounced back.

-----Original Message-----
From: Daniel Waska [mailto:atmautluaktc@gmail.com]
Sent: Friday, April 08, 2016 2:45 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Resolution 16-03-69

Good afternoon,

Here is the adopted resolution to extend the comment period as attachment.

Daniel

Atmautluak Traditional Council
P.O. Box 6568
Atmautluak, Alaska 99559
Phone: (907) 553-5610 Fax: (907) 553-5150
Email: atmautluaktc@gmail.com

RESOLUTION 16-03-69

Re: A RESOLUTION TO FORMALLY REQUEST THAT THE ARMY CORPS OF ENGINEERS (ACOE) EXTEND THE PUBLIC COMMENT PERIOD FOR THE DONLIN GOLD DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) BY A MINIMUM OF AT LEAST SIX (6) MONTHS BEYOND THE CURRENT COMMENT DEADLINE OF APRIL 30th, 2016.

WHEREAS, the Atmautluak Traditional Council is the Federal recognized Tribal Governing body for The Native Village of Atmautluak, and;
WHEREAS, the Atmautluak Traditional Council represents the interests and well-being of the Tribal members of the Native Village of Atmautluak, and;

NEP 1 WHEREAS, Atmautluak Traditional Council believes that given the immense size, complexity and breadth of the proposed Donlin Gold project, the enormity of the nature of the issues and alternatives analyzed in the DEIS coupled with the conflicting Agency conclusions on the impact to subsistence uses and users, that additional time is necessary for public review of the document to allow for meaningful public comments to the ACOE and BLM on the DEIS, and;

NEP 1 WHEREAS, a high proportion of Villages lack a hard copy of the DEIS (and even the DVD's), and many residents are not familiar enough with computers to find their way through the digital files, and;
WHEREAS, Federal Agencies are required to make efforts to provide meaningful public involvement in their NEPA process (CEQ NEPA Regulations, 40 C.F.R. SS 1501.4(b), 1506.6(b)), and;
WHEREAS, the Atmautluak Traditional Council does not feel that the current public participation efforts to-date, or scheduled prior to the April 30th deadline will meet the requirements of "providing **MEANINGFUL** public involvement", for reasons noted above, and;
WHEREAS, the proposed project has the potential to directly affect our Tribal members up and down the drainage as well as other Kuskokwim stakeholders for generations to come, if not forever;
NOW THEREFORE BE IT RESOLVED, that the Atmautluak Traditional Council is requesting that the ACOE

NEP 1 extend the public comment period for at least six (6) months beyond the current deadline of April 30th, 2016 and that the ACOE schedule additional outreach with the affected communities and Tribes during

PUB 1 this extended period for the purpose of soliciting meaningful public comments on the DEIS.

CERTIFICATION

The foregoing resolution 16-03-69 was duly adopted by the Atmautluak Traditional Council at a duly called regular council meeting by a vote of 4 for, 0 against, 0 abstaining on this 7th day of April, 2016.

Melvin Egoak – President

Moses A. Pavilla Sr. - Secretary

| | |
|---|---|
| **From:** | Curt Freeman |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Wednesday, December 02, 2015 8:49:23 AM |
| **Attachments:** | Donlin-DEIS-comments-Let1.pdf |

Mr. Gordon - attached please find my comments on the draft EIS for the Donlin Gold project, Alaska. Thank you for your consideration.

Curt Freeman, President

*Avalon Development Corp.*
*P.O. Box 80268*
*Fairbanks, AK 99708*
*Phone 907-457-5159*
*Fax 907-455-8069*
*email avalon@avalonalaska.com*
*web site Blockedwww.avalonalaska.com*

# *Avalon Development Corp.*

*P.O. Box 80268*
*Fairbanks, Alaska 99708*
*Phone: 907-457-5159*
*Fax: 907-455-8069*
*Email: avalon@avlonalaska.com*
*Web site: www.avalonalaska.com*


December 3, 2015

VIA EMAIL: POA.donlingoldeis@usace.army.mil

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
Joint Base Elmendorf-Richardson, AK, 99506-0898

Dear Mr. Gordon,

On behalf of Avalon Development Corporation I am submitting these written comments on the draft Environmental Impact Statement (DEIS) recently published as part of the permitting requirements for the proposed Donlin mine project in southwest Alaska. Please accept the following comments for public record:

1. Avalon Development Corp. is an Alaska corporations whose sole business in geological exploration and development consulting for the minerals industry. Avalon has been active in Alaska since 1985.
2. Through numerous clients, some of which still maintain mineral interests in the area, Avalon has worked extensively in southwestern Alaska and worked on the Donlin gold project in the mid-1990s.
3. My staff and I have had the opportunity to observe and consult with the Barrick Gold – NovaGold Resources JV and its predecessor, Placer Dome, operate in the area since the mid-1990s.

PUB 2

4. Donlin Gold LLC has shown itself to be a good Alaska citizen and an exemplary ambassador for the Alaska mining industry. Their efforts to keep over 50 communities in the region informed of their activities over a 20-year time frame set a new standard of excellence in our industry and our state.
5. Avalon supports approval of Alternative 2 of the DEIS because we believe it provides

the most cost-effective and environmentally sound approach to mine construction, operation and closure.

Thank you for the opportunity to supply my comments for your consideration. Please contact me if you have any questions or need further information.

Sincerely,
AVALON DEVELOPMENT CORP.

Curtis J. Freeman
President

Filename: Donlin-DEIS-Comments-Let1.docx

*AVALON DEVELOPMENT CORPORATION*
*P.O. Box 80268, Fairbanks AK 99708*
*Phone: 907-457-5159 Fax: 907-455-8069 avalon@avalonalaska.com*

Andy Baker
P.O. Box 116
Kotzebue Alaska 99752
907-223-8167 b.andy.baker@gmail.com

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RECEIVED
JUN 13 2016
AK REGULATORY

May 26, 2016

US Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

FISH 4

I am a lifelong resident of the Northwest Arctic Borough, the home of the Red Dog Mine.

I have seen the changes from before, during, and after the Mine was constructed and how current operations are faring. I saw firsthand how the streams were too dirty for fish to even swim up and how the fish are now going farther upstream and healthier than ever before.

With this knowledge I want to fully support the Donlin project and their Pipeline Project.

SER 10

I am confident that the infrastructure can be built in the most environmentally friendly way possible and the economic benefits to the region will be invaluable in a State which needs a thriving economy first and foremost.

Job training and jobs prove to ameliorate social ills in communities and bring pride to the residents therein. Combining these with the indispensable bonus of cheaper, more affordable energy makes this project vital for the people.

In my opinion, not only do I feel this project should happen but I believe it must happen for the good of the local people in addition to their ability to live in their communities and continue to live a subsistence way of life.

Respectfully submitted,

Andy Baker

Andy Baker

| | |
|---|---|
| **From:** | Randy Barnes |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Monday, April 25, 2016 11:31:29 AM |
| **Attachments:** | Donlin Gold_2016.docx |

---

See attached comments regarding the subject EIS.
Regards,

Randy Barnes

May 2, 2016

To Whom It May Concern:

SER 4 I'm am writing this letter in the hopes that the Donlin gold project becomes a reality. Alaska is at a critical juncture. Low oil prices and low reserves are devastating economies around the State. Our villages, already hurting due to a lack of jobs, will be the most negatively affected. Anyone who has spent time in rural Alaska can attest to the rampant unemployment and sky high prices our villagers face.It is critical that new sources of jobs and revenues be created and the Donlin project will do both.

Tens of millions of dollars have already been invested in the local communities and Donlin has gone above and beyond to make sure local people are involved in the planning process. Alaskans should look at the successes of other large mines in the state. From Fort Knox, Greens Creek, Red Dog, Pogo, Valdez Creek, etc., Alaska mines have gainfully employed thousands of people and have been stewards ofthe environment.

The Donlin project will employ as many as 3,000 people during construction and another 1,000 during operations. Money generated will not only fuel the local economies but help all native corporations thru revenue sharing. This money will be wisely invested and grown to take care of future generations.

A major solution to our economic woes lies literally right under our feet. Please let Alaskans responsibly develop their own natural resources and let the Donlin project move forward.

Thank you,

Randy Barnes
Alaska Resident

## Smith, Neal

**From:** Craig, Bill
**Sent:** Wednesday, April 27, 2016 12:56 PM
**To:** Bellion, Tara; Evans, Jessica; Smith, Neal
**Subject:** FW: [EXTERNAL] Written Comments
**Attachments:** Donlin1.pdf; Donlin2.pdf

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Wednesday, April 27, 2016 12:53 PM
To: Craig, Bill
Subject: FW: [EXTERNAL] Written Comments

-----Original Message-----
From: Robert Beans [mailto:rlbeans@gmail.com]
Sent: Wednesday, April 27, 2016 12:50 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Written Comments

Mr. Gordon,

Attached to this email is my written comments in support of the Donlin mine project proposed to be constructed in the upper Kuskokwim river area. I will send hard copies to you in the mail at my earliest convenience.

If you have any questions or need for me to resend this email, please contact me. Thank you for allowing me to comment in support of the project.

Robert Beans

Robert L. Beans
P.O. Box 2645
Palmer, AK 99645
Home phone: 907.746.2733
Mobile: 907.355.5088
Email: rlbeans@gmail.com

April 24, 2016

Re: Written Comments

Mr. Keith Gordon, Project Manager
U.S. army Corps of Engineers, Alaska District
COPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

My name is Robert Beans, born and raised at Mountain Village, AK, in the region formerly known as the Wade Hampton Census Area now called the Kusilivak Census Area. I am a lifelong Alaska Native (Sugpiaq/Yupiaq) currently serving as a Board member on the Calista Corporation, the regional Corporation whose service area spans the Yukon-Kuskokwim Delta and where the proposed Donlin Gold mine is situated.

In March of this year, I spoke in favor of the mine during a hearing held at Tooksook Bay, AK I am following up with written comments, still in favor of the project.

Previous to me learning mining is now done in an environmentally sound fashion, I was opposed to the project largely based on my views of how mining operated without federal and state oversight. Conducting my own review of the existing mines in Alaska, I found that they operate environmentally sound with little or no danger to fish and wildlife. I have since changed my views on mining in Alaska. On a subsequent tour of the Barrick gold mine in Elko, NV I saw first hand how environmentally sound the minerals are extracted and the reclamation of the land to near pristine condition.

SER 5

I am in favor of the Donlin mine project because of the following:

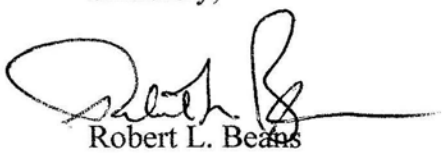
1. The jobs it will create for the shareholders of Calista Corporation. As many well know, the Kusilvak Census area is the poorest in the State and perhaps in the nation. The average household income is $10,000. Village based gainful employment is very limited and social ills are at a high.
2. Calista Corporation, as all ANCSA Native Corporations, is obligated to share its wealth with other regional corporations which have a trickle down effect to the village corporations. This helps the corporations in realizing the mandated obligation to promote the socio-economic lives of their shareholders, regionally and at local village levels.

GAS 1

3. In the proposed Donlin project, there is a plan to construct a natural gas pipeline from Cook Inlet to the mine sight for the purpose of providing the necessary and adequate energy for the entire project. The proposal estimates that, after use for the Donlin project, there would be excess natural gas from the 14" pipeline that could possibly be used for alternative electric energy by partnering with a competent electric utility. This is a peripheral benefit for the Yukon Kuskokwim region. Once an energy efficient power plant and the subsequent tie lines erected, there would be no need for diesel power, only limited to storage of the diesel fuel for emergency stand-by power. Subsequently, lower electric cost will be realized by the residents of the Yukon Kuskokwim Delta. High energy costs are a hindrance for village based economic development and small businesses. On the other hand, with the lower costs brought on by a large natural gas power plant and the tie lines, these village based economies and small businesses would thrive and be sustainable.

Thank you for the opportunity to submit these comments. If you have any questions, please feel free to contact me at the above contact information provided.

Sincerely,



Robert L. Beans

| | |
|---|---|
| **From:** | morgan beasley |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, April 26, 2016 9:32:59 AM |

Dear Army Corp of Engineers,

I am writing to comment on the Donlin Gold Project. I live in the Alaska Bush in Unit 19c, in the Kuskokwim drainage.

LAND 3 The pipeline will be an access corridor for sportsmen, but not actual infrastructure for public use. This benefits one entity first and foremost and is a risk to public land and wildlife. With such an amount of wealth in the ground, perhaps they should plan on using clean, locally generated power from wind and solar. Such an investment would also be useful infrastructure for the communities after the mine closes. Natural gas is a dying technology and by the time the mine closes will be prohibitively expensive, leaving the locals with nothing.

FISH 10 Barging fuel in that quantity up the Kuskokwim is an absolutely unacceptable risk of a public asset. Fish must last forever and the Kuskokwim is one of the few refuge rivers they have left as ocean conditions and factory farming encroach from all directions.

PAA 12 At some point the mine will cost more to clean up and maintain than the value of the gold mined. I could support a smaller, clean powered operation that permanently plugged the pit so mine drainage was not possible. Ever. That is the only standard.

BER 9 I would also expect executives and investors in this project to legally commit themselves to vast fines and prison time if there was every contamination or failure. The Donlin Mine will take risks with the freedom of generations of future Alaskans and without real, harsh consequences that are automatic, with mandatory minimum sentencing, there is no way mine owners will be motivated to hold environmental safety above profitability.

Please do not permit the Donlin Gold mine, it puts our greatest assets at risk for gold we don't need. All gold is fools gold and ultimately a curse on the future.

Thank You.

Morgan Beasley

**From:** BENSON, Brian
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold EIS comment
**Date:** Tuesday, May 31, 2016 9:58:26 AM

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Please accept this comment in support of the proposed Donlin mine project and Alternative 2

Alaska is a resource dependant state; we have few manufacturing jobs, seasonal hospitality and fishing jobs, and a declining petrochemical industry. We have extremely stringent oversight and permitting rules, but successfully manage our resources and environmental quality better than any other state in the union. This highly managed resource development results in long-term benefits to Alaskan wildlife and local urban lifestyle; but has a tendency to keep rural development minimal, and jobs and benefits (like good schools and medical availability) unavailable to Alaskans outside of major cities. It stifles growth.

SER 5

The Donlin Gold project as planned can provide well paying jobs in an area that is stagnant with very high unemployment and few opportunities for families to grow. The youth of the area must leave in order to find work. The skills learned locally in this project can be utilized in future developments in that area, and in the rest of the state. Mining can provide decades of wealth for individuals as well as the Native corporations and their shareholders--mostly in the Kuskokwim region but shared with others under the Alaska Native Claims Settlement Act.

I believe Donlin's plan will not only provide economic benefits, but can continue to protect the environment well past the initial construction phase and through the operational lifespan of the mine. The proposed pipeline in Alternative 2 is designed to minimize impacts on the Iditarod National Historic Trail; the line itself is of almost immeasurable value in increasing infrastructure into western Alaska. It's construct has been timed to have little impact on hunting or the annual dog sled races.

Up to 3,000 construction jobs in the first four years, and 600-1200 full time jobs can be created at a time where this state is heading into a recession and unemployment is growing. At the present mine life of 27.5 years, the benefits to the state are staggering. These opportunities will keep communities strong while maintaining local culture and families together.

All-in-all, I believe Donlin Gold's project shows a good understanding of Alaska's environmental issues and meets them with a strong, well grounded approach. The project can provide both prosperity for the area while protecting the environment and other resources.

Best regards,

Brian Benson
Alaska Sales Manager, Air Liquide America L. P.
6510 Arctic Spur Rd., Anchorage, AK 99518 U.S.A.

mailto:brian.benson@airliquide.com> office (907)273-9763 /cellular (907)529-8787

"It is better to be careful 100 times than to get killed once" - Mark Twain

**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline.

SVE 4

All The wild in the world is not worth a cent if there is pollution & land damage. Donlin must be held under constant light scrutiny to ensure environmental compliance and if it cuts into their profit margin well tough.

Mr. Paul C. Bentler
3315 174th Avenue Kp S
Longbranch, WA 98351-9429

SEATTLE WA 981

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U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

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BERING STRAITS
Native Corporation

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April 20, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK, 99506-0898

RE: Comments on Donlin Gold Project Draft Environmental Impact Statement

Dear Mr. Gordon:

Bering Straits Native Corporation (BSNC) appreciates the opportunity to provide input into and comments on the Draft Environmental Impact Statement (DEIS) for the Donlin Gold project. As President & CEO of BSNC, I worked with NOVAGOLD RESOURCES (NOVAGOLD) as the company explored, began development of, and ultimately closed the Rock Creek project outside Nome, Alaska. The relationship between BSNC and NOVAGOLD grew to be a strong relationship, with the company consistently fulfilling its commitments to BSNC. I believe that NOVAGOLD will act in good faith in its future dealings with the indigenous population in the Calista region, as they consistently demonstrated great respect for our culture and ways of life when we engaged with them on issues of concern to BSNC and its shareholders.

Once NOVAGOLD definitively decided not to advance the Rock Creek project in 2010, the company entered into negotiations with BSNC for the sale of the project. In addition, NOVAGOLD worked with BSNC and the Sitnasauk Native Corporation, owner of most of the surface lands at the project, to develop a revised closure plan for the project. The two-phase plan was submitted to and approved by the Alaska Department of Natural Resources (ADNR).

At its sole expense, NOVAGOLD completed Phase 1 of the plan, which involved eliminating all sources of contact water at the mine site that would require active water treatment prior to discharge and removing all remaining hazardous chemicals and fuel. The Phase 1 closure activities were completed to the full satisfaction of ADNR in October 2012 and all Phase 1 financial assurance was released. Upon completion of the Phase 1 reclamation, NOVAGOLD sold the Rock Creek project to BSNC and transferred all of the remaining financial assurance that the company had provided to ADNR to ensure completion of final closure. Through a number of consultants with mining expertise, BSNC fully explored a variety of opportunities to restart the Rock Creek project. Ultimately, BSNC decided to implement Phase 2 of the closure plan, which was completed in 2015 and fully accepted by ADNR.

Even though the Rock Creek project did not succeed as a mine, the operation did not cause environmental damage, and NOVAGOLD fulfilled all of its obligations to the State and BSNC.

BERING STRAITS
Native Corporation



Since acquiring the land and other assets of the Rock Creek project, BSNC has completed several related transactions, including land exchanges and equipment sales that have benefitted BSNC and its shareholders.

Based on my experience with NOVAGOLD, I am confident that NOVAGOLD's participation in the Donlin Gold project will benefit the Calista Corporation (Calista), The Kuskokwim Corporation, as well as their respective shareholders, descendants and non-Native residents of the region. I believe that the project will bring much needed economic development to the Calista region, and important economic benefits to Alaska Native people throughout the State because of the Section 7(i) clause of the Alaska Native Claims Settlement Act (ANCSA). Seventy percent of the project royalties received by Calista for mining on their land will be shared with the other regional corporations, including BSNC, because of the Section 7(i) provision. These benefits will help us achieve our mission of "improving the quality of life of our people through economic development while protecting our land and preserving our culture and heritage." I urge the USACE to emphasize these state-wide benefits to Alaska Native people and the shareholders, descendants, and non-Native residents of the Calista region in the FEIS, and give them important consideration in its Record of Decision.

SER 2

I commend and respect NOVAGOLD for its integrity in honoring its commitments and for its appreciation for and support of Alaska Native Corporations through its fair and transparent business dealings with BSNC. I encourage the federal and state agencies to approve the permits necessary to construct and operate the Donlin Gold project. I strongly believe that it can be developed in an environmentally and socially responsible manner, while providing meaningful economic, employment, training, and self-determination opportunities for Alaska Native and non-Native people throughout the State.

Quyaana,

Gail R. Schubert
President & CEO

4600 DeBarr Road, Suite 200 • Anchorage, Alaska 99508-3126 • 907.563.3788 • Fax 907.563.2742 • www.beringstraits.com

BERING STRAITS
Native Corporation

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Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

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**From:** Craig, Bill
**To:** Bellion, Tara; Evans, Jessica
**Subject:** FW: Donlin EIS
**Date:** Monday, March 21, 2016 1:22:04 PM
**Attachments:** BNC Resolution 2016-08.pdf

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-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Monday, March 21, 2016 12:50 PM
To: Craig, Bill
Subject: FW: Donlin EIS

DEIS comment

-----Original Message-----
From: Jimmie Nelson Jr. [mailto:Jnelson@bncak.com]
Sent: Monday, March 14, 2016 4:40 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Donlin EIS

Keith:

I have attached the Bethel Native Corporation resolution requesting a 6 month extension to the comment period of the Donlin Gold EIS. Lori Strickler, City Clerk for the City of Bethel told me to forward any resolutions to your attention. Thank you.

Jimmie Nelson, Jr.

Bethel Native Corporation | Administrative Assistant

P.O. Box 719 | Bethel, Alaska 99559

Office: (907) 543-2124 | Fax: (907) 543-2897

Blockedwww.bethelnativecorp.org

Bethel Native Corporation
RESOLUTION 2016-08

RESOLUTION REQUESTING A SIX MONTH EXTENSION TO THE OFFICIAL COMMENT PERIOD FOR THE ARMY CORPS OF ENGINEER'S ENVIRONMENTAL IMPACT STUDY ON THE DONLIN GOLD PROJECT

WHEREAS, Bethel Native Corporation is the Native village corporation for the Village of Bethel, having incorporated and organized in accordance with Section 8 of the Alaska Native Claims Settlement Act (ANCSA) as amended, 43 U.S.C. § 1601 et seq. and the laws of the state of Alaska;

WHEREAS, Bethel Native Corporation represents the cultural and economic interests of its approximately 1800 indigenous Shareholders;

WHEREAS, the Shareholders of BNC rely on their inter-relationship with the Land and the Kuskokwim River for physical, cultural, and spiritual sustenance;

WHEREAS, Donlin Gold LLC has applied for permits to develop an open pit, hardrock mine about 10 miles north of the community of Crooked Creek, in southwest Alaska;

WHEREAS, Donlin Gold's proposed mine is located approximately 145 miles upriver of Bethel and therefore will affect the Shareholders of BNC;

WHEREAS, in addition to the mine site, the project has two other major components: transportation infrastructure and pipeline infrastructure;

WHEREAS, the project contemplates a new Bethel Yard Dock to be built in Bethel that appears to extend well into the Kuskokwim River 150 feet and has the potential to cause life-safety and obstruction concerns as well as unknown hydrologic impacts to the surrounding areas upriver and downriver;

WHEREAS, the transportation infrastructure includes barges that will dock within the City of Bethel and transportation barges will utilize the waterways of the Kuskokwim River for transportation of supplies, equipment and toxic materials for the project that will impact many corporation shareholders, corporate lands and impact local business operations;

WHEREAS, the construction of and planned lifetime of the mine lasts for the next 30 plus years;

WHEREAS, monitoring of the tailings and the area around the mine will be required for perpetuity;

WHEREAS, the project will undoubtedly affect the residents of Bethel and the surrounding villages, and areas along the Kuskokwim river for decades and possibly centuries to come;

WHEREAS, the Army Corps of Engineers Environmental Impact Study (EIS) was released on November 27, 2015;

WHEREAS, the EIS itself totals over 5,300 pages and has taken Donlin and its consultants many years to collect and disseminate data and perform scientific and economic impact analysis related to proposed activities;

WHEREAS, in addition to the sheer volume of the EIS, the report itself includes numerous technical and engineering terms that require additional research and investigation by the average reader;

WHEREAS, currently the comment period for the EIS is essentially five months and is slated to end on April 30, 2016;

WHEREAS, the magnitude of the proposed project and its impacts on subsistence activities, the environment, economic development, job creation and other such concerns make it extremely important that the comment period be open for as long as necessary to allow a thorough understanding and thoughtful comment time period that is not rushed;

WHEREAS, it is essential that all citizens, Alaska Native Corporations, tribal entities, governmental bodies, and agencies have an adequate amount of time to read, review, digest and form thoughtful comments regarding the EIS report on this project.

WHEREAS, it would be prudent for the Corps of Engineers to allow sufficient time for all affected parties to review, disseminate, comprehend, validate, and otherwise exercise proper due-diligence in an effort to protect the environment, and to assess the economic impacts, cultural impacts, and the impacts to the general health and welfare to individuals and communities directly and indirectly affected by the proposed project identified in the EIS;

NEP 1

NOW THEREFORE BE IT RESOLVED that the Bethel Native Corporation Board of Directors does hereby formally request an extension of at least six (6) months and at least one more public comment meeting in Bethel, with for the public to offer comment on the Army Corps of Engineers' Donlin Gold Environmental Impact Study.

ADOPTED AND DATED this 18th day of February 2016, in Bethel, Alaska, by a vote of 9 for, 0 against, and 0 not voting.

## CERTIFICATE

The undersigned, Donna Lindsey, Secretary of Bethel Native Corporation, an Alaskan Corporation, does hereby certify that a meeting of the Board of Directors of said Corporation duly called and held on the 18th day of February, 2016, at which a quorum was at all times present and voting, the foregoing Resolution was duly adopted.

By: _____
Lyman Hoffman, Chairman

Attest: _____
Donna Lindsey, Secretary

**From:** Aaron O"Quinn
**To:** donlingoldeis, POA
**Cc:** Tom Kennedy; Phil Blumstein
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Tuesday, May 31, 2016 4:43:54 PM
**Attachments:** 40T3762-Final Comment Letter to USACE from BNC regarding Donlin DEIS.PDF

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To Whom It May Concern:

Attached, please find Bethel Native Corporation's comments to the Donlin Gold Project Draft EIS.

Sincerely,

Aaron O'Quinn


LANDYE BENNETT BLUMSTEIN LLP
ATTORNEYS

Aaron O'Quinn | Associate

aarono@lbblawyers.com

Suite 1200
701 West 8th Avenue
Anchorage, Alaska 99501

907.276.5152 (w)
907.868.9220 (d)
907.276.8433 (f)



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LANDYE BENNETT BLUMSTEIN LLP
ATTORNEYS

PHILIP BLUMSTEIN, ESQ.
philb@lbblawyers.com
Direct Dial: 907.868.9217

May 31, 2016

Via Email: POA.donlingoldeis@usace.army.mil

Department of the Army
Alaska District, U.S. Army Corp of Engineers
Regulatory Division
Attn: Keith Gordon, Project Manager
Post Office Box 6898
JBER, Alaska 99506-0898

Re: Donlin Gold Project Draft Environmental Impact Statement ("DEIS")

Dear Mr. Gordon:

We are submitting these comments on the above-referenced DEIS for the proposed Donlin Gold Project (the "Project") on behalf of Bethel Native Corporation ("BNC"), the Alaska Native village corporation for the Bethel area, established pursuant to the Alaska Native Claims Settlement Act of 1971, as amended ("ANCSA"). BNC has over 1800 shareholders, sixty percent of whom reside in the Bethel, Alaska area. They work in the area and rely on the Kuskokwim River in some capacity in nearly all facets of their daily lives. Their lives and the business interests of BNC will be directly impacted by the Project.

G2G 1

Since the publication of the Notice of Intent to prepare an Environmental Impact Statement ("EIS") in December of 2012, BNC struggled to be meaningfully heard by the U.S. Army Corps of Engineers ("USACE"), especially in relation to the impacts that BNC will directly experience as a result of planned barging operations on the Kuskokwim River and at the Donlin Gold Bethel Port. These issues are of utmost importance to the corporation and its shareholders, and as an Alaska Native Corporation ("ANC"), BNC is legally entitled to consultation with the USACE on a government-to-government basis prior to decisions being made on the Project to ensure that BNC has an effective voice in project planning.

NEP 1

The allotted time for public comment does not give the most impacted project stakeholders adequate time to review and understand the DEIS. The document itself is thousands of pages long, technical problems plagued the publication website, which prevented BNC from ready access to the most detailed and in-depth technical materials for a large portion of the comment period. Problems accessing the DEIS materials were undoubtedly much worse in rural Alaska where communications infrastructure is less developed or, in some cases, completely lacking. Without meaningful access to the DEIS for significant portions of the

NEP 1 comment period, the cities, village councils, village corporations and individual stakeholders have not had a legally sufficient opportunity to review the DEIS. On February 9, 2016, the City of Bethel passed a resolution highlighting the breadth of the DEIS and the magnitude and potential impact of the Project on the region requesting an additional six month time period to review the DEIS. BNC's Board has passed a similar resolution. The 30-day extension of the comment deadline is inadequate given the seriousness of the technical problems, the volume of information presented and the unprecedented scope of the Project. BNC renews its request to extend the deadline for initial public comments until no earlier than October 31, 2016.

The DEIS ignores many of the concerns BNC raised during the scoping process, and others are barely analyzed. It is for these reasons and others that BNC submits these comments in opposition to the DEIS in its current form.

TRAN 2 Specifically, the DEIS inadequately analyzes the direct effects the proposed port in Bethel will have. Bethel is the center of the region. During barging season Bethel is the commercial and transportation hub for nearly all of the villages of the Yukon-Kuskokwim region. Most goods, fuel, and freight bound for households in the region are distributed from Bethel. As the DEIS points out, the shipping season on the Kuskokwim River is short and disruptions to traffic on the river or at the Bethel Port distribution site lead to costly shipping delays. It is therefore critical that the DEIS analyze the impacts the Project will have in Bethel, as required by law.

The importance of a thorough and complete environmental analysis for this region is paramount. The historic legacy of mining in the Kuskokwim River basin is everywhere. The cleanup of the mine at Red Devil and other sites has become a great expense to our government and has left the Kuskokwim River and its food chain with unacceptable heavy metal pollution. The Project could prove transformative to the region, bringing with it new jobs, population growth, and wealth, but these failed legacy mining projects highlight the need for the most comprehensive review of all Project elements. This Project will undoubtedly affect subsistence lifestyles, patterns of energy use, and transportation. Increased barge traffic and activity at the Bethel Port will greatly affect these components of BNC's shareholders' lives. Questions about these direct impacts to shareholders' way of life are the impetus for our concerns and review of the DEIS reveals that BNC remains in the dark as to how it and its shareholders will be affected.

SUB 1

NEP 6 The DEIS fails to conform to legal requirements. Specifically, the DEIS inappropriately segments the Project. Environmental analysis of known, definite portions of the Project, namely the transportation facilities at Bethel, has been segmented and treated as if their occurrence is merely a possibility when, in fact, they are most likely the first components of the Project to be constructed. The DEIS fails to adequately state the cumulative impacts of the

Project and fails to analyze direct impacts relating to the proposed expanded Bethel Port facilities, the new fuel tank farm in Bethel, and the increase of ocean-going and river barges staging within the City of Bethel and traversing 199 miles of the Kuskokwim River from the Donlin Gold Bethel Port to Crooked Creek and an additional segment from Bethel to the Bering Sea.

NEP 6

**The DEIS Improperly Segmented and Failed to Take a Hard Look at all Components of the Project and Failed to Consider Less Harmful Alternatives**

The USACE's treatment of the Bethel facilities has been problematic from the beginning. In April of 2014, BNC commented on USACE permit application POA-2014-64: a bulkhead permit on the Kuskokwim River at Bethel. The application contained detailed design specifications, but stated its purpose and need as only "to improve efficiency and safety on cargo barge operations at the Knik Construction Yard." BNC's comments expressed skepticism that the purported scope of that project was genuine, as the dock depicted in the application matched the exact specifications of the dock proposed in the Project's transportation plan scoping documents. As a direct result of BNC's input, this permit application was shelved.

The problematic treatment of the Bethel facilities continues in the DEIS. Instead of reviewing them as direct effects of the Project, the USACE instead mischaracterizes the facilities as "indirect effects." The USACE has, once again, illegally segmented the Bethel facilities from the Project as a whole and conducted only a minimal level of environmental analysis in doing so. This is misleading to the public and antithetical to the mandate of NEPA, which requires a hard look at environmental effects of proposed actions.

NEP 6

Purportedly, because a third party "would determine what amount of additional storage space and waterfront structures, if any, would be required" and "would be responsible for applying for and obtaining any permits that may be required" the USACE is justified in this "indirect effect" characterization. There is no rationale to the assertion that involvement of a third party designer/operator of the Donlin Gold Bethel Port facilities in some way renders these Project components "indirect." The Donlin Gold Bethel Port facility and Tank Farm are not "indirect effects" of the Project, rather they are actual, integral components of the Project.

Just as the Project would be unable to operate without the supply of energy from its proposed natural gas line, the Project would similarly be unable to operate without the Bethel facilities, nor would its construction be possible in the first place. All materials, with the exception of natural gas, imported and exported to and from the mine pass through the Donlin Gold Bethel Port. The projects in Bethel are wholly unnecessary without the Project upriver, they are already planned and the plans were prepared at Donlin's request. These particular

components also have the potential to affect the greatest number of stakeholders throughout the life of the Project due to the increase in barge traffic they will both facilitate and their location in the population center of the region. As such, a "hard look" at their consequences is particularly important. The USACE has no rational or legal basis to avoid analyzing these components in greater detail.

NEP 6

The USACE has all of the information it needs to perform a detailed analysis regardless of how it chose to characterize the Bethel facilities and still, it prepared a legally deficient analysis. The USACE is well-aware of the Bethel facilities design features. Detailed plans for the facilities were revealed in the POA-2014-64 permit application. These detailed plans made their way into graphics found in the transportation plan of the Project application, and the DEIS contains detailed discussions of the Bethel Port facility and Tank Farm and how they are to operate, including cargo volumes, barge trips, and barge berthing. Notably absent from the DEIS are detailed schematics and barge traffic analyses for the Bethel Port similar to those submitted for the upriver dock facilities at the Jungjuk Port site. Construction is apparently already underway for the Donlin Gold Bethel Port, yet the USACE and Donlin have not presented or analyzed the impacts of this project component with the requisite level of detail as they have for the upriver components, though this component is as necessary as any of those.

Despite having such detailed information at its fingertips, these mischaracterized "indirect effects" of the Bethel Port in the DEIS are given cursory treatment by the USACE with their analysis completely want for technical details. Such a basic level of analysis of project components that are essential to the success of the Project simply cannot be meaningfully analyzed by the commenting public at large, much less by BNC or its shareholders. This oversimplified environmental review will undoubtedly lead to a segmented environmental analysis of the Project. By analyzing these components as indirect effects today and later conducting an environment analysis of them as discrete projects when their permits are applied for amounts to illegal segmentation of their environmental impacts and deceives the commenting public of the true scope of the expected environmental consequences of the Project as a whole, a practice prohibited by NEPA.

BNC does not oppose the Project, recognizing its potential as an economic accelerator in the region. However, certain substantive analyses of the Donlin Gold Bethel Port fail to comprehensively analyze and quantify the impacts the Bethel facilities will have on the Public.

NEP 6

For instance, the DEIS states that the creation of "three beneficial acres of new ground . . . would be localized and beneficial . . . useful for community and industrial purposes." (DEIS 3.7-71). Such glib assurances do little to explain how the community would benefit from an exclusive, highly industrialized and private port facility, which will undoubtedly make sweeping changes to the area's long-term geomorphology and sediment deposition processes.

HZM 6

Work at the Donlin Gold Bethel Port, including fill activities with existing terrestrial soils, has the potential to disturb existing known and unknown environmental hazards that exist at the proposed site. The DEIS contains discussion that there are multiple known hazard sites at the Donlin Gold Bethel Port and Tank Farm, but only superficial assurances that "distance, hydraulic gradients, and/or presence of permafrost" render these hazards benign. (DEIS 3.2-130). The possibility of renewed environmental or health hazards from existing sites disturbed by construction activities is an impact that the public has a right to know about and the Project proponent a moral obligation to disclose. Where are these sites and what activities are planned in their vicinity? Moreover, there is no meaningful discussion of how distance, hydraulic gradient and (melting) permafrost removes them as risks to the public.

BARG 10

Absent from the DEIS is a technical discussion of the impacts which the Donlin Gold Bethel Port location and design will have on sediment deposition in the bed of the Kuskokwim River at Bethel and the adjacent areas. The river is a common resource and a transportation corridor used by all residents of the region in one way or another. Alteration of such a significant length of shoreline (nearly one-fifth of a mile) at a navigationally challenging bend in the river will most certainly lead to altered deposition patterns of sediments and gravel. As a corporate citizen reliant on the river for its own prosperity, BNC expects a revised DEIS to include additional information from a reliable third party, which analyzes the impacts the sheet pile dock and resulting altered river flow has on sediment deposition in the vicinity of the dock. This information is critical to inform the public of additional costs and upkeep requirements to the public navigation channel resulting from Donlin's proposal and is especially important for BNC's shareholders, many of whom utilize adjacent waters for subsistence activities and will be greatly affected by altered flow of the river.

PAA 49

Moreover, the USACE failed to look at less harmful alternatives in Bethel. Other land in Bethel that is suitable for the Project's needs and available to Donlin on commercially reasonable terms could be economically developed as a port without the major negative environmental impacts a revised DEIS will likely reveal with the current site. The DEIS's summary elimination of this alternative because of "increased environmental impacts" does not hold water. The expansion of the current facilities will concentrate activity at a choke point and push out existing users, leading to increased environmental impacts of its own, the magnitude of which the DEIS fails to quantify. Failure to seriously consider alternative sites for this critical facility is arbitrary and capricious. Only after USACE takes a hard look at these project components and their alternatives and publishes those findings can the people of the region truly understand what effect this Project will have on their lives and on the environment upon which those lives depend. The USACE is required to assess the effects of the Project and those of various alternatives, not advance the commercial interests of the project sponsor.

TRAN 2

Because these facilities are integral to the Project, certain to be built, and envisioned with finality, the USACE is compelled by law to analyze them in the same way it analyzed other project components. The USACE must perform additional environmental analyses on these proposed Bethel facilities that fully account for all of the facilities' effects on the environment. Especially critical in this analysis is their interface with the Kuskokwim River. The public must know how barges will be maneuvered through the city, how river traffic will be managed, and how these planned operations and altered river flow affect subsistence, recreation, the costs of goods, and the villages' access to their own barged supplies.

SER 17

The DEIS must analyze, in the Bethel area, the socioeconomic effects the facilities will have on the population of the City of Bethel including local job creation or transient worker populations flown in to operate them. These integral components must be analyzed with the same level of care and detail as that which was conducted for other components of the transportation system, including the haul road and the Angyaruaq Port site.

**The DEIS Fails to Comply with the Congressional Mandate to Consult with Alaska Native Corporations**

The USACE failed to comply with the statutory requirement that all Federal agencies consult with ANCs. PL 108-199 section 161 and PL 108-447 section 518 require the USACE to consult with ANCs on the same basis as Indian tribes under Executive Order No. 13175. The Department of Defense's own policy documents require this.[1]

USACE consulted with Federally-recognized Alaska Native villages under this mandate. However, it failed to conduct required consultation with any of the ANCs affected by the Project. Congress has unequivocally required this. The DEIS should be withdrawn and reissued only after legally required consultation with ANCs is complete.

LEG 2

The CEQ encourages Alaska Natives to participate as cooperating agencies with the lead agency in drafting the EIS and the CEQ regulations require the lead agency to consult with Natives early in the NEPA process. Indeed, many Native villages availed themselves of these consultation arrangements and several participated at a high level as Cooperating Agencies. However, ANCs were not consulted at all, let alone early in the NEPA process.

[1] *See* Note (a) to the Preamble to the American Indian and Alaska Native Policy and Department of Defense Instruction Number 4710.02: DoD Interactions with Federally-Recognized Tribes. *See also* Wyoming v. United States Dep't of the Interior, 136 F. Supp. 3d 1317, 1346 (D. Wyo. 2015) (Failure to follow agency policies and procedures regarding the duty to consult with tribal entities is arbitrary and capricious).

BNC is the ANC for Bethel, the transportation and logistical hub for the Project. BNC owns 230,506 acres in and around the City and represents 1800 shareholders, 1200 of them live and subsist in and around the City. It would be difficult to find a source of traditional ecological knowledge that is more comprehensive. BNC's shareholders and their ancestors have occupied the lands of the Bethel area for millennia and are familiar with its plants, fish, and terrestrial animals. Moreover, as users of the river and port area themselves, they bring first-hand knowledge to the analysis of environmental impacts of increased barge traffic and port activities on their lives as well as the ecology of the area. BNC could serve as an information clearinghouse – able to contact and engage shareholders directly and efficiently. Moreover, as a for-profit corporation, BNC has the means and resources to staff and commit as a Cooperating Agency. Undoubtedly, other ANCs in the region can provide similar input.

LEG 2

The USACE failed to comply with its legal mandates by not engaging with ANCs on a government-to-government basis. This failure leaves the DEIS legally deficient and the USACE must retool the consultation component of the DEIS and allow full public review and comment before it may move on to the next step in the environmental review process. It must fully consult with ALL of the Alaska Natives in the Project area, including the ANCs.

**The DEIS is Incomplete: ANILCA §810 Process Has Not Been Finalized**

ANILCA §810 requires Federal land management agencies to assess proposed actions for impacts on subsistence resources within the entire Project. In the case of the Project, BLM conducted this analysis and found that subsistence uses will be significantly impacted by the transportation infrastructure, the pipeline, and the mine site. The BLM indicated that they will consult with the affected communities and publish their findings and public input in the Final EIS.

BNC objects to this sequence: it is contrary to NEPA procedures. The purpose of a DEIS is to allow the public to comment and the agency to integrate those comments into its analysis before the FEIS is released. By the proposed process, the public will be denied this opportunity. The ANILCA §810 analysis in the FEIS will look markedly different from the §810 analysis prepared for the DEIS. The BLM is set to hold hearings in at least 20 different communities as well as present its findings to the applicable §805 subsistence boards. The comments received at these meetings and from the boards will no doubt yield insightful information. Subsistence uses are of paramount importance to shareholders and other members of their communities and the region at large. The final §810 findings will provide meaningful information, information that is relatable to non-scientists and aggregated from those individuals dependent on subsistence as a way of life. By withholding this information from release until the FEIS stage of the process, the USACE and BLM are short circuiting the public involvement process and have published the current DEIS before it was legally complete. As

NEP 6

NEP 6 such, the USACE and BLM must complete the notice and hearings required under ANILCA §810, aggregate the public commentary they receive and republish the completed DEIS with these findings to allow the public to fully understand the scope of the Project and its effects.

NEP 6 In conclusion, BNC requests that the USACE resolve the issues and correct the legal deficiencies described above, and republish the DEIS providing a reasonable comment period sufficient for meaningful review given the volume of information and importance of issues at stake. As it stands, the DEIS lacks key analysis of the direct effects of necessary components, information is absent because USACE did not fulfill legal obligations to consult with impacted ANCs, and was published without the required public input related to the Project's admitted significant restrictions on subsistence activities. BNC appreciates the opportunity to comment.

Very truly yours,

LANDYE BENNETT BLUMSTEIN LLP

Philip Blumstein

cc: Bethel Native Corporation

From: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Sent: Thursday, February 25, 2016 7:04 AM
To: Craig, Bill
Subject: FW: Donlin Gold Draft EIS comment

-----Original Message-----
From: Betts, Derek [mailto:Derek.Betts@gcinc.com]
Sent: Wednesday, February 24, 2016 11:59 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

RE: Donlin Gold Draft EIS

To Whom it May Concern:

SER 5

I am sending this in support of the Donlin Gold Project. This project is an exciting opportunity for the residents of Alaska and the residents in the local area of the Project. It will provide numerous benefits to the State, the Region, the economy, the Alaska Natives and importantly, improved transportation and communication infrastructure in support of the mine, including ports, possibly pipeline facilities, and can provide better services and lower cost of energy, goods and services to the local residents in the area.

Derek Betts, Alaska resident

**From:** Steve Bills
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Thursday, April 21, 2016 9:47:17 AM

---

To who it may concern,

Please support Alternative 2, Donlin Gold s proposed project. Lack of development will have a negative social and economic impact on the Yukon Kuskokwim region, particularly as the Alaska economy retracts.

Rural Alaska is being impacted most by the reduction of state and federal dollars. Alternative 1 (the no project alternative) would have a negative impact on the region, and all of Alaska.

1. 3,000 construction jobs for 4 years and between 600 to 1,200 jobs for the 27.5Kyear estimated life of mine, will have a significant and positive impact on the economy of the region and the state.

2. The jobs and the economic benefits provided by Donlin Gold would help sustain communities in the Yukon Kuskokwim region and fund traditional subsistence activities.

3. New, high paying jobs will allow more residents to remain in the region and finance the purchase of supplies needed to maintain their traditional way of life for generations to come.

GAS 1

4. The proposed natural gas pipeline will have excess capacity should there be an interest in accessing natural gas to address the energy needs of the region.

Thank You

Steve Bills
General Manager
TonaTec Exploration
801 446 2400 Office
801 310 1628 Cell
801 489 9552 Fax
steve@tonatec.com
www.tonatec.com

CONFIDENTIALITY NOTICE:
This message (including any attachments) is intended for the sole use of the individual to whom it is addressed, and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If you are not the addressee, you are hereby notified that you may not use, copy, disclose, or distribute to anyone the message or any information contained in the message. If you have received this message in error, please immediately advise the sender by reply email and delete this message.

| | |
|---|---|
| **From:** | John Binkley |
| **To:** | donlingoldeis, POA |
| **Cc:** | John Binkley |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, May 31, 2016 4:17:47 PM |
| **Attachments:** | image00001.png<br>image002.png<br>image003.png |

---

John Binkley has shared a OneDrive file with you. To view it, click the link below.

Donlin EIS comments.docx

Please find our comments on the Donlin Creek EIS attached and below. Thanks you. John and Judy Binkley.

**John and Judy Binkley**
5325 Chena Small Tracts Rd – Fairbanks – AK – 99709

Keith Gordon
U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
Joint Base Elmendorf Richardson, AK 99506-0898

Mr. Gordon,

Thank you for the opportunity to comment on the proposed Donlin Gold draft environmental impact statement.

My wife and I have a significant history in the Yukon Kuskokwim (YK) region. In 1977 we built and operated a tug and barge business on the (YK) Rivers and coastwise on the YK Delta.

Our barge business generally served the people of the YK Delta and specifically, the Kuskokwim River from its mouth, past Crooked Creek, McGrath and Nikolai; even up to Telida on occasion. We employed local residence to run various tugs and barges, delivering fuel, freight, gravel and supplies along the river. Over the years we had as many as five sets of tugs and barges per day operating on the Kuskokwim River between May and October. We worked with local fishermen to make certain the tugs and barges were not disruptive to the salmon runs or interfered with commercial or subsistence fishing activities. I believe the Kuskokwim River can handle additional barge traffic as it is one of the widest and longest rivers in the state of Alaska, allowing both barging and subsistence fishing to co-exist.
During our time barging, my wife and I saw first-hand how job opportunities can significantly improve the quality of life in the YK region. The people we worked with were highly motivated, skilled at river work and hard working. They looked forward to productive summer days on the river and found joy in providing for their families.

I believe that if the Donlin Gold project moves forward, we will see the same effects in the region on a much larger scale, with an estimated 3,000 jobs created during the construction phase of the project, which is anticipated to last three to four years. As it moves forward into the 27-year operation phase, 600 to 1,200 high-paying, full-time jobs will exist because of the Donlin Gold mine.

With more jobs, we can expect to see an abundance of benefits. More young people will have the opportunity to remain in the region and preserve its long cultural history. With high-paying jobs the people of the YK region will also have a steady source of income, allowing them to pay for expenses that help support a subsistence way of life. Hunting and trapping supplies, transportation, gas and heating fuel all require cash. Being able to independently provide for themselves and their family will give

people a sense of purpose and fulfillment, improving the quality of life.

SER 18

Additionally, families battle the crippling cost of living in Western Alaska, the proposed natural gas pipeline from tidewater to the region will serve as an opportunity for reasonable energy prices. With steady careers and a reduced cost of living, the financial burden that rests on the shoulders of the YK residents will be lightened.

Our first-hand experience of how more jobs can benefit the YK region did not stop with my work in the barge business. After moving from the Yukon River 1979, Bethel was our home for the next 11 years. During those years, I had the privilege of serving on the Bethel City Council, in the Alaska House of Representatives and the Alaska State Senate. My Senate District included 74 villages from the Canadian border to the Bering Sea.

As an elected official, I had the responsibility to find opportunities that could ultimately improve the quality of life in the YK region. Additionally, I served as chairman of a special committee aimed at giving local communities more law enforcement tools to combat the devastation of alcohol abuse.

To learn what tools would be most beneficial to the YK residents, we held 18 hearings on the issue. During this time, I listened to gripping testimony from scores of people on countless tragedies resulting from alcohol abuse.

I will never forget our first hearing in Aniak and one of the first people, an elder who testified, offered that; “the solution to the health and social problems related to alcohol abuse were not in additional laws…but for people to have meaningful jobs”. He further stated that “the self-worth found in supporting one’s family through a job is far more effective than any law banning alcohol consumption” (paraphrased).

I also sat on a Senate Special Committee on suicide prevention, where we heard testimony in a number of Alaska villages. People poured their hearts out to us in an attempt to make sense of the devastation that takes place in a community when someone takes their own life.

Out of all the information I have learned about laws, social programs and our desire to do well, the first testimony in Aniak was the most poignant. **Allowing people to earn the self-respect that comes with a job to provide for their family, is the most meaningful solution for allowing people to find the right path**.

After managing the barge business, serving multiple leadership roles in the YK region and listening to testimony from so many local people, I believe I have some insight into the benefits of new job opportunities in the YK region and how that can improve people's quality of life.

SER 10

I believe Donlin Gold will bring these opportunities to the YK region with their demonstrated commitment to local hire and their insistence on a drug and alcohol-free work place. Residents will have the motivation to give up dangerous vices, which could lead to fewer drug and alcohol related deaths. With fewer deaths in the YK region, we could experience a brighter future for an area tormented by tragedies, financial turmoil and broken dreams. The Donlin Gold project has the potential to be a bright light for the YK people.

The people we worked with in the YK region are some of the hardest working, most productive, responsible and caring people I have ever had the pleasure of knowing, and they will embrace the new opportunities that Donlin Gold will bring. Please allow them the opportunity to prosper and to thrive.

Thank you.  John and Judy Binkley.

| | |
|---|---|
| **From:** | Michelle Toohey |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, May 31, 2016 11:41:30 AM |
| **Attachments:** | Dotlin Project.pdf |

Please see attached public comment letter on the Donlin Gold Draft EIS. mt

--
Michelle Toohey
907-229-7855

birchridgegolf@msn.com
(907) 262-5270
www.birchridgegolf.com

BIRCH RIDGE
Soldotna Alaska
GOLF COURSE
Inc.

P.O.Box 828
Soldotna, AK 99669
42223 Sterling Hwy.

May 25, 2106

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

Dear Mr. Gordon,

My wife and I own a golf course in Soldotna, Alaska. We have four children who still live and work here and 13 grandchildren, most of who reside here as well. We have one son and two son-in laws who work for the oil and gas industry. One son-in-law who is the Government Affairs Manager for Shell Alaska is one of over 400 employees left here after the company's announcement it was ceasing exploration in Alaska. This is a scary time for Alaskans who are looking for any and all opportunities for economic development. The Donlin Gold Mine Project in the Yukon-Kuskokwim region of Alaska represents a huge opportunity and we are happy to write in support of the project and the Draft EIS currently under review.

The company has spent over two decades in the region building the project, working with villagers to address their needs, and through state of the art technology to protect the environment. The company has kept the region's pristine land, fish and game first of mind as the project advances with grave concern for the residents' subsistence way of living.

SER 18

The Y-K is one of the poorest regions of the state and its remote location only exacerbates the problem. The projects inclusion of infrastructure, such as the natural gas pipeline could be used to bring cheaper energy to the region. That and the hundreds of good paying jobs that will offer new skillsets, can make a huge difference to the region's economy. We cannot afford to pass up the thousands of good paying jobs the project will bring.

The people in the region have worked with the companies involved in the project for years and years. In that time, Donlin Gold has held many meetings with shareholders, has listened to their concerns and has made substantial changes to the project as a result.

birchridgegolf@msn.com
(907) 262-5270
www.birchridgegolf.com

BIRCH RIDGE
Soldotna Alaska
GOLF COURSE
Inc.

P.O.Box 828
Soldotna, AK 99669
42223 Sterling Hwy.

This project has been too long in coming and represents a huge boon to Alaska's economy. Now is the time to move forward with the Donlin Gold Mine Project for the benefit of our people. Your consideration is appreciated.

Sincerely,

Pat Cowan Myrna Cowan

Pat and Myrna Cowan

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April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15

Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

IDIT 1

Donlin Gold has also demonstrated a notable commitment to the environment. Donlin has 16+ years of extensive studies focused on creating an environmentally and socially responsible project; and has purposefully designed its project to reduce the overall footprint of the mine and diminish any social impacts it may have on the YK region. Proposals such as building a natural gas pipeline have been developed in an effort to minimize barge traffic on the Kuskokwim River. Furthermore, a specific route for the pipeline has been selected to minimize disturbance to known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

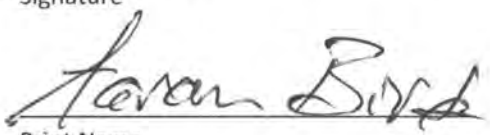
LAND 1

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Signature



Print Name

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April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15 Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

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IDIT 1 known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims

LAND 1 Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Benjamin Birch
Taiga Mining Company, Inc.
Anchorage, Alaska
(907) 301-4797

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May 24, 2016

Jerry Birch
PO Box 92376
Anchorage, AK 99509

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

RE: Comments on Donlin Gold Project

Dear Sirs:

I support alternative 2

SER 4 I worked in Southwest Alaska in the Nyac region for 12 years. As a result of that experience I observed firsthand the economic hardship and lack of opportunity for the people in Southwest Alaska. As Alaska's economy continues to decline with declining oil price and production, Donlin Gold adds bright new opportunity for economic opportunity for the people of Southwest Alaska.

The Donlin Gold project will provide 3000 jobs in direct employment during the construction phase estimated to last 4 years. Then it is estimated to provide 600-1200 jobs during estimated 27.5-year life of the mine. The jobs and economic benefits created by Donlin would help communities of the region

SER 11 sustain and fund traditional subsistence activities. And the life of a mine always seems to grow during the mining period as the mine operator gathers more information and gets a better understanding of the mine reserves. Another added benefit for the people of the region is that the job skills and training

SER 13 will train the workforce for futures jobs beyond the life of the mine.

SER 18 An incredible amount of capital investment will be made to improve the transportation and communications infrastructure to develop and support the mine. This includes port and pipeline facilities, will add an asset to the region that will provide better services and lower costs of energy, goods, and services to local residents in the region.

SVE 1 This economic opportunity is not a tradeoff with the environment. Donlin has done extensive environmental and engineering studies in designing their mine plan. They put extra effort in a design to reduce the overall footprint of the mine and allow for safe water management during the mine life and post closure. After initial concerns about the amount of diesel that would have to be barged on the river, they came up with a proposal for a natural gas pipeline that would not only reduce the amount of diesel that would have to be brought in, but would also reduce air emissions. Donlin is the first large mine in Alaska that is going to use a synthetic liner under the entire tailings impoundment and is planning a dry cloture of the tailings storage facility at the end of the mine life. Donlin will construct an active water treatment plant to ensure it meets water quality standards and employ state of the art

SVE 1

mercury emissions controls to ensure it is below air quality standards. No shortcuts have been made in their mine plan. Donlin Gold has been transparent discussing the project plans with the people of the region holding numerous meeting in local villages and distributing materials in the Yup'ik language.

NSB 1

Every detail and concern of the project has been discussed openly by Donlin Gold and the comments have been used to adjust their plans to make a better plan. I have been working in Alaska since 1979 and most of my work is in rural Alaska. I've seen the struggles of rural Alaska and the lack of opportunity and what other resource development opportunities have done in other areas of the State. I have also reviewed and commented on some of the plans for other projects. Donlin Gold has gone above and beyond what I have ever seen done in transparency, community outreach, environmental planning, social planning, and cultural planning to promote their project. I very highly support Alternative 2.

Regards,

Jerry Birch

## Smith, Neal

**From:** Steve Borell <sborell@alaska.net>
**Sent:** Tuesday, April 26, 2016 7:01 PM
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin DEIS comment letter
**Attachments:** Corps - Donlin Gold DEIS comment letter 4-26-16.pdf

Mr. Keith Gordon, Project Manager
Alaska District CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK, 99506-0898

Attached please find my comment letter on the Donlin DEIS.

Sincerely,

Steve Borell

**Borell Consulting Services LLC**
6420 Rockridge Drive
Anchorage, AK 99516
907-230-7580

April 26, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineer
Alaska District CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK, 99506-0898

POA.donlingoldeis@usace.army.mil

RE: Donlin Gold DEIS

Dear Mr Gordon,

I support Alternative 2 for the Donlin Gold DEIS. There are however two areas where the DEIS is deficient, specifically where it addresses the impacts on the affected communities.

SER 13 The DEIS does not effectively address the benefits to the local communities, and to all of Alaska communities where the workers will reside. Each employee at Donlin will go through initial training which will include safety and first aid. The safety training will cover basic worker safety such as personal protective equipment, workplace inspections, proper use of tools, proper use of ladders, proper lifting procedures, how to block mobile equipment when not in use, etc. Each job will also have specific training related to that specific job.

Every employee will also receive basic First Aid training. This will include not just the production employees but every person working at the minesite, port, road, airfield, etc. Several dozen employees will go further and receive several months of training to become EMT certified. For each shift there will be several EMTs on the minesite at all times.

The result of this training is that the communities where the employees live will greatly benefit. When the workers are at home they will have these safety and first aid skills to help their families and neighbors. They will be safer and they will help educate everyone around them how to work and play safer and when accidents does occur, they will have the first aid skills immediately available.

The above benefits have already been observed during the exploration phase at Donlin. A safety culture has already developed among what thus far have been temporary employees. This safety culture will only improve as the mine begins operating.

SER 13 The second deficiency in the DEIS relates to the future opportunities that will be open to persons that are working at Donlin. Working at Donlin will open new opportunities and new horizons for many people who for all their lives have been without hope. The experience they gain at Donlin will allow these employees to take those skills anywhere in the world that has mining or other jobs needing those skills. This benefit has been observed for the people that have worked at Red Dog.

I urge that the above points be incorporated into the FEIS and that the FEIS and Record of Decision be completed at the earliest possible time that will ensure a legally defensible document.

Sincerely,

Steven C. Borell, P.E.
Principal

# Comment Form

**The Corps welcomes your comments on the Draft Environmental Impact Statement. If you'd like to mail your comments, please feel free to use this form. Write your comments below then fold this page in thirds so the mailing address shows. Additional pages can be inserted. Remember to affix first class postage. You can also email your comments to POA.donlingoldeis@usace.army.mil, or fax them to (907) 753-5567.**

Important topics for comments would include:

- *Comments and questions about the accuracy of information in the Draft EIS.*
- *Comments and questions about the adequacy of methods or assumptions used.*
- *New information to be considered in preparing the Final EIS.*
- *New reasonable alternatives or revisions to current alternatives.*
- *Additional measures to reduce impacts (mitigation).*

BARG 3

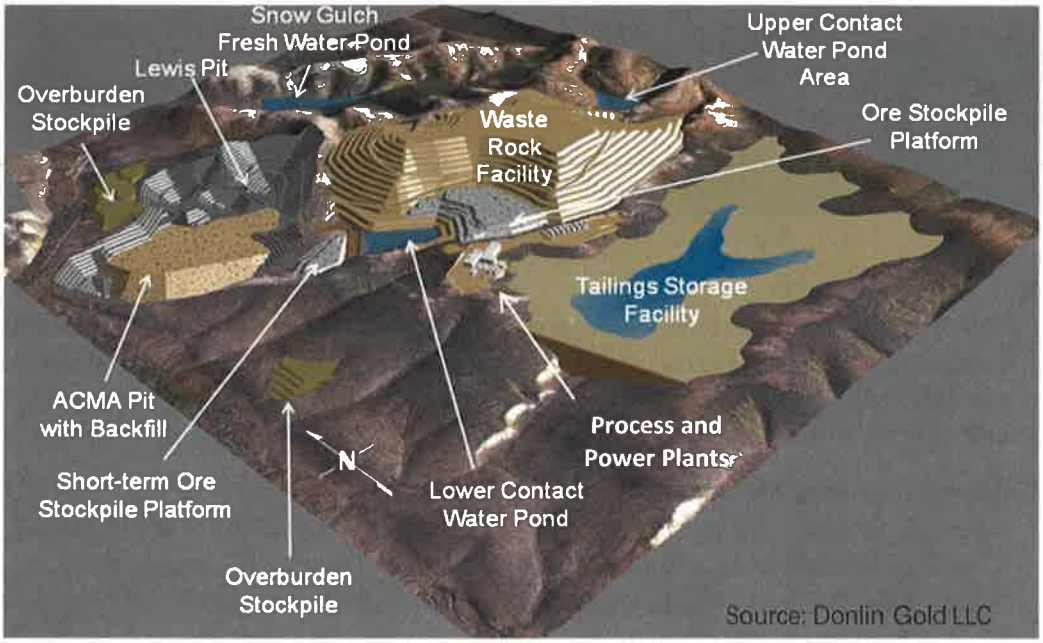
I WITH THE INCREASE OF BARGE TRAFFIC NEW RIVER PILOTS WILL BE NEEDED. HAS ANY ON LOOKED INTO THE OBSTUCTION ALONG THE RIVER. FOR EXAMPLE, OLD DOZER AND DRAGLINE AROUND THE VILLAGE OF ANIAK. HA. THEY HAVE BEEN IN THE RIVER. SENCE THE MID 70's

John Borowski Sr.
P.O.Box287 aniak 99557

## Layout of Proposed Mine Site

The image to the right illustrates the eventual layout of a proposed gold mine, ten miles north of the community of Crooked Creek on the Kuskokwim River in southwestern Alaska, for which the US Army Corps of Engineers is preparing an EIS. The project, proposed by Donlin Gold, LLC, includes a natural gas pipeline and transportation and components. You may use this mail-in form to submit comments.

For more information, please visit:
www.DonlinGoldEIS.com




(fold here)

from:

US Army Corps of Engineers
Donlin Gold Project EIS

Please place first-class postage here.

Keith Gordon
Regulatory Division
US Army Corps of Engineers
CEPOA-RD-Gordon, PO Box 6898
Joint Base Elmendorf Richardson, AK
99506-0898

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Thursday, February 25, 2016 6:52:09 AM

---

-----Original Message-----
From: Ken Bradshaw [mailto:kenbradshaw@gci.net]
Sent: Tuesday, February 16, 2016 6:48 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

NSB 1 I support the donlin mine and its benefits to the area.

Ken Bradshaw

**From:** Ken Bradshaw
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Thursday, April 21, 2016 10:39:29 AM

SER 4

We Alaskans need to develop all of our resources as quickly as we can to help with the state budget problem. I encourage you to move it forward .

Ken Bradshaw
Bradshaw and Associates, Inc.
1205 E. 72nd Ave. suite A
Anchorage, Alaska 99518

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska
District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

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3/10/16

Keith Gordon, USACE

NSB 1

Donlin Mine is essential to maintain and improve the way of life for the community that lives in the area.

It is obvious that engineering controls and responsible ownership and supervision can grow a mine that will be a world class mine that sets an example for everyone in this industry can use as an example of how to and can do attitude.

Please use your expertise to help make this project move forward.

Norma Brady Roberson 907-388-7822
3250 Easy Street
Fairbanks, AK 99701

**From:** Bellion, Tara
**To:** Evans, Jessica
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Tuesday, March 08, 2016 9:54:54 AM

---

-----Original Message-----
From: Randy Brand [mailto:RBrand@grtnw.com]
Sent: Thursday, March 03, 2016 3:19 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

NSB 1 I support the development of this project.

Randy Brand
907-322-8898

Brice Environmental Services Corporation

Fairbanks Office
301 Cushman Street, Suite 100
Fairbanks, Alaska 99701
907.456.1955 PH
www.briceenvironmental.com

Anchorage Office
3800 CenterPoint Drive, Suite 520
Anchorage, Alaska 99503
907.275.2820 PH
www.briceenvironmental.com

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April 11, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Ref: Comments regarding the Donlin Mine Draft EIS

Dear Mr. Gordon,

I am writing to express my strong support for Alternative 2 in the Draft EIS for the Donlin Gold Mine Project. I have lived in Fairbanks, Alaska, for 40 years and have spent my entire career in the environmental field working in the oil, mining, and private sectors. As President of Brice Environmental Services Corporation, a proud subsidiary of the Calista Corporation, I have been directly involved with numerous projects throughout Alaska, and in particular projects in the Yukon Kuskokwim region. I have seen firsthand that good jobs provide opportunities that both sustain communities and fund traditional subsistence activities.

SER 11

For a region that is both the poorest in Alaska and the most expensive to live the benefits that Donlin Gold offers with this multi-year, environmentally responsible project are tremendous. With 3,000 construction jobs for 4 years to construct the mine and between 600 and 1,200 jobs for the 27.5 estimated life of the mine, significant positive impacts on the economy of the region as well as the State of Alaska will be realized. In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care.

Since the mid-1990s Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project. More than $480 million has been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel and other supplies. Their focus on developing an environmentally safe project is outstanding with:

- A design that will reduce the overall footprint of the mine and allow for safe management of water over the mine life and post closure.
- A proposal to use natural gas for power generation to reduce both barge traffic on the Kuskokwim River and to reduce air emissions.

- Constructing the first large mine in Alaska that employs a synthetic liner underneath its entire tailings impoundment as well as dry closure of the tailings storage facility at the end of the mine's life.
- Constructing a tailings dam of engineered rock fill and a downstream construction method that is the most stable of all tailings dam types, designed for water storage and to withstand earthquakes.
- State of the art mercury emissions controls to ensure that mercury emissions are well below air quality standards.
- Constructing an active water treatment plant to ensure that water that is discharged from the site is treated to meet water quality standards.

SER 2

The land and resources for Donlin belong to the shareholders of TKC and Calista. It is TKC's and Calista's right and duty to support development of their natural resources for the benefit of the people of the region. Calista selected the mineral rights at Donlin Gold, and TKC selected the surface estate during the Alaska Natives Claims Settlement Act (ANCSA), so their shareholders would benefit from the development and production of the mine. The economic opportunity for shareholders and descendants is precisely the purpose behind Congress' grant of entitlement of these lands to Calista and TKC.

For the past 20 years Donlin Gold has proven their commitment to developing this project that is consistent with the values of the Yup'ik and Athabascan cultures of the region, maximizes local resources, and prioritizes environmental safety first and foremost.

I appreciate the opportunity to submit the above comments regarding this exciting opportunity for both the Lower Yukon-Kuskokwim Region and our State.

Sincerely,

Craig Jones
President
Craigj@briceenvironmental.com
907-459-3022 (Direct)
907-978-3022 (Cell)

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FROM: Brice Environmental
301 Cushman Street Suite 300
Fairbanks, AK 99701

TO: Mr. Keith Gordon
U.S. Army Corps of Engineers
PO BOX 68898
JBER, AK 99506-0898

Label 228, July 2013

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**From:** Alba Brice
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Mine
**Date:** Tuesday, May 31, 2016 12:57:08 PM

---

I wish to voice my support for the Donlin Gold project. As a life-long Alaskan, I firmly believe that responsible resource development is a crucial component for Alaska's economic future, especially as the state enters a period of declining oil revenues and uncertainty in the petroleum industry.

SER 5 The Donlin mine is prospect is an especially exciting prospect in the region where the mine location is planned, a part of the state that has historically seen little to no sustained economic opportunity and is one of the most impoverished regions in Alaska. The mine represents potential for long term jobs providing a living wages. The infrastructure and ongoing operations at the mine will provide economic stability not before seen in the region.

As a manager of an Alaskan marine company, I am confident that the proposed barge system will operate safely and efficiently with as little impact on the river and the eco system as possible. Donlin has thoroughly vetted the marine logistic plan for nearly 20 years and during that period have maintained a consistent dialogue with the Alaska Marine industry for their input and expertise. The proposed marine equipment will be well suited for the project utilizing shallow draft vessels along with an established and proven multi barge system currently in use at various river and marine highway locations around the globe. Operations will be carefully coordinated and open communication with other users of the river will be established to ensure safe transit for all during the barge season.

SER 5 The Donlin mine is an exciting project that can potentially provide tremendous economic stability in an impoverished region. This project has been studied and vetted for nearly 20 years and represents the kind of responsible development/ large scale project sorely needed in a state that is currently struggling with today's fiscal realities.

Alba Brice
V.P. Brice Companies
Anchorage Office
745 W. 4th Ave. Suite 306
99501
(907) 277-2002 Office
(907) 250-5667 Mobile

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica |
| **Subject:** | FW: [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Wednesday, March 30, 2016 10:22:10 AM |
| **Attachments:** | Donlin Mine EIS Comments srb.pdf |

---

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Wednesday, March 30, 2016 6:21 AM
To: Craig, Bill
Subject: FW: [EXTERNAL] Donlin Gold Draft EIS comment

-----Original Message-----
From: Sam Brice [mailto:samrobert@me.com]
Sent: Tuesday, March 22, 2016 12:36 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

Please find my comments regarding the Donlin Gold Draft EIS, attached.

Thank you,

Sam Robert Brice

Fairbanks, AK

Sam Robert Brice
504 Bennington Drive
P.O. Box 84822
Fairbanks, AK 99708

March 22nd, 2016

Ref: Comments regarding the Donlin Mine Draft EIS

To Whom It May Concern:

I am submitting these comments regarding the Donlin Gold Mine Draft EIS currently out for public comment. I'm a lifelong Alaskan of 52 years born in Fairbanks, AK and continue to live there. I have spent my entire working career involved with civil infrastructure related construction projects throughout rural Alaska. The work has required our company (Brice Incorporated) to own and operate numerous tug / barge and landing craft vessels for more than 40 years to transport construction equipment and materials on Alaska's Rivers and Coastal waterways, including the Kuskokwim River. Because of this significant time and experience gained working in rural Alaska, I understand the challenges rural Alaskans face balancing traditional subsistence activities and the economics of living there. Simply put, there are not many "good" jobs available to support the high cost of living in the rural communities. Donlin Mine presents such an opportunity. Additionally, because of the numerous items listed below, the project should be viewed favorably and the construction alternative selected:

**Barging Issues**

Our Companies face numerous challenges each year during the compressed barging season in western and northern Alaska supporting our jobs. Some of the most common include:

- Working with communities on mutually agreeable operational windows and schedules to minimize impacts to subsistence and commercial activities; fishing, hunting, migration schedules, etc.
- Adverse weather creating potentially hazardous impacts to operations – low water conditions, high water conditions, rough water conditions, changing channels due to scour and / or erosion, etc.
- Navigating shallow and / or narrow waterways to access work locations.

Donlin Gold would implement guidelines for barge operations to minimize the potential for impacts. Minimally this includes measures as follows:

- Adjusting loads based on water level of river to avoid risk of grounding.
- Establishing navigational aids and procedures for operating in narrow channels.
- Barges would use state-of-the–art navigation and communication equipment.
- Implementing a communication program to keep local communities informed of barge schedules and status.

**Barging comments in reference to the EIS**

- The increase in barge traffic is unreasonably characterized in the EIS. The EIS focuses on a percentage increase of barge traffic while placing little context on the rest of boat activity on theKuskokwim River. The level of existing barge traffic (less than 1 per day [0.6]) would increase to less than two per day (1.7 barges per day during operations). The EIS does little to put this in

BARG 5

BARG 5 context with the 100 to 200+ boats that could be encountered on any given summer day on the Kuskokwim River.

- NEP 1 The inclusion of Dutch Harbor in the impact assessment is unnecessary and speculative. Whether or not a third-party may require additional diesel storage simply extends the area of project influence beyond that required by NEPA.
- Barges have been running on the river for decades with little impact.
- BARG 9 Most erosion or scouring is a natural occurrence that takes place during spring break-up and high water events. Any additional impact from a couple barges per day is inconsequential in comparison.

**Environmentally Responsible Development**

- PUB 6 Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project.
- SVE 1 The Donlin Gold project was designed to reduce the overall footprint of the mine and allow for safe management of water over the mine life and post closure.
- PUB 6 The natural gas pipeline proposal is a result of conversations with the region about reducing the amount of diesel barges on the Kuskokwim River. The use of natural gas for power generation, instead of diesel, will also reduce air emissions.
- MIT 9 Donlin Gold will be the first large mine in Alaska to use a synthetic liner underneath its entire tailings impoundment. Additionally, dry closure of the tailings storage facility at the end of the mine's life is a "best practice" Donlin Gold is proposing to ensure an environmentally responsible mining project.
- The tailings dam will be constructed of engineered rock fill and use a downstream construction method that is the most stable of all tailings dam types, designed for water storage and to withstand earthquakes.
- AIQ 1 Donlin Gold will employ state of the art mercury emissions controls. To ensure the mercury emissions are well below air quality standards.
- SVE 1 Donlin Gold will construct an active water treatment plant to ensure that water that is discharged from the site is treated to meet water quality standards.

**Job Opportunities and Economic Stimulant**

- GAS 3 Improved transportation and communications infrastructure to support the mine, including port and pipeline facilities, can provide better services and lower cost of energy, goods and services to local residents in the region.
- SER 12 More than $480 million has been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel and other supplies, with most of that expended in the last 10 years
- SER 13 The job skills and training received while working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine.
- Donlin Gold will support local and statewide organizations that offer job skill training for a prepared workforce.
- SER 5 3,000 construction jobs for 4 years to construct the mine and between 600 and 1,200 jobs for the 27.5 estimated life of the mine, will create significant positive impacts on the economy of the region and the state.
- SER 12 In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care.

**Rights and Goals of Calista and TKC**

- The land and resources belong to the shareholders of TKC and Calista. It is TKC's and Calista's right and duty to support development of their natural resources for the benefit of the people of the region.

SER 2

- Calista selected the mineral rights at Donlin Gold, and TKC selected the surface estate during the Alaska Natives Claims Settlement Act (ANCSA), so their shareholders would benefit from the development and production of the mine. This economic opportunity for shareholders and descendants is precisely the purpose behind Congress' grant of entitlement of these lands to Calista and TKC.

SER 2

- As ANCSA corporations, Calista and TKC have two primary goals: generate profit for the corporation and its shareholders and provide other socio-economic opportunities and benefits to shareholders and their descendants. The Donlin Gold project will assist Calista and TKC in meeting these goals.
- The ANCSA corporations recognize the importance of subsistence lifestyle and the possibility of achieving unity and managing the land for both modern and traditional uses.

**Benefits to the Region and Alaska Natives**

SER 2

- Through the ANCSA 7(i) and 7(j) revenue sharing provisions, the Donlin Gold project will provide revenue to all Alaska Native regional and village corporations and their shareholders.

SER 11

- The jobs and the economic stimulus provided by Donlin Gold would help sustain communities in the YK region and fund traditional subsistence activities.

SER 1

- Rural Alaska is being impacted most by the reduction of state and federal dollars. Alternative 1 (the no project alternative) would have a negative impact on the YK region.

SER 11

- New, high-paying jobs will allow more residents to remain in the YK region and finance the purchase of supplies needed to maintain their traditional way of life for generations to come.

SER 15

- With a local hire record of up to 90% at their camp during exploration, Donlin Gold has proven their commitment to hiring local residents.

GAS 1

- The proposed natural gas pipeline will have excess capacity should there be an interest in accessing economical, clean burning natural gas to address the energy needs of the YK region.

SER 24

- Donlin Gold's continued presence in the region over the past two decades, and the partnerships developed between the company, Alaska Native Corporations and local communities, represent tremendous opportunities for shareholders and the broader YK community.

**Transparent Operations**

PUB 2

- Donlin Gold has a proven record of discussing the project's plans with the people of the region and listening to what they have to say about the region and the proposed project, including meetings and materials in the Yup'ik language.
- Donlin Gold is committed to developing a project consistent with the values of the Yup'ik and Athabascan cultures of the region.

Thank you for the opportunity to submit the above comments regarding this extraordinary opportunity for the Lower Yukon-Kuskokwim Region of our State, one of the most economically challenged regions in our nation.

Sam Robert Bruce

**From:** Bellion, Tara
**To:** Evans, Jessica
**Subject:** FW: Donlin Comments
**Date:** Tuesday, March 08, 2016 9:57:05 AM
**Attachments:** Donlin comments wsb.pdf

---

-----Original Message-----
From: Bill Brophy [mailto:bill@usibelli.com]
Sent: Thursday, February 25, 2016 10:16 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Comments

Mr. Gordon,

Please find attached my personal comments regarding Donlin DEIS.

Appreciate being added to your email and postal list for distribution of information.
With best regards,

Bill

Bill Brophy

301 Snowy Owl Lane

Fairbanks, AK 99712

bill@usibelli.com

Bill Brophy

301 Snowy Owl Lane

Fairbanks, AK 99712

bill@usibelli.com

Mr. Keith Gordon, Project Manager

U.S. Army Corps of Engineers, Alaska District

ATTN: CEPOA-RD-Gordon

P.O. Box 6898

JBER, AK 99506-0898

POA.donlingoldeis@usace.army.mil

Dear Mr. Gordon, 24 February 2016

I fully support Alternative 2 of Donlin Gold Project.

The Alaska state constitution established "the policy of the State to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest. The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people."

Donlin Gold is committed to developing a safe and environmentally responsible project, providing jobs for families in the Yukon-Kuskokwim region and the State, transparent communication about the project, respecting subsistence and cultural values, and creating business opportunities that benefit the Alaska economy.

SER 2

The economic opportunities for shareholders and descendants of The Kuskokwim Corporation (TKC) and Calista are precisely the purpose established by Congress' grant of entitlement of these lands. The project will generate wealth and provide socioeconomic opportunities and benefits to all Alaskans for many years.

Donlin has 10 years of experience, invested a half billion dollars, and has established proven success of working responsibly with the people and taking care of the environment in the area to be developed.

Donlin has a well-thought out plan for providing safe, efficient, and environmentally sound practices for transportation facilities, logistics and energy requirements including barging and pipeline operations.

The time is right. Move this project forward as outlined in Alternative 2.

With best regards,

*Bill*

Bill Brophy

*This communication submitted by email.*

| | |
|---|---|
| **From:** | J B |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Statement |
| **Date:** | Wednesday, June 01, 2016 12:10:46 AM |
| **Attachments:** | Donlin Statement.docx |

To who it may concern:

Attached is my brief statement about the Donlin Gold Mine. Was not able to fully read the EIS. Wish I had more time to betty explain my case, hope it makes it prior to the dead line.

Very Respectfully,

Jeremiah

AWS1 Jeremiah D. Brown

6305 Connors Trail Circle

Anchorage, Alaska 99502

US Army Corps of Engineers

Keith Gordon, Project Manager

P.O. Box 6898

JBER, Alaska 99506

donlingoldeis@usace.army.mil

Mr. Gordon:

I am writing this in regards to the Donlin Gold project. Would like to start off by saying thank you and your staff for the work you all have been doing and also taking the time to hear my inputs. Currently I strongly encourage all permitting committees to consider Alternative 1***- No Action***. For me the risk far outweighs the reward. I am a simple man who was raised completely off of a subsistence lifestyle in the Aniak area. Spent all my winters living and working a trap line 60 miles up the Aniak River just below the confluence of the Aniak and Salmon Rivers. We lived off of the land and only took what we needed to feed our family. During the summer we lived at a fish camp 6 miles below Aniak where we spent the summer putting up salmon for the winter months. After high school I enlisted in the US Navy and have been serving for the last 19+ years. Serving in the Navy as an Aviation Rescue Swimmer my entire career I have personally responded to numerous natural disasters, been all over the world flying medical evacuation , Search and Rescue, humanitarian and Combat support missions. Prior to enlisting and while not wearing the uniform I worked as a Volunteer Fireman and EMT in the Aniak while home on military leave. Why I bring that up, well is simple. That area of Alaska does not have the capability to FSR 5 handle or contain a spill of any kind and prevent it from getting into the water system. Wish I had for time to explain my case but am out of time to get this turned in prior to the deadline. Again I am for Alternative 1- NO ACTION.

Very Respectfully,

AWS1 Jeremiah D Brown

| | |
|---|---|
| **From:** | Margaret Brown |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, May 31, 2016 7:37:12 AM |
| **Attachments:** | Donlin EIS letter final.pdf |

Please see letter attached.

May 31, 2016

Margaret Brown
PO Box 521583
Big Lake, Alaska 99652

Mr. Keith Gordon
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER Alaska, 99506-0898

**RE: Comments, Donlin Gold Project EIS**

Dear Mr. Gordon:

I am writing to express my support of the Donlin Gold Project and urge the Corps of Engineers to permit the development of the Project as proposed in Alternative 2.

I began my long association with the Alaska Native Claims Settlement Act (ANCSA) and its land selection provisions in 1974, only two years after the ANCSA regional corporations were incorporated. Working first for the Calista Corporation, I helped the Calista and its villages make their land selections mandated by ANCSA. Included in these selections are the lands that are now within the proposed Donlin Gold Project and are owned by TKC and Calista.

In 1976, I began work for Cook Inlet Region, Inc. (CIRI) becoming CIRI's VP, Land and Resources. I became CIRI's President and CEO in 2005 and held this position until my retirement in 2013. In my various positions at Calista and CIRI, I worked to implement the provisions of ANCSA and lived through the tortuous negotiations and complex implementations of the Section 7(i) Agreement, setting out the rules under which the revenue-sharing provisions of ANCSA would be fulfilled. It is from this experience that I offer these comments in support of the Donlin Gold Project.

Calista's land selection goals:

Calista had two goals in mind as the first selection deadline of December 1974 approached. One was to assist its 56 village corporations make their selections under Section 12 of ANCSA. These lands would be lands selected for traditional uses, primarily for subsistence activities. The other goal was to, together with the villages, select for the subsurface potential that these Section 12 lands might hold. I distinctly recall such discussions with village representatives. That Calista would seek conveyance of subsurface estate with potential for development is not surprising. ANCSA mandated the regional corporations be for-profit entities and one of underlying tenants of ANCSA was that lands conveyed to ANCSA's for-profit corporations were to be available for development.

As early as 1974, Calista viewed development of minerals in the region as an important potential for economic benefit to the company, its shareholders, and to the larger Yukon-Kuskokwim region. Permitting the development of the lands owned by Calista and TKC within the Donlin Gold Project would be consistent with ANCSA and would fulfill the intent of Congress that is embodied in the legislation.

ANCSA Section 7i) revenue-sharing:

SER 2

If the Donlin Gold development were to occur, the revenues Calista would receive would be subject to ANCSA's Section 7(i) revenue-sharing provision. This is no small consequence. In fact, the positive, long-lasting benefits of this revenue-sharing would be felt throughout the entire Alaska Native community and beyond.

Those who negotiated ANCSA knew then - as we know now - that natural resources, particularly subsurface resources in economic quantities do not occur evenly. Rather, those resources, especially a world class deposit like the deposits within the Donlin Gold Project, are few and far between. This uneven distribution means that one region could have such a deposit, and others not, leading to a "have and have not" situation. ANCSA's Section 7(i) addressed this by mandating that regional corporations share revenues from subsurface developments and timber harvests. The rules by which this sharing is to occur are carefully set out in the Section 7(i) Settlement Agreement.

Others have written to you and have described the positive socio-economic benefit that the Donlin Gold Project would bring to Western Alaska. I strongly support those views. But beyond the Y-K region, the reach of the revenue-sharing from these ANCSA lands can not be underestimated. This is because Section 7(i) revenue-sharing to date has not worked as Congress had intended. It was hoped that more discoveries would be made on ANCSA lands and that more regions would be revenue contributors to the Section 7(i) revenue pool.

CIRI was an early contributor to the Section 7(i) revenue pool. Those shared revenues were critical because they were early in the history of the ANCSA. As CIRI made those early distributions I often heard that these Section 7(i) payments "kept the lights on" many ANCSA corporations' offices. However, CIRI's shared revenues did not come from new discoveries. They came from existing legacy oil and gas fields on the Kenai Peninsula. NANA is now a major contributor to the Section 7(i) revenue pool, but it is sharing revenues from the Red Dog mine, a resource that was largely known before the conveyance to NANA. Likewise, ASRC lands are in a known oil and gas province.

SER 2

The discovery of the world-class mineral deposit on Calista's lands within the Donlin Gold Project is different. It is precisely the kind of new discovery that Congress and the Alaska Native negotiators hoped for when they crafted ANCSA and the Section 7(i) revenue-sharing provision. And because the Donlin Gold Project revenues would be shared widely across the state the positive benefits will be felt well beyond the Y-K region. It is the kind of discovery that could lead to "keeping the lights on" once again for many ANCSA recipients.

Bargains within the Alaska Native Claims Settlement Act:

As we move further away in time from the passage of the Alaska Native Claims Settlement Act, I fear that the intent of the Act is being lost. ANCSA was - as its title proclaims - a settlement. It was a settlement of aboriginal claim to land by Alaska Native peoples, a claim recognized by Congress's own Federal Field Commission as both valid and vast. As in all settlements, there are gives and takes and bargains that are struck. The ability of ANCSA corporations to take title in fee to lands they receive in settlement and to have a meaningful say as to when and how those lands are developed is the bargain struck in ANCSA. As Calista requests, allowing the Donlin Gold Project to move forward as proposed in Alternative 2 (and the numerous permits that will necessarily follow to ensure the development is done in an environmentally sound way) upholds this carefully crafted bargain.

I urge the Corps to permit the development of the Donlin Gold Project as proposed in Alternative 2. The proposed action is designed to minimize environmental impact while providing long-lasting positive socioeconomic benefits throughout the State.

Thank you for the opportunity to give input on this important project.

Sincerely,

Margaret Brown
CIRI Shareholder
Former CIRI President and CEO

USACE
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MAY 1 1 2016
AK REGULATORY

April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15 Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

Donlin Gold has also demonstrated a notable commitment to the environment. Donlin has 16+ years of extensive studies focused on creating an environmentally and socially responsible project; and has purposefully designed its project to reduce the overall footprint of the mine and diminish any social impacts it may have on the YK region. Proposals such as building a natural gas pipeline have been developed in an effort to minimize barge traffic on the Kuskokwim River. Furthermore, a specific route for the pipeline has been selected to minimize disturbance to IDIT 1 known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims LAND 1 Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Signature

Zachary M Bryant

Print Name

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MAY 0 3 2016
AK REGULATORY

April 21, 2016

US Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Donlin Gold Draft Environmental Impact Statement

To Whom It May Concern:

I am a current resident of Alaska who has been involved in logging, construction and stream restoration projects primarily in the southeast region of Alaska, for about 25 years. I strongly support **Alternative 2, Donlin Gold's proposed project**, and consider it to be a tremendous benefit for the local community as well as for the health of the economy beyond southwest Alaska.

SER 18 Benefits from the approval of this project will be the improvement of transportation and communications infrastructure to support the mine, port and pipeline facilities, better services and lower cost of energy, goods, and services to local residents and businesses.

More than $480 million have been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel and other supplies over the last ten years. Job skills and training received from this project will generate skilled laborers to train and educate following generations to build a strong workforce, reaching beyond the life of this mining project. Over the 27 ½ estimated life of the project, 3,000 construction jobs for four of those years and between 600 to 1,200 jobs will have a significant and positive impact on the economy of the southwest region as well as the rippling effect throughout the state.

Employment opportunities, both directly and indirectly in areas such as logistics, transportation, training, education and health care are anticipated developments of this project.

Please consider approval of this well researched, environmentally and responsibly engineered draft proposal.

Sincerely,

Bert Burkhart
7284 North Tongass Hwy
Ketchikan, AK 99901

**From:** Aaron Burmeister
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Wednesday, May 25, 2016 1:40:46 PM

---

To whom it may concern,

I am in support of the Donlin Gold Project as well as their Pipeline Project. I was born and raised in rural Alaska and am very familiar with gold mining and development in Rural Alaska. I believe that if completed and managed responsibly as Donlin Gold has proven to be diligent in doing through out the planning and design phases it will be a big economic boom for the region and the state of Alaska as a whole. Donlin Gold has proven as a partner to many of the Communities, Native Corporations and School Districts in the Region that they are here for the long haul and they have made big investments in these communities as far as training, employment and further education.

IDIT 2

With direct regards to the Natural Gas Pipeline Project and EIS, I feel that Donlin Gold has made every effort through planning and design to leave a minimal footprint. They have worked together with many of the users of the trail to design and accommodate the winter travelers and subsistence users of the region access to all areas with minimal visual impacts.

I am very much in support of the Donlin Gold Projects as outlined in the EIS and have full faith that they will be completed in a very responsible manner. The development of this mine and pipeline will bring a great amount of resources to the State of Alaska along with employment, training and other opportunities to this region.
Sincerely,

Aaron Burmeister
Iditarod Musher
General Manager of Tumet Industries, LLC
PO Box 35
Nome, AK 99762
(907)-460-8229

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL] Donlin Gold Project
**Date:** Thursday, February 25, 2016 7:01:28 AM

---

-----Original Message-----
From: Dee B [mailto:rdalaska@gmail.com]
Sent: Thursday, February 18, 2016 10:50 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Project

SVE 2

Please record my objection to the proposed Donlin Gold Project. Despite the ubiquitous claims by mining developers of reclamation and removal, it is unconscionable that projects such as this will not result in permanent, indelible changes to the environment. In my opinion those permanent changes are in no way worth any temporary financial gains that might be realized.

Deanna Burris

1120 Huffman Rd., PMB 623

Anchorage, AK 99515

Sent from Mail <Blockedhttps://go.microsoft.com/fwlink/?LinkId=550986> for Windows 10

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL] Donlin Gold Project
**Date:** Thursday, February 25, 2016 7:00:58 AM

---

-----Original Message-----
From: rdalaska@gmail.com [mailto:rdalaska@gmail.com] On Behalf Of Dee and Ron Burris
Sent: Thursday, February 18, 2016 10:21 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Project

SVE 5

I would like to express my strong opposition to the Donlin gold mine as it follows the China model which is to destroy everything now for a few jobs and let the next generation try to somehow figure out how to deal with the incredible and irreversible destruction. Thank you for your consideration.

Ron Burris

| | |
|---|---|
| **From:** | Jack Bynum |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlon Gold EIS Comments |
| **Date:** | Saturday, April 30, 2016 1:25:11 PM |
| **Attachments:** | Donlon Gold Project EIS Review.pdf |

Dear Army Corps of Engineers and those overseeing this project,

NEP 2 Below you will find attached a small number of my comments about the project. I am pleased to see you have extended the comment window into the end of may as that was my first point of someone. I strongly believe that Donjon and the companies that own Donlon have showed a long history of failures, spills, and mal practice and because of this the NO ACTION alternative should be chosen.

Please feel to contact me via email or phone (845-661-3008) if you have any questions.

Sincerely Yours,
Jack Bynum

Jack Bynum, Alaska Resident
107 N. Harbour Drive
Valdez, AK
jbynum22@gmail.com
April 21, 2016

Dear U.S Army Corps of Engineers,

As a resident of Valdez, Alaska, a U.S Citizen and long time user of Alaskan Land and waterways, a fisherman and someone who makes a living off the Alaskan Land, I am writing to ask you to deny permitting to the Donlin Gold Project by choosing the **No Action Alternative**.

NEP 1 Additionally, given the highly limited publicity of the project and the massive length of the EIS, I believe a 6 month minimum increase in the commenting period is required;

PUB 1 For a project of this size, 169 unique submissions for initial scoping clearly evidences an inadequate outreach and scoping procedure. According to Table 1 of the Final Scoping Report from 2013, many of the town meeting times/dates work work days and therefore limited participation. This is especially true in light of Donlin Gold's use of gag orders in the Iditarod Trail case. The reasons for my rejection or request of restricted and cautious progress of the project are as follows:

**1) Acid Mine Drainage (AMD), Arsenic, Cadmium, Lead, Cyanide, and Mercury off gassing emissions.**

RME 1 While Donlin Gold maintains that they will both work to capture off-gassing and fully line their waste rock pit, there are still significant risks associated with the quantity of acid rock waste.

WAQ 20 The main concern is the proximity Kuskoskwim River, and more minutely any leaching into ground water. While the liner is certainly beneficial, it does not account for the 1) the high seismic activity of the area, 2) inevitable off-gassing

RME 1 from diffuse rather than point sources, 3) Animal encounters and transfer of acid rock deposits proliferating local and global bioaccumulation and biomagnification 4) Life span

WAQ 20 of the liner after the predicted 27 1/2 year life span of the mine and resulting cleanup.

RME 1 Mercury is a well-studied neurotoxin. A recent paper by Mathieu Miller and released by the Air and Waste Management Association indicated that non-point sources at open pit gold mines can be between 14- 56 percent of the total mercury emissions from a mine. The EPA need to monitor and regulate non-point source emissions. While it is true that the Kuskoskwim River has had an historic exposure to Mercury due to past mining and that the people of the area have unusually high levels of Mercury, this should be in no way an excuse for slack regulations.

HZM 5 Mercury's effects compound over time both in bodies and in ecologies. If a spill were to happen, that is 413 million cubic meters of mill tailing, decant water and storm water into the waterways of the Alaskan Coast and its fisheries. Barrick Gold Corp. and NovaGold Resources, the two companies running the Donlin project, have awful track records when it comes to spills of all sorts.

BER 13 The Rock Creek Mine in Nome, Alaska shut down and two employee deaths and an (at least)15,000 liter cyanide leak at Barrick's Veladaro mine in Argentina in which five rivers were contaminated both come to mind as examples of the company's poor track record.

HZM 5 The massive spill and damn break of the Mount Polley Mine in B.C ought to serve as yet another warning of the inevitability of leak under companies poor provision and supervision.

FSR 2

**2) Dredging and High Spill Potential for the Barging on the Kuskoskwim River**

Given the high value of the Kuskoskwim both as a cultural symbol and as a rich locale for salmon and other biodiversity, there is a great risk in increasing a barging network (through CWA 404). Over the span of 30 years, the likelihood of a spill of the some 37.5 million gallons of fuel per year to be transported is high. At present, Donlin has yet to provide a convincing solution to this high-risk problem. Alaska has had repeated accidents with Barge groundings and spills. While in parts of Alaska, such as Valdez there are 24 hour cleanup crews at the ready, this is not a proposal made by the Donlin group.

FSR 1

**3) 313 Mile Pipeline Crossing the Alaska Range and threatening Iditarod Trail Cultural Significance**

According to a report put together for the U.S Dept. of Energy, all gas lines have at least a small amount of leak. This leak is both affecting air quality, and potentially impacting streams of the Alaska Range and affecting water quality. The Alaska Range is already crossed by one pipeline, the TAPS, and does not need a second. Moreover, it would be more sensible to piggyback this pipeline on the TAPS instead of making a new corridor and re-routing gas into Port Valdez instead of Cook Inlet. Additionally, the destruction of 58 miles of the Iditarod trail should be avoided for cultural significance.

PAA 35

IDIT 8

BER 13

**4) Both Barrick Gold Corp. and NovaGold Resources are Canadian Corporations with a Track Record of Environmental abuse and Regulation Violations.**

Within this comment is no anti-Canadian sentiment. Rather, what the comment pertains to is the fact that 70% of the worlds mining industry is headquartered in Canada for a reason: because Canada has a history of sheltering Mining companies from legal disputes and contract fall outs. The concern is that, barring a massive catastrophe earlier, after 27.5 years of mining, when the gold deposit runs out, the companies will simply leave without spending the money to truly clean the area. If they were American companies they would in theory be held more accountable by the U.S government and EPA. If this were to happen, then the 1400 jobs that had been provided by Dunlin Gold will likely be cut with those remaining shifting over to clean-up efforts possibly paid for by the U.S govt. This is all speculation of course, but time an again this has happened across the U.S and by Barrick and NovaGold. A CorpsWatch Report published in May 2007 outlines many of the regulations broken by Barrick in it's global mining projects of that year. The list is extensive. On the NovaGold side: in 2007 the Galore Creek copper-gold mine came to an abrupt halt after the companies projected a 3 billion dollar cost overrun. If a similar thing were to happen at Donlin, any infrastructure, expense, and landscape destruction endured by the natives there would be without financial return. It make more sense from socio-economic perspective to have an American company mine the gold.

ESA 2

**5) Inadequate Study and Address of Habitat Loss Specifically Pertaining to Endangered Species.**

Endangered Species present in Alaska in the area effected by the Donlin Gold Mine are: Short-Tailed Albatross, Eskimo Curlew, Blue Whale, Humpback Whale, Right Whale. All of these species have a high potential to be affected by the project either because of continual emissions and ground water leaks, or because of a spill. The population of Eskimo Curlew in the area has not been adequately assessed. Given he current

ESA 2

superfund sight already leaching into the Crooked Creek area, baseline testing needs to be done on the fish and wildlife of the area. Most importantly, said testing ought to be done on the resident whale populations so levels of mercury and arsenic can be monitored throughout the duration of the project and their origins traced. IF this monitoring were to show any increase in levels as a result of the Donlin Project, a cease and desist would be in order. All alternatives in the Donlin project suggest no impact to endangered or threatened species, but this is based off a narrow definition of threat.

BER 7

**6) Provision of funds for future long-term decommissioning costs and impacts.**
Given the immensity of this project, research at comparable mines for a total 200 year long cost of cleanup and monitoring should be compiled. This amount must then be put in an escrow account between Donlin Gold and U.S Bureau Reclamations for use in decommissioning, cleanup, or cleanup of unforeseen spills. This escrow account must be put in place before any development permit are registered.

RME 3

7) **Need automatic and publicly accessible air quality, water quality data collection**
These stations need to be immediately on sight for point sources and in the surrounding areas for diffuse emissions.

**Consideration of Alternatives:**

With these concerns, and many more in mind, I strongly advocate for the **NO ACTION** Alternative. At the least, an extension in the comment period is required. If No Action is not endorsed, I provide a critique of a few of the alternatives mentioned in the DEIS.

**Alternative 3A**

PAA 47

**2.3.3** — while using LNG powered trucks does reduce the diesel barging up the Kusoskwim, it increases the flow thru the pipeline and makes said pipeline all the more necessary and increases likelihood of leaks. An impact statement should be prepared comparing the relative impacts of a pipeline as compared to barging. Additionally, while LNG burns much cleaner than diesel, the overall emissions impact is comparable.

**Alternative 4**

PAA 22

**2.3.5.2 —** Reducing Barge Traffic by increasing the length of the access road from 30 to 76 miles is a poor plan. While Barge traffic has the significant risk of leaks and congesting the waterway, the increase in road length would spell a massive increase in dust production and a decrease in air quality. A simple calculation would suggest that by increasing the road by 153% you also increase the dust produced by road traffic by 153%. This would be offset by a minuscule reduction in emissions from barge traffic.

**Proposed Alternative Amendment:** including alternative 2.3.5.2 while paving the entire length of the 76 mile road would reduce barge traffic and decrease fugitive dust emissions.

PAA 15

**Notable Alternatives Left Out of Proposal for Reconsideration:**

MS-88 Decommission and remove all mine infrastructure at closure

MS-107 Remote-sensing monitoring

TI-55 Use “Hi-Float” or “Chip Seal” on the road to the mine site from Angyaruaq (Jungjuk) Port.

TI-62 Reclaim the mine site airstrip after operation was complete.

TI-79 Combining two or more of options TI-69 through TI-78 (energy alternatives)

PL-47 Installing slope breakers and trench breakers at wetland boundaries to prevent trenches from draining wetlands.

PL-67 Option for HDD at all fish-bearing streams.

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica |
| **Subject:** | FW: Comments on DEIS Donlin |
| **Date:** | Tuesday, March 22, 2016 8:50:25 AM |
| **Attachments:** | SKM_C754e16012516470.pdf |

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Tuesday, March 22, 2016 6:16 AM
To: Craig, Bill
Subject: FW: Comments on DEIS Donlin

-----Original Message-----
From: Monica James [mailto:mjames@calistacorp.com]
Sent: Monday, January 25, 2016 7:02 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Comments on DEIS Donlin

Mr. Gordon,

Please find my comment letter on the DEIS Donlin Project. I plan to attend the meeting on 28 January 2016 meeting at the Egan Center.

Respectfully,

Monica James

_____

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EITHER THE U.S. DEPARTMENT OF STATE OR DEPARTMENT OF COMMERCE.

''22 CFR Part 125.4 (b) (9) applicable.''

CALISTA CORPORATION
www.calistacorp.com

January 28, 2016

Mr. Keith Gordon
Regulatory Division
US Army Corps of Engineers
P.O. Box 6898
Joint Base Elmendorf Richardson, AK 99506-0898

Re: Calista Comments on the Donlin Gold Draft Environmental Impact Statement

Dear Mr. Gordon,

Calista Corporation is an Alaska Native Corporation (ANC) organized under the Alaska Native Claims Settlement Act (ANCSA) and is pleased to provide the following comments on the Donlin Gold Draft EIS (DEIS).

The Kuskokwim Corporation (TKC) and Calista own the surface estate within the project footprint and Calista owns the mineral estate which is the focus and driver of the Donlin Gold Project. Calista is mandated under ANCSA to manage its lands for the maximum benefit of its shareholders, many of whom live in the region and in the vicinity of the project. Not only will Calista and TKC shareholders benefit from the project, but this project provides a singular
SER 2 opportunity to satisfy the intent of the all-important Alaska Native Claims Settlement Act, to the benefit of all Alaska Native Corporations and the struggling state economy.

As an ANCSA corporation, Calista has two primary goals: generate profit for the corporation and its shareholders and provide other socioeconomic opportunity and benefits to the shareholders and their descendants. The Donlin Gold Project has, in the past, and to a much larger extent in the future, is anticipated to provide vocational training and employment opportunities that otherwise do not exist in the economically challenged Kuskokwim region and surrounding areas.

As stated in the DEIS, an estimated 1,600 to 1,900 individuals from Yukon-Kuskokwim communities would be employed during construction. During operations, an estimated 500 to 600 regional residents would be employed. Employment income could help to offset the current trend of decreasing income from commercial fishing. For each year the project is operational, an estimated 650 jobs and $40 million in annual wages would be generated statewide, while sales within the state would increase by $150 million per year. Beyond these benefits, the landowners will receive substantial royalty payments that will be shared with other ANCSA regional and village corporations. State and local governments would receive tax revenue that currently doesn't exist.

Improved transportation and communication infrastructure to support the mine, including port and pipeline facilities, can potentially provide better services and lower the cost of goods to local residents. Ultimately, economic
SER 19 development of such a large project will help fulfill the broader goal of self-determination by allowing residents and Calista shareholders to significantly participate in the world economy. Calista intends to be an active, involved participant in the development of our land and mineral resources at Donlin Creek.

SER 5 Calista supports and encourages the Army Corps of Engineers to permit Alternative 2, the Applicant's Proposed Action. Calista believes that the Proposed Action is designed to minimize environmental and negative social impact and will provide long-lasting socioeconomic benefit to not only Calista Shareholders and descendants but other residents in the region and the State of Alaska as a whole.

Quyana,

CALISTA CORPORATION

Monica James

Monica James,
EVP/Chief Operating Officer

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 f: (907) 275-2919

Calista Comments on the Donlin Gold Draft Environmental Impact Statement

February 1, 2016 at Bethel, Alaska

Good evening, I am June McAtee, Vice President of Lands at Calista Corporation. Calista Corporation is a regional Native Corporation organized under the Alaska Native Claims Settlement Act. Together with The Kuskokwim Corporation, Calista owns surface lands at Donlin Creek and Calista owns the mineral estate that is the focus of the Donlin Gold Project.

Calista is mandated under ANCSA to manage its lands to provide maximum benefit for its shareholders. This was the underlying intent of the Act itself, to provide lands for exactly such purposes.

The land at Donlin was selected in the 1970's for its mineral potential which has always been seen as a resource that could provide economic benefits to the region as a whole. After years of its own exploration at Donlin Creek, Calista brought in an industry partner that has been thoughtful about development, mindful of the environment and dedicated to training and hiring our shareholders from the very beginning of the project 20 years ago.

Calista has two primary goals as an ANCSA corporation, 1.) to generate profits for the corporation and its shareholders, and 2.) to provide economic benefits and opportunities for its shareholders and descendants. Finally, the Donlin Gold Project, after many years of study and development, and in partnership with Calista and The Kuskokwim Corporation, has sought permits to build a mine.

During exploration and development, the Project provided vocational training and employment to Calista shareholders and descendants, who comprised up to 90% of the workforce at Donlin. In the future, the project will provide these benefits on a greatly expanded scale. An estimated 1,600 to 1,900 workers would be employed during construction and 500 to 600 during operations at the mine.

SER 2

During operation, 650 jobs and $40 million in annual wages would be generated statewide. Sales of goods and services in the state would increase by $150 million per year. The land owners will receive royalty payments and Calista will share its resource revenue with other regional and village corporations across the state through 7(i) and 7(j) revenue sharing. State and local governments will receive tax revenues from the project. We expect the project's port and pipeline facilities have potential to provide better services and lower the cost of some goods locally.

These economic benefits from such a large project can do much to help the region achieve self-sufficiency and fulfil the much broader goal of self-determination. With declining oil production and struggling state economy, a large resource project in rural Alaska can help offset reductions in governmental funding. We see this project as an integral part of our self-determination as a rural people. We intend to be active and involved participants in the development of our own land and resources at Donlin Creek.

Calista supports Alternative 2, the proposed action to build the mine, which has benefited from years of research and input from local residents and has been carefully designed to minimize environmental and negative social impacts. We encourage the Army Corps of Engineers to permit this Alternative.

Quyana.

CALISTA CORPORATION

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March 28, 2016

RE: Donlin Mine Draft EIS – Support of Alternative 2

To Whom It May Concern:

I am submitting comments regarding the Donlin Gold Mine Draft EIS that is open for public comment.

I have served as Calista Corporation's CFO since 2011. Before then, I was Corporate Tax Director for another ANC with revenues in excess of $1b per year. I am a CPA and earned a BA in Business Administration and an MBA with a triple major in Accounting, HR and International Business from the University of Washington. I have also served in highly regulated industries, finance, and the government sector for over 20 years.

Donlin represents an extraordinary opportunity for Calista to grow its revenues and profits above the royalties Calista receives from Donlin's operators and the opportunities to win projects in the region. The opportunity comes in the form of substantial federal and state tax savings that can be used for any of the following:

SER 20

1) Fully fund an endowment, the inflation-proofed income of which will provide burial assistance and scholarships for Calista Shareholders in perpetuity
2) Purchase at least one new subsidiary business each year for fifty consecutive years
3) Greatly increase the size of the cash dividends paid to Calista Shareholders
4) Purchase significant income-producing real estate utilizing non-recourse debt and no cash down by leveraging the unique tax opportunities Donlin offers Calista.

By way of explanation, Calista and other Alaska Native Corporations are taxable corporations. This means that when they earn taxable income, they pay taxes to the U.S. government and to states in which they operate.

SER 19

When Donlin becomes a productive mine, the value of the gold extracted from the ground becomes tax deductible as a depletion expense on Calista's state and federal tax returns. Because this tax deduction is enormous relative to Calista's size, Calista will stop paying federal income taxes for about 50 years. This will save Calista a conservative minimum of about $10 million per year for 50 years ($500 million). If the tax savings are used to purchase profitable businesses, the impact is far greater; pre-tax net income would be two to four times higher since Calista would be much bigger than it otherwise would be.

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 * f: (907) 275-2919

These savings and growth opportunities could not come at a more critical time for Calista and its owners. With job losses occurring at the North Slope, cuts in state operating and capital spending, and the potential loss of both the Permanent Fund dividend and Power Cost Equalization, Western Alaska is at risk of economic collapse.

SER 4

Calista can help avert this catastrophe by using the unique tax advantages Donlin will provide to ensure higher dividends, scholarships and burial assistance. This literally means food on the table for families in Western Alaska.

For the reasons stated above, I strongly support Alternative 2.

I realize this topic is complex, therefore, I would be more than happy to address these issues in greater detail if requested.

Yours truly,

Sharon Lechner

Sharon Lechner CPA, MBA
CFO, Calista Corporation

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 * f: (907) 275-2919

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April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

My name is Andrew Guy. I was born and raised in the Bethel, AK and Kuskokwim Delta. I am President and CEO of Calista Corporation (Calista), a Calista and Napaskiak, Inc. Shareholder, and currently reside in Anchorage.

Donlin Gold has been a hot topic of conversation given the recent release of the project's draft environmental impact statement (EIS) by the U.S. Army Corps of Engineers. Much of the general public is becoming aware of the project and familiarizing themselves on its attributes for the first time. But for those who call the Yukon Kuskokwim (YK) region home, and for Calista Shareholders and Descendants, Donlin Gold has been an ever-present entity, topic of conversation and alliance for the past 20 years.

As stewards of the land and owners of the resources, we do not take such a significant project lightly. Under the Alaska Natives Claims Settlement Act (ANCSA), Calista is mandated to responsibly develop our Shareholders' natural resources to improve their socio-economic lives.

Donlin Gold has taken great strides in planning a responsible project, continuously working with Calista board members, and undergoing extensive environmental baseline studies since 1996. They have also held numerous meetings to hear stakeholders' thoughts while determining the economic and environmental feasibility of the project.

PUB 6

Donlin Gold's proposed project is a culmination of the extensive research performed in conjunction with input from stakeholders, whose voices were key in shaping the project. In the past, many expressed concern over the amount of proposed barge traffic on the Kuskokwim River. An underground natural gas pipeline was introduced as a solution, significantly reducing the amount of barge traffic and fuel barged to the proposed development.

Donlin Gold has also made it a priority to incorporate industry-leading technology. It will be the first large mine in Alaska to use a synthetic liner underneath its entire tailings impoundment.

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 f: (907) 275-2919

During a time when oil revenue is declining at an alarming rate, permanent fund dividends face reduction, limitations or elimination, and funding in the Calista region continues to be cut, an environmentally responsible project offers a beacon of hope to our region, which is economically the poorest in the state.

The U.S. Census reports the Calista region has some of the highest unemployment rates in the nation, yet our energy rates, and food and transportation costs are some of the highest. The situation is far more grim than the unemployment rates even portray, as to be considered unemployed you have to be actively seeking a job.

SER 2

Through ANCSA's 7(i) and 7(j) revenue sharing provisions, the Donlin Gold project will provide revenue to all Alaska Native regional and village corporations, including Calista. The Donlin Gold project offers an opportunity to satisfy the intent of ANCSA to benefit all Native corporations in this struggling state economy and a much-needed infusion of cash into the village corporations in the YK Delta.

Calista has ownership of mineral rights in the proposed mining area, and Donlin Gold has ensured hiring preferences for qualified Calista Shareholders, Descendants, and their spouses, and bidders' contracting preference for Calista subsidiaries. An estimated 3,000 jobs will be created during the construction phase of the project, which is anticipated to last 3-4 years. As it moves forward into the 27-year operation phase, 600-1,200 high-paying, full-time jobs will exist because of the Donlin Gold mine. Donlin Gold's 90 percent local hire record during the exploration period serves as a testimony to its commitment to hiring locals.

SER 11

When discussing socio-economics and subsistence, many split the two subjects. However, the people of the land are those best qualified to speak on subsistence. They know the topics of socio-economics and subsistence cannot be separated, for without a source of income, we cannot afford a subsistence way of life, a life that to the surprise of many, is not cost-free.

The modern day supplies required to hunt, fish and gather all have a price. Gas, snow machines and ATVs are all equipment and supplies we rely on to practice subsistence, and they are often supplies the people of the Calista region cannot afford without jobs.

PHL 3

As a drug-free and alcohol-free workplace with an emphasis on work safety, the region could also experience less substance abuse, a fact borne out during the exploration phase of the project when many of our Shareholders and Descendants became eligible for hire after initially failing drug and alcohol tests.

We cannot afford to say no to an environmentally responsible project like the Donlin Gold mine, which will improve our quality of life and provide ample jobs, a strong financial future and viable opportunities where there are none.

Calista and its board of directors strongly support that Donlin Gold move forward with development of our land, as set forth in the U.S. Army Corps of Engineers' draft EIS alternative number 2.

Sincerely,

CALISTA CORPORATION

Andrew Guy
President & CEO

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

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April 26, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

RE: Comments, Donlin Gold Project EIS

Dear Mr. Gordon:

Calista Corporation was organized under the Alaska Native Claims Settlement Act (ANCSA). ANCSA mandated the formation of Regional and Village Native Corporations to select and receive title to lands and resources to provide economic benefits to the Shareholders enrolled in those corporations. Congress enacted ANCSA to "provide for the real economic and social needs of Natives ... with maximum participation by Natives in decisions affecting their rights and property."

The Donlin Gold project is located on surface lands owned by The Kuskokwim Corporation (TKC) and by Calista Corporation(Calista). Calista owns the subsurface mineral estate within the entire Property. The land was selected under the Alaska Native Claims Settlement Act (ANCSA) specifically for its recognized mineral development potential. Congress intended that Native corporations would be able to develop and realize the potential of the land conveyed to them, a point that has been affirmed by the Ninth Circuit Court of Appeals. Donlin Gold proposes to develop the land at Donlin Creek to build a gold mine in partnership with Calista Corporation and TKC. In addition to an open pit gold mine, the project proposal includes 313 miles of buried natural gas pipeline, a power plant, port and road, airstrip and barge landings. Calista Corporation supports the project as proposed, Alternative 2 of the Donlin Gold Draft Environmental Impact Statement.

The Donlin Gold project is located in Southwest Alaska, approximately 277 miles west of Anchorage. The nearest community is the Kuskokwim River community of Crooked Creek. Throughout the project's lengthy exploration period, Donlin Gold committed strongly to local hiring and job skills training, and showed support to communities, cultures and people in the region. Calista Shareholder hire rates during exploration reached 90% of the workforce, including management level jobs in operations and logistics. This result was achieved through dedicated effort over several years to create a work culture based on responsibility, sobriety, training, safety and personal pride in work. Our shareholders and descendants developed skills that serve them elsewhere and some have launched professional careers that began at Donlin Creek. Development of a mine would continue to enhance economic opportunities for residents in rural Alaska.

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The Calista region experiences some of the highest unemployment rates and lowest family

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 · f: (907) 275-2919

SER 5

The Calista region experiences some of the highest unemployment rates and lowest family income levels in Alaska and has few other economic opportunities. The Donlin Gold project as proposed would produce gold for more than 27 years, providing well-paying jobs, with a preference for Calista shareholder and local hire. An estimated 3,000 jobs will be created during the approximate four-year construction phase, and between 600 to 1,200 jobs during the estimated life of mine. Post-production reclamation and monitoring will extend employment opportunities beyond production life of mine. These jobs will have a significant and positive impact on the economy of the region and the state. The Donlin Gold project is a rare opportunity to improve the local economy where few other opportunities exist.

SER 11

The social and economic benefits of this project will extend to the region, state, and to the nation. The economic stimulus provided by Donlin Gold would help sustain communities in the Yukon-Kuskokwim region and assist residents to pay the increasing costs of subsistence activities. Rural Alaskans continue to rely heavily on traditional food sources and yet some families are forced to choose between heat, electricity and food. In this century, there has been a steady erosion of traditional subsistence practices, yet there has been nothing put in place of traditional subsistence economies. There is a continuing and growing need to earn personal income to afford the equipment and fuel that allows people to hunt, fish and otherwise provide for their families. Subsistence and economic development go hand in hand.

SER 1

Rural Alaska is being severely impacted by the reduction of state and federal dollars, that has a disproportionately negative impact on rural economies where there are limited to no options for diversified economic development. Lack of jobs in rural areas of Alaska impacts the ability of indigenous people to provide for their families, which is at the core of traditional life and culture. Alternative 1 (the no project alternative) will only deepen impacts of the current downturn of the Alaska economy, that are already being felt. Opportunity to work within the region on a year-round basis will provide alternatives to out-of-region migration for work, so that traditional lifeways and culture can be maintained in place. Mineral resource development has been a single enduring source of rural jobs and, in some areas of the state, it remains the only viable option for economic self-sufficiency.

GAS 1

Fuel and electrical power generation costs in the Yukon-Kuskokwim area are several times higher than in rail belt Alaska and the rest of the nation, deriving in large part from geographic isolation, lack of surface transportation and resulting high transportation costs. The Donlin Gold project contains the potential for lower cost energy options to the region such as the proposed natural gas pipeline that has been designed for excess capacity to allow for future access to natural gas for regional energy needs.

IDIT 1

The pipeline itself was designed to have minimal impacts to the environment and to Iditarod Trail use. It will be buried and will not obstruct human or animal movement or impact view sheds. Crossings well beneath river beds will eliminate bridging or overhead structures and temporary construction roads will be removed after construction to minimize human access and environmental impacts.

PUB 6

The natural gas pipeline will greatly reduce the amount of fuel that would otherwise have to be barged, minimizing the number of barge trips on the

Kuskokwim River. This solution is in direct response to concerns expressed by local residents along the river.

The Donlin Gold project description demonstrates an understanding of environmental concerns and best environmental principles and practices. The project will be scrutinized under a rigorous permitting process that reviews and analyzes all potential impacts, and this analysis must include the positive economic impacts of a vibrant resource-based economy. Alaska has seven existing large producing mines that were permitted under a rigorous review required by the National Environmental Policy Act and a scientifically based permitting process requires as many as 100 State and Federal permits and authorizations. These mines operate under high standards and in harmony with renewable resources. The Donlin project will be subject to stringent stipulations by the State of Alaska Department of Natural Resources and the Department of Environmental Conservation, that regulate mining operations statewide and protect wildlife, the environment and human health.

Calista seeks to participate in the growth of Alaska's economy. Mineral royalties Calista will derive from the Donlin Gold project will in part be redistributed to all other regional and village corporations in Alaska, pursuant to the Section 7(i) and 7(j) resource revenue-sharing provisions of ANCSA, providing an infusion of cash across the State of Alaska. As a region, we can contribute to growth rather than overburden shrinking governmental budgets. Calista Corporation and its board of directors strongly support and recommend that Donlin Gold move forward with development of our land as proposed in Alternative 2.

Sincerely,

Calista Corporation

Andrew Guy
President and CEO

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 * f: (907) 275-2919

CALISTA CORPORATION
www.calistacorp.com

April 26, 2016

Mark Spencer, District Manager
U.S. Department of the Interior
Bureau of Land Management, Anchorage District Office
4700 BLM Road
Anchorage, Alaska 99507

Dear Mr. Spencer:

Calista Corporation was organized under the Alaska Native Claims Settlement Act (ANCSA), an Act mandating formation of Regional and Village Native Corporations to select and receive title to lands and resources to provide economic benefits to the Shareholders enrolled in those corporations. Congress enacted ANCSA to "provide for the real economic and social needs of Natives ... with maximum participation by Natives in decisions affecting their rights and property."

Congress intended that Native corporations would be able to develop and realize the potential of the land conveyed to them, a point that has been affirmed by the Ninth Circuit Court of Appeals. Donlin Gold proposes to develop the land at Donlin Creek to build a gold mine in partnership with Calista Corporation and TKC. In addition to an open pit gold mine, the project proposal includes 313 miles of buried natural gas pipeline, a power plant, port and road, airstrip and barge landings. Calista Corporation supports the project as proposed, Alternative 2 of the Donlin Gold Draft Environmental Impact Statement.

The Donlin Gold project is located in Southwest Alaska, approximately 277 miles west of Anchorage. The nearest community is the Kuskokwim River community of Crooked Creek where the original land selections including Donlin Creek were made by that village corporation's leaders, prior to its merger with several other central Kuskokwim River villages to form The Kuskokwim Corporation. The land was selected specifically for its recognized mineral development potential.

Calista disagrees with the conclusions reached in the Preliminary ANILCA Section 810 Subsistence Impact Analysis that the Donlin project will have substantial impacts to subsistence. This opinion lacks vigorous scientific inquiry and input from local subsistence users about how and where they practice subsistence. We are convinced that the analysis is unbalanced and flawed by assessing <u>possible</u> negative impacts and totally disregarding the positive social and economic impacts the project will provide.

Actual patterns of subsistence use of the land is lacking in the 810 analysis. For instance, Calista challenges the assumption that subsistence berry harvesters walk ten or more miles over hills and streams to pick berries at Donlin Creek, bypassing miles of abundant berry crops along the way. There are no established or maintained roads or trails to the Donlin Creek project site. BLM determined that Crooked Creek is non-navigable above its

Getmuna Creek and Bell Creek tributaries, therefore Donlin Creek cannot be accessed by boat during berry-picking or fall hunting seasons.

Crooked Creek is a tiny tributary of the Kuskokwim River. The limited run of salmon in the small creek is not large enough to be a subsistence resource for the community of Crooked Creek. The village is located on the banks of the Kuskokwim River and Crooked Creek residents do their subsistence salmon fishing in the larger river utilizing the far more significant Holitna and upper Kuskokwim River fish stocks.

There are no herds of migratory animals that utilize Crooked Creek or Donlin Creek as migration corridors. The terrain surrounding Donlin Creek comprises low rolling hills covered with boreal forests that are further surrounded by hundreds of square miles of similar boreal forest habitat, therefore, the project would present no constrictions to migratory passage or habitat availability to unduly impact subsistence resources. Donlin Creek is privately-owned ANCSA corporation land closed to non-subsistence hunting preventing competition from non-subsistence hunters. Further, hunting is a restricted activity at all mine sites to ensure worker safety. We reject the assertion in the 810 analysis that there could be significant restrictions to subsistence resources.

The 810 Analysis states that the project will release contaminants into surface waters. This activity is unlawful and the Donlin Gold project does not propose to conduct activities that violate laws and regulations. Rather, the project has made extraordinary efforts to design a project that exceeds current environmental regulatory standards, including state of the art emission control and surface and ground water protection. Discharges from the mine operations must comply with the Clean Water Act and meet Alaska water quality standards that are developed to protect fish and aquatic life. Permitted discharges would not adversely affect subsistence resources. Additionally, the project proposes natural gas power generation, a far cleaner power source with fewer emissions and without fuel spill risks associated with burning diesel fuel.

GAS 1 Fuel and electrical power generation costs in the Yukon-Kuskokwim area are several times higher than in rail belt Alaska and the rest of the nation, deriving in large part from geographic isolation, lack of surface transportation and resulting high transportation costs. The Donlin Gold project contains the potential for lower cost energy options to the region such as the proposed natural gas pipeline that has been designed for excess capacity to allow for future access to natural gas for regional energy needs.

IDIT 1 The pipeline itself was designed to have minimal impacts to the environment and to Iditarod Trail use. The pipeline will be buried and will not obstruct human or animal movement or impact view sheds. The pipeline route was specifically chosen to avoid areas of heavy subsistence use, including ANCSA village lands that were selected for subsistence use. Pipeline crossings tunneled beneath river beds will eliminate bridging or overhead structures and temporary construction roads will be removed after construction to minimize human access and environmental impacts.

WILD 1 Tree clearing and post construction reclamation of the temporary construction road along the pipeline right of way will create moose browse.

PUB 6 The natural gas pipeline will greatly reduce the amount of fuel that would

PUB 6 otherwise have to be barged, minimizing the number of barge trips on the Kuskokwim River. This solution to energy transportation is in direct response to concerns expressed by local residents who utilize the Kuskokwim River for subsistence fishing and access to other subsistence areas.

The Donlin Gold project description demonstrates an understanding of environmental concerns and best environmental principles and practices. The project will be scrutinized under a rigorous permitting process that reviews and analyzes all potential impacts, and this analysis must include the positive economic impacts of a vibrant resource-based economy. Alaska has seven existing large producing mines that were permitted under a rigorous review required by the National Environmental Policy Act and a scientifically based permitting process requires as many as 100 State and Federal permits and authorizations. These mines operate under high standards and in harmony with renewable resources. The Donlin project will be subject to stringent stipulations by the State of Alaska Department of Natural Resources and the Department of Environmental Conservation, that regulate mining operations statewide and protect wildlife, the environment and human health.

Throughout the project's lengthy exploration period, Donlin Gold committed strongly to local hiring and job skills training, and showed support to communities, cultures and people in the region, beginning with the first employees from Crooked Creek. Calista Shareholder employees and descendants during the project's exploration ultimately came to total 90% of the workforce, including management level jobs in operations and logistics. This result was achieved through dedicated effort over several years to create a work culture based on responsibility, sobriety, training, safety and personal pride in work. Our shareholders and descendants developed skills that serve them elsewhere and some have launched professional careers in environmental management that began at Donlin Creek.

SER 5 The Calista region experiences some of the highest unemployment rates and lowest family income levels in Alaska and has few other economic opportunities. The Donlin Gold project as proposed would produce gold for more than 27 years, providing well-paying jobs, with a preference for Calista shareholder and local hire. An estimated 3,000 jobs will be created during the approximate four-year construction phase, and between 600 to 1,200 jobs during the estimated life of mine. Post-production reclamation and monitoring will extend employment opportunities beyond production life of mine. These jobs will have a significant and positive impact on the economy of the region and the state. The Donlin Gold project is a rare opportunity to improve the local economy in a place where few other opportunities exist.

SER 11 The social and economic benefits of this project will extend to the region, state, and to the nation. The economic stimulus provided by Donlin Gold would help sustain communities in the Yukon-Kuskokwim region and assist residents to pay the increasing costs of subsistence activities. Rural Alaskans continue to rely heavily on traditional food sources and yet some families are forced to choose between heat, electricity and food. In this century, there has been a steady erosion of traditional subsistence practices, yet there has been nothing put in place of traditional subsistence economies. There is a continuing and

SER 11

growing need to earn personal income to afford the equipment and fuel that allows people to hunt, fish and otherwise provide for their families. Subsistence and economic development go hand in hand.

SER 1

Rural Alaska is being severely impacted by the reduction of state and federal dollars, which has a disproportionately negative impact on rural economies where there are limited to no options for diversified economic development. Lack of jobs in rural areas of Alaska impacts the ability of indigenous people to provide for their families, which is at the core of traditional life and culture. Alternative 1 (the no project alternative) will only deepen impacts of the current downturn of the Alaska economy, that are already being felt. Opportunity to work within the region on a year-round basis will provide alternatives to out-of-region migration for work, so that traditional lifeways and culture can be maintained in place. Mineral resource development has been a single enduring source of rural jobs and, in some areas of the state, it remains the only viable option for economic self-sufficiency.

Calista Corporation and its board of directors strongly support and recommend that Donlin Gold move forward with development of our land as proposed in Alternative 2 and that the BLM reconsider its analysis of the project's impacts on subsistence.

Sincerely,

Calista Corporation

Andrew Guy,
President and CEO

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 * f: (907) 275-2919

**From:** Su Flanders
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Monday, May 02, 2016 1:25:57 PM
**Attachments:** 20160502 R Hoffman ltr supporting EIS.pdf

---

Attached please find a letter from Robert Hoffman regarding the Donlin Gold draft EIS.


**Su Flanders | Corporate Paralegal**
Calista Corporation
5015 Business Park Blvd., Suite 3000
Anchorage, Alaska 99503
Ph: 907.275.2931
Fax: 907.275.2960
Email: sflanders@calistacorp.com


CAL_Logo_3Met

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION

May 2, 2016

Keith Gordon, Regulatory Division
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

I appreciate the opportunity to write a letter in support of the Donlin Gold Mining Project Draft Environmental Impact Statement. My name is Robert Joseph Hoffman from Bethel in the Calista region of Alaska. I retired from the military after 23 years and serve on the Calista Corporation's Board of Directors. Our region is home to two of Alaska's most famous rivers, the Yukon and the Kuskokwim, both isolated and remote and is home to our state's indigenous Yup'ik, Cup'ik and Athabascan people, Calista Shareholders.

There are no roads that connect our region to the rest of Alaska which requires goods to be flown or barged to each community and that makes the cost of living there very high. Add to the hardships of living there the problem that our young people have very few jobs available to them. They continue to have families as they should, but because there are no jobs, they're forced to live with their grandparents for support.

The Donlin Gold project will give them opportunities for jobs and a chance to raise their families on their own. The project will also give them an opportunity for education and to learn new skills such as work with heavy-duty equipment. I sincerely hope the project goes through and provides the opportunity for economic development in our region, jobs and money for our people.

I talk about "a Bible" for the project, which in my mind are the documents that require the steps necessary to ensure the project is safe and will protect our region's subsistence lifestyle. Shareholders understandably have concerns about the project, and the mine closure 50 to 100 years after the mine is completed. They want to make sure the right rules and regulations are continuously followed from the beginning to the end. From what I've learned of the project and the safety measures that have been put in place and are required for the project, "the Bible", it can work. I tell our shareholders that everything is as safe as possible.

SER 11

Our people talk of subsistence, but I tell them without dollars we can't subsist. We need financial assistance to purchase gas, fuel, ammo, food and transportation to pursue our subsistence quests. The project will bring jobs and money to our region and can be done safely.

Sincerely,

Robert Hoffman

5015 Business Park Blvd., Suite 3000 Anchorage, AK 99503
t. (907) 275-2800 · f. (907) 275-2919

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica; Smith, Neal |
| **Subject:** | FW: Draft Environmental Impact Statement Letter 5-4-16 Earl Samuelson |
| **Date:** | Thursday, May 05, 2016 3:25:22 PM |
| **Attachments:** | SKM_C754e16050508330.pdf |

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Thursday, May 05, 2016 1:48 PM
To: Craig, Bill
Subject: FW: Draft Environmental Impact Statement Letter 5-4-16 Earl Samuelson

-----Original Message-----
From: Marlis Luke [mailto:mluke@calistacorp.com]
Sent: Thursday, May 05, 2016 8:57 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Draft Environmental Impact Statement Letter 5-4-16 Earl Samuelson

Good Morning,

Please find the attached letter from Mr. Earl Samuelson RE: Draft Environmental Impact Statement Letter, dated May 4, 2016.

Thank you,

Marlis Luke

CALISTA CORPORATION

5015 Business Park Blvd., Suite 3000 | Anchorage, AK 99503

T: (907) 275-2877

F: (907) 275-2942

mluke@calistacorp.com <mailto:mluke@calistacorp.com>

Blockedwww.calistacorp.com

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION
www.calistacorp.com

May 4, 2016

Keith Gordon, Regulatory Division
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

I appreciate this opportunity to submit comments on the Draft Environmental Impact Statement for the Donlin Gold mining project. My name is Earl Samuelson and I was born and raised in Bethel in the Yukon-Kuskokwim region of Alaska where the mine project is located. I currently live in Napaskiak, a village on the Kuskokwim River. I have been on the Board of Directors for the Calista Corporation, an Alaska Native Corporation under the Alaska Native Claims Settlement Act, (ANCSA) for over a year and a half.

My wife and I have five children raised in the region where I flew airplanes for the Alaska State Troopers for almost 35 years before retiring a year ago. I know the region very well including the mine site I have flown over many times and stopped a few times as well.

PHL 3

As I look at the Draft EIS and consider how the Donlin Gold project can benefit my region, several things come to mind. First is the opportunity for the project to bring relief to the villages that are currently suffering and living in poverty. There are no jobs in the communities and the conditions lead to a high rate of crime including physical and sexual abuse, and drug crimes that are affecting our youth.

The Donlin Gold project would be one way of putting our young people to work bringing from 1500 up to 3000 jobs to the region. There are 30,000 people in the region -- that's enough jobs for 1/10th of our young people and it would be a huge boost to our economy. The project could bring $100 million dollars in payroll a year to our region. Those dollars would contribute to our subsistence lifestyle by allowing us to buy boats and motors to access the fish and game.

As a member of the Board of Directors for Calista Corporation, it's my obligation to find opportunities for economic development in our region. It's difficult because most of the Calista region is a Federal Refuge, which makes it nearly impossible to permit for resource development projects. However, the area where the mining project will take place is unique and is a place where development can happen. Of course, we would have to be careful, but there are many examples that have proven mining and subsistence can work together. The federal and state governments will be watching over the permitting process as they are now.

GAS 1

The project also has the potential to bring cheaper fuel costs to our region through the gas line that is part of the project proposal. Some villages pay as much as $8.00 a gallon for fuel which is a burden on an area where the residents are already having difficult making ends meet.

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

CALISTA CORPORATION
www.calistacorp.com

It is my sincere wish that the project will move forward soon bringing much-needed jobs and economic development to our region. I support Alternative B and I'm confident the project can be done safely and ensure the longevity of our region's subsistence culture.

Sincerely,

Earl Samuelson

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

## Smith, Neal

**From:** Craig, Bill
**Sent:** Wednesday, April 27, 2016 10:37 AM
**To:** Bellion, Tara; Evans, Jessica; Smith, Neal
**Subject:** FW: [EXTERNAL] Donlin letter
**Attachments:** Earl Samuelson Donlin Comment Ltr.doc; ATT00001.txt

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Wednesday, April 27, 2016 8:42 AM
To: Craig, Bill
Subject: FW: [EXTERNAL] Donlin letter

-----Original Message-----
From: Earl Samuelson [mailto:edsamuelsonsr@gmail.com]
Sent: Tuesday, April 26, 2016 8:01 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Donlin letter

CALISTA CORPORATION
www.calistacorp.com

March 30, 2016

Keith Gordon, Regulatory Division
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

I appreciate this opportunity to submit comments on the Draft Environmental Impact Statement for the Donlin Gold mining project. My name is Earl Samuelson and I was born and raised in Bethel in the Yukon-Kuskokwim region of Alaska where the mine project is located. I currently live in Napaskiak, a village on the Kuskokwim River. I have been on the Board of Directors for the Calista Corporation, an Alaska Native Corporation under the Alaska Native Claims Settlement Act, (ANCSA) for over a year and a half.

My wife and I have five children raised in the region where I flew airplanes for the Alaska State Troopers for almost 35 years before retiring a year ago. I know the region very well including the mine site I have flown over many times and stopped a few times as well.

PHL 3

As I look at the Draft EIS and consider how the Donlin Gold project can benefit my region, several things come to mind. First is the opportunity for the project to bring relief to the villages that are currently suffering and living in poverty. There are no jobs in the communities and the conditions lead to a high rate of crime including physical and sexual abuse, and drug crimes that are affecting our youth.

The Donlin Gold project would be one way of putting our young people to work bringing from 1500 up to 3000 jobs to the region. There are 30,000 people in the region -- that's enough jobs for 1/10th of our young people and it would be a huge boost to our economy. The project could bring $100 million dollars in payroll a year to our region. Those dollars would contribute to our subsistence lifestyle by allowing us to buy boats and motors to access the fish and game.

As a member of the Board of Directors for Calista Corporation, it's my obligation to find opportunities for economic development in our region. It's difficult because most of the Calista region is a Federal Refuge, which makes it nearly impossible to permit for resource development projects. However, the area where the mining project will take place is unique and is a place where development can happen. Of course, we would have to be careful, but there are many examples that have proven mining and subsistence can work together. The federal and state governments will be watching over the permitting process as they are now.

GAS 1

The project also has the potential to bring cheaper fuel costs to our region through the gas line that is part of the project proposal. Some villages pay as much as $8.00 a gallon for fuel which is a burden on an area where the residents are already having difficult making ends meet.

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 * f: (907) 275-2919

CALISTA CORPORATION
www.calistacorp.com

It is my sincere wish that the project will move forward soon bringing much-needed jobs and economic development to our region. I support Alternative B and I'm confident the project can be done safely and ensure the longevity of our region's subsistence culture.

Sincerely,

Earl Samuelson

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 * f: (907) 275-2919

| | |
|---|---|
| **From:** | Marlis Luke |
| **To:** | donlingoldeis, POA |
| **Cc:** | Andrew Guy; Bonnie Paskvan |
| **Subject:** | [EXTERNAL] Letter RE: Support for Alternative 2 Donlin Gold Project EIS |
| **Date:** | Monday, May 09, 2016 1:02:40 PM |
| **Attachments:** | 5-9-16 Keith Gordon RE Support for Alternative 2 Donlin Gold Project EIS....pdf |

Mr. Gordon,

Please see the attached letter dated May 9, 2016 RE: Support for Alternative 2 in the Donlin Gold Project EIS.

Thank you,

Marlis Luke
Executive Assistant to Andrew Guy, President & CEO
CALISTA CORPORATION
5015 Business Park Blvd., Suite 3000 | Anchorage, AK 99503
T: (907) 275-2877
F: (907) 275-2942

mluke@calistacorp.com
www.calistacorp.com

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION
www.calistacorp.com

May 9, 2016

Submitted via email to: POA.donlingoldeis@usace.army.mil

Keith Gordon, Project Manager
U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Support for Alternative 2 in the Donlin Gold Project EIS

Dear Mr. Gordon:

Thank you for the opportunity to submit the following comments in support of Alternative 2 in the Donlin Gold Project Draft Environmental Impact Statement ("EIS").

**As an ANC, Calista is mandated by Federal Law to Develop Its Lands and Resources for the Benefit of its Shareholders**. Calista Corporation ("Calista") is one of the 13 Native Regional for-profit Corporations established by Congress in 1971 under the Alaska Native Claims Settlement Act ("ANCSA").[1] As described very recently in the unanimous ruling by the U.S. Supreme Court in Sturgeon v. Frost, ANCSA extinguished aboriginal land claims in Alaska; in exchange, Congress provided a $960 million settlement and permitted Alaska Native corporations to select 40 million acres of federal land to manage within the State of Alaska.[2] ANCSA mandated the formation of Regional and Village Native Corporations to select and receive title to lands and resources to provide economic benefits to their shareholders. Congress expressly and explicitly enacted ANCSA to "rapidly, with certainty," provide for the "real economic and social needs of Alaska Natives."[3] ANCSA calls for maximum participation by Alaska Natives in decisions affecting their rights and property.[4] Congress subsequently passed the Alaska National Interest Lands Conservation Act ("ANILCA") in part to provide "adequate opportunity for satisfaction of the economic and social needs of the State of Alaska and its people."[5]

The lands in question to be developed for the mine are not federal or state-owned parks, refuges or public lands. The Donlin Gold Project is located on privately-owned land, surface lands owned by Calista and The Kuskokwim Corporation ("TKC"). Calista also owns the subsurface mineral estate within the entire Donlin Gold Project. Calista specifically and intentionally selected these lands under ANCSA for their recognized mineral development potential, and the corresponding potential for economic and employment opportunities in the Region. Congress intentionally enacted ANCSA so that Alaska Native Corporations would be able to develop and realize the potential of the land conveyed to them, for the benefit of their Shareholders, a point affirmed by the Ninth Circuit Court of Appeals. Under Alternative 2, Donlin Gold proposes to develop the land at Donlin Creek to build a gold mine in partnership with Calista and TKC, to realize the value of Calista's gold deposits for its Shareholders, in full conformance with ANCSA and ANILCA's Federal mandates.

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[1] 43 U.S.C. § 1601 *et seq.*
[2] Sturgeon v. Frost, Alaska Regional Director of the National Park Service, *et al.*, Slip Opinion No. 14-1209 (March 22, 2016), at 4; 43 U.S.C. § 1605, 1610-1615.
[3] Sturgeon v. Frost at 4, *citing* 43 U.S.C. § 1601(b).
[4] 43 U.S.C. § 1601.
[5] Sturgeon v. Frost, at 5, *citing* ANILCA, 16 U.S.C. § 3101 *et seq.*

**The Socio-Economic Needs for the Donlin Gold Project are Dire**. The economic and social needs to develop the Donlin Gold Mine are dire. The Yukon-Kuskokwim (YK) Region suffers some of the highest unemployment rates and lowest income levels in the U.S. Included in the YK Region, the Kusilvak Census Area's per-capita income makes it one of the very poorest in the U.S.; in 2014, it had the highest percentage of unemployed people in any census area in the U.S., at 23.7%.[6] That statistic is actually drastically under-representative, as it only includes the number of people still actively looking for jobs in a region where few year round, well-paying jobs exist. Many of the villages in the Region suffer Third World conditions, lacking running water or plumbing. Unsurprisingly, with few economic opportunities, the Region struggles with near epidemic rates of suicide, violence, drug- and alcohol-related deaths, child neglect and juvenile delinquency.[7] This project would provide a major economic boost to the YK Region, providing critical jobs and much-needed opportunities and hope.[8] Throughout the Donlin Gold project's 16-year exploration period, Donlin Gold successfully hired locally and focused on job skills training. Calista Shareholder hire rates during exploration reached 90% of Donlin Gold's workforce, including management level jobs in operations and logistics. During exploration, Donlin Gold created a work culture based on responsibility, sobriety, training, safety and personal pride. The Donlin Gold project would produce gold for more than 27 years, providing critical well-paying jobs, with a preference for Calista and TKC shareholder and Regional local hire. As an economic engine for the Region, an estimated 3,000 jobs will be created during the approximate 4-year construction phase, and between 600 to 1,200 jobs during the estimated life of mine, plus post-production reclamation and monitoring jobs. As with any major project, the mine would have positive multiplier effects in the Region and across the state. Personal income is also needed to purchase the equipment and fuel that allows the YK people to engage in subsistence hunting and fishing, cultural, traditional activities for our Yup'ik, Cup'ik and Athabascan Shareholders, that both allow our Shareholders to preserve and keep vibrant their cultures developed over millennia, and to feed their families.[9] These jobs will have a significant, very material and positive impact on the economy of the Region and the state. The Calista Region was not blessed with fuel or other extractable mineral deposits of the magnitude of the gold deposits. The Donlin Gold Project is the unique and critically-needed major economic opportunity for our Region.

SER 10

SER 2

SER 19

**The Tax Savings for Calista would be potentially Enormous**. As described in Calista's CFO Sharon Lechner's letter submitted to the U.S. Army Corps of Engineers on March 28, 2016, when Donlin commences production, Calista would be entitled to reflect the value of the gold extracted as a depletion expense on its state and federal tax returns. Because the depletion allowance is huge compared to Calista's size, Calista would enjoy a tax holiday for about 50 years, saving conservatively a minimum of $500 million, at $10 million per year for 50 years. If Calista would use those savings to provide higher dividends, scholarships, burial assistance, and to invest in profitable businesses to further support its shareholders and invest in economic opportunities both within and outside of the Region.

**High Fuel and Transportation Costs Thwart Development in the YK Region**. In addition to the severe dearth of adequate employment opportunities, power generation costs in the Yukon-Kuskokwim area are several times higher than in urban Alaska and the rest of the nation. Extremely high power and transportation costs arise from the Region's geographic isolation: there are no railways or roads connecting the area's 56 villages to the rest of the state and the country: goods and materials must arrive

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[6] Labor Force Data by County, 2014 Annual Averages. U.S. Bureau of Labor Statistics.
[7] See Donlin Gold Project EIS Governance Capacity Technical Report, AECOM (April 2016), at 30.
[8] See Institute of Social and Economic Research, University of Alaska Anchorage Professor Bob Loffler, "Mining and Sustainable Communities," Economic Development Journal (Volume 14, No. 2, Spring 2015), at 30 ("Red Dog has increased villagers' economic opportunity, provided employment, and increased median household incomes for village residents.... Through NANA's requirement to share profits with other regions, the mine has shared these benefits with Native corporations throughout Alaska.")
[9] *Id.*, at 24.

by barge or air. The Donlin Gold Project contains the potential for lower cost energy options in the Region, as the proposed natural gas pipeline is designed for excess capacity to allow for future access to natural gas for Regional energy needs. The buried pipeline designed will have minimal impacts to the environment, Iditarod Trail use, human or animal movement or view sheds. The natural gas pipeline will greatly reduce the amount of fuel that would otherwise have to be barged in for the Project, reducing the number of barge trips on the Kuskokwim River to the very minimal number of 1-2 a day up and down river. This solution was designed in direct response to concerns expressed by local residents along the river.

**Environmental Compliance and Sustainability have been Overarching Focus of the Donlin Gold Team**. Calista's Board of Directors and officers have fulfilled their Alaska Statutory duty of due care to act in the best interest of our Shareholders[10] by selecting a world class, highly experienced, sophisticated and well-financed business partner to develop the Donlin project—Donlin Gold to build, operate and decommission the mine. Significant environmental concerns are inevitably inherent in the development of any major extraction project. Calista and Donlin Gold have worked in partnership for more than 20 years to extensively research, analyze, minimize and mitigate the risks of this project, to develop a project with maximum, long-term environmental, social and economic sustainability as key drivers. The Donlin Gold EIS addresses the legitimate environmental concerns with best environmental principles and practices, to be built, operated, and then de-commissioned in full compliance with all applicable laws and regulations. No detail is spared. The plan even addresses using local plants for reclamation, to ensure no introduction of foreign, invasive species in the reclamation phase. The project will be scrutinized under a rigorous permitting process that reviews and analyzes all potential impacts. It is noteworthy that this analysis must also include the positive economic impacts of a vibrant resource-based economy. Alaska has 6 existing large producing mines that were permitted under a rigorous review required by the National Environmental Policy Act. As with the other operating mines, the Donlin project is subject to a scientifically-based permitting process that requires as many as 100 State and Federal permits and authorizations. The Donlin project will be subject to stringent stipulations by the State of Alaska Department of Natural Resources and the Department of Environmental Conservation that regulate mining operations statewide and protect wildlife, the environment and human health.[11]

SER 2

**Section 7(i) and 7(j) Revenues will benefit the entire State of Alaska**. Calista will distribute a significant percentage of the mineral royalties from the Donlin Gold project to all other Regional and Village corporations in Alaska, pursuant to ANCSA's Section 7(i) and 7(j) resource revenue-sharing provisions, providing much needed infusions of cash across the State of Alaska. As a Region, Calista can then contribute to growth rather than overburden shrinking governmental budgets, in a time of drastic reductions to our State's oil-based economy.

Calista Corporation's Board of Directors and officers strongly support the Donlin Gold project, to develop our land and resources, as set forth in Alternative 2.

Sincerely,

Bonnie J. Paskvan
General Counsel

---

[10] AS 10.06.450 and 10.06.483.

[11] See "Mining and Sustainable Communities," Economic Development Journal, at 29-30 (Residents of the Red Dog Mine area villages voiced concerns about the mine's potential negative effects on important village subsistence uses: The Alaska Dept. of Fish and Game actually found the mine *improved* water quality; "the agency reports an aquatic environment that is healthier than before the mine existed... ." The ISER study found no significant material negative effects on caribou, whales or fish.)

| | |
|---|---|
| **From:** | Marlis Luke |
| **To:** | donlingoldeis, POA |
| **Cc:** | Andrew Guy; Bonnie Paskvan |
| **Subject:** | [EXTERNAL] Support Letter for Alternative 2 Donlin Gold Project EIS |
| **Date:** | Wednesday, May 18, 2016 2:07:12 PM |
| **Attachments:** | J WERNING DEIS SUPPORT LETTER 5-12-16.pdf |

Mr. Gordon,

Please see the attached letter dated May 12, 2016 RE: Support for Alternative 2 in the Donlin Gold Project EIS from Ms. JoAnn Werning.

Thank you,

Marlis Luke
CALISTA CORPORATION
5015 Business Park Blvd., Suite 3000 | Anchorage, AK 99503
T: (907) 275-2877
F: (907) 275-2942

mluke@calistacorp.com
Blockedwww.calistacorp.com

CAL_Logo_3Met

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION

May 12, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Donlin Mine Draft EIS – Support of Alternative 2

Dear Mr. Gordon:

Please accept this letter regarding the Donlin Gold Mine Draft EIS that is open for public comment.

I serve on the Board of Calista Corporation and have been a Calista Director for over a decade. During that time, Calista has grown into a financially successful and stable corporation. However, its Shareholders (owners) are severely economically disadvantaged, with one of the highest unemployment rates combined with one of the highest costs of living in the entire United States. The dividends and other benefits that Calista pays to its Shareholders are insignificant when compared to the needs of our families to buy fuel, clothing, housing and transportation.

SER 2

When Donlin becomes an active mine, all of Calista's Shareholders will benefit. Some Shareholders will obtain well-paying jobs with benefits (I'm especially grateful knowing that in the past, Donlin has recruited from villages located throughout the Calista Region, such as Emmonak, and not just those villages located closest to the mine). Some Shareholders will benefit as the cost of power to their communities is decreased. But **all** Shareholders will benefit in the form of higher dividends and enhanced scholarships and burial assistance programs.

SER 12

Additionally, many local businesses across the Region will benefit as more Shareholders have more money to spend at local grocery stores, or with increased air travel to Anchorage and vacation destinations outside of the State.

SER 2

Even more, Donlin will be subject to 7(i) revenue sharing with the other Alaska Native Corporations (ANCs). This means that Alaskan Natives across the state will benefit as Calista starts distributing 7(i) money to the other ANCs, who in turn are required to distribute 50% of the payments to their local village corporations in the form of 7(j). Essentially, almost every Alaskan Native will benefit from the mine's operations, in at least one form if not multiple forms.

PHL 3 Development of the Donlin Creek Mine goes beyond just the financial benefits mentioned in this letter; development of the Donlin Creek Mine has the potential to have very positive emotional impacts on many individuals who live in a Region that suffers from one of the highest suicide rates in the nation. Goals to work toward, a bright Future, the happiness that comes with living in a thriving environment, are all good things that Donlin Creek Mine may contribute to the overall Lives of our People.

I support Alternative 2 in the Donlin Mine Draft EIS and respectfully request that Calista Corporation be allowed to develop the resources located on the land that it rightfully owns.

Respectfully,

Calista Corporation

JoAnn Werning
Director

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

| | |
|---|---|
| **From:** | Isaacs, Jon |
| **To:** | Bellion, Tara; DonlinEISAR |
| **Cc:** | Evans, Jessica |
| **Subject:** | Fwd: DEIS Comment FW: Letter of Support for the Alternate 2 of the proposed Donlin Gold Project |
| **Date:** | Wednesday, May 25, 2016 9:32:26 AM |
| **Attachments:** | Letter of Support 5 24 16.pdf<br>ATT00001.htm |

---

Sent from my iPhone

Begin forwarded message:

**From:** "Gordon, Keith POA" <Keith.Q.Gordon@usace.army.mil>
**Date:** May 25, 2016 at 3:36:23 AM AKDT
**To:** "Isaacs, Jon" <jon.isaacs@aecom.com>, "Bellion, Tara" <tara.bellion@aecom.com>
**Subject: DEIS Comment FW: Letter of Support for the Alternate 2 of the proposed Donlin Gold Project**

-----Original Message-----
From: Marva Weeden [mailto:mweeden@calistacorp.com]
Sent: Tuesday, May 24, 2016 4:09 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Letter of Support for the Alternate 2 of the proposed Donlin Gold Project

My support letter is attached.

Marva Weeden

_____

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION
www.calistacorp.com

May 24, 2016

Mr. Keith Gordon
Regulatory Division
US Army Corps of Engineers
P.O. Box 6898
Joint Base Elmendorf Richardson, AK 99506-0898

Re: Support for Donlin Gold Project

Dear Mr. Gordon,

I am writing in support of the Donlin Gold Project. This project will benefit all Alaska Native Corporations thru ANSCA 7(i) payment which further are distributed to village corporations thru 7(j). This will also benefit the struggling state economy thru new taxes being paid to the SOA. The Donlin Gold Project has, in the past, and is expected in the future to provide much anticipated vocational training and employment opportunities that currently do not exist in the economically challenged Kuskowim region and surrounding areas. Approximately 600 to 1,200 jobs will be created as a result of the construction and also during the operational phase for the regional residents. The estimated mine life is 27.5 years. Annual wages would be in the millions statewide while significant increase in sales for the state would increase dramatically.

Donlin Gold's project description demonstrates an understanding of environmental concerns, and features vigorous environmental management principles.

SER 8 I cannot emphasize enough how with the creation of job opportunities this likely will lead to reduced out-migration and will help to maintain rural schools and culture, and including traditional ways of life in the Kuskowim region and surrounding areas.

I highly support Alternate 2 of the proposed Donlin Gold Project.

Sincerely,

CALISTA CORPORATION

Marva Weeden
Executive Assistant
Calista Corporation

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

| | |
|---|---|
| **From:** | Su Flanders |
| **To:** | donlingoldeis, POA |
| **Cc:** | Bonnie Paskvan |
| **Subject:** | [EXTERNAL] Letter re: Support for Alternative 2 Donlin Gold Project EIS |
| **Date:** | Wednesday, May 25, 2016 1:15:29 PM |
| **Attachments:** | 20160525 SF ltr supporting EIS.pdf |

Mr. Gordon,

Attached is my May 25, 2016 letter supporting Alternative 2 in the Donlin Gold Project EIS.

Sincerely,

**Su Flanders | Corporate Paralegal**
Calista Corporation
5015 Business Park Blvd., Suite 3000
Anchorage, Alaska 99503
Ph: 907.275.2931
Fax: 907.275.2960
Email: sflanders@calistacorp.com

CAL_Logo_3Met

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION
www.calistacorp.com

May 25, 2016

Mr. Keith Gordon, Project Manager
US Army Corps of Engineers
Alaska District CEPOA-RD-Gordon
P.O. Box 6898
Joint Base Elmendorf Richardson, AK 99506-0898

Re: Support for Donlin Gold Project

Dear Mr. Gordon,

SER 2 I support Alternative 2 of the proposed Donlin Gold Project. This project will benefit all Alaska Native Corporations thru ANCSA 7(i) payments which are further distributed to village corporations thru 7(j). This will also benefit the struggling state economy with new tax revenues being paid to the State of Alaska, as well as infusions of cash across the state by other means.

The Donlin Gold Project has already provided vocational training and employment opportunities to those in our state who may not have been afforded that without it, and is expected to continue to do the same in the future. Approximately 600 to 1,200 jobs will be created as a result of the construction and also during the operational phase for the residents of the Yukon-Kuskokwim Region. The estimated mine life is 27.5 years. Annual wages would be in the millions, statewide, as a result.

Donlin Gold's project description demonstrates an understanding of environmental concerns which are inherent in this type of project. The project plan features vigorous environmental management principles and validates Donlin Gold's commitment to responsible planning and execution.

SER 8 I cannot emphasize enough how the impoverished Y-K Region will benefit from this project. The creation of job opportunities coupled with the likely reduction of out-migration will help to maintain its rich culture, provide better rural education and maintain traditional ways of life in the Kuskokwim region and surrounding areas.

I strongly support the Donlin Gold project as set out in Alternative 2 to develop Alaska's land and resources, and strengthen our weakening economy.

Sincerely,

Su Flanders

Su Flanders
Corporate Paralegal

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

| | |
|---|---|
| **From:** | Isaacs, Jon |
| **To:** | DonlinEISAR |
| **Cc:** | Bellion, Tara |
| **Subject:** | FW: Support for Alternative 2 Donlin Gold Project EIS Letter 5-26-16 |
| **Date:** | Friday, May 27, 2016 9:52:31 AM |
| **Attachments:** | seebold letter.pdf |

---

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Thursday, May 26, 2016 5:25 PM
To: Isaacs, Jon; Bellion, Tara
Subject: FW: Support for Alternative 2 Donlin Gold Project EIS Letter 5-26-16

-----Original Message-----
From: Marlis Luke [mailto:mluke@calistacorp.com]
Sent: Thursday, May 26, 2016 1:57 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Cc: Bonnie Paskvan <BPaskvan@calistacorp.com>; Andrew Guy <aguy@calistacorp.com>
Subject: [EXTERNAL] Support for Alternative 2 Donlin Gold Project EIS Letter 5-26-16

Mr. Gordon,

Please see the attached letter dated May 26, 2016 in support for Alternative 2 in the Donlin Gold Project EIS, signed by Ms. Frieda Seebold.

Thank you,

Marlis Luke

CALISTA CORPORATION

5015 Business Park Blvd., Suite 3000 | Anchorage, AK 99503

T: (907) 275-2877

F: (907) 275-2942

mluke@calistacorp.com <mailto:mluke@calistacorp.com>

Blockedwww.calistacorp.com <Blockedhttp://www.calistacorp.com>

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"22 CFR Part 125.4 (b) (9) applicable."

CALISTA CORPORATION

May 26, 2016

Submitted via email to: *POA.donlingoldeis@usace.army.mil*

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898
Attn: CEPOA-RD-Gordon

Re: Employment for Calista Shareholders

Dear Mr. Gordon:

If Donlin Creek becomes a mine, it will create thousands of jobs for the shareholders in our region. I have been employed with Calista Corporation for over 30 years. I remember when Donlin Creek was being constructed and in the first stage of exploration, a lot of Calista shareholders from the Calista and other ANSCA villages were employed by Donlin Gold. Unemployment in the Calista region is high and price of everything is very expensive, if Donlin becomes a mine it will give families and youth the choice to learn different types of jobs and skills.

SER 13

I remember when Alyeska was being constructed, there was concerns about subsistence that may get harmed by the oil, but today the animals, berries and plants are still gathered for subsistence.

SER 11

I strongly support Donlin Gold moving forward, because jobs at the mine will allow our shareholders financially and also be able to afford subsistence, not only Calista other ANSCA shareholders will benefit from the project.

I support Alternative 2, the project as it is proposed.

Frieda Seebold

Frieda Seebold
Anchorage/Mekoryuk

5015 Business Park Blvd. Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

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www.calistacorp.com

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# U.S. Army Corps of Engineers Letter Template

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

My name is Svetlana Reid. I was born in Russia and have lived in Alaska since 1999. I work for Calista as an Accounting Manager.

I support the Donlin Gold mine because it will bring more jobs to the YK region. According to some recent studies, Donlin Gold could offer up to 3,000 jobs during construction and between 600 and 1,200 during operation. With more residents able to provide for their family, I believe people will have a greater sense of purpose and quality of life will be improved.

SER 10

The development of the mine and operations promise to be safe for potential employees as well as for the environment and with current technology this, indeed, is achievable.

[redacted] With many struggling for a consistent source of income in the YK region, I believe we need Donlin Gold and the economic stability it could bring to the region. I support the Donlin Gold Alternative 2, as proposed in the DEIS.

Sincerely,

Svetlana N. Reid

| | |
|---|---|
| **From:** | Marlis Luke |
| **To:** | donlingoldeis, POA |
| **Cc:** | Andrew Guy; Bonnie Paskvan; Norman Resnick |
| **Subject:** | [EXTERNAL] Support Letter for Alternative 2 Donlin Gold Project EIS |
| **Date:** | Tuesday, May 31, 2016 11:37:10 AM |
| **Attachments:** | N. Resnick Support Letter Donlin Gold Project EIS.PDF |

Mr. Gordon,

Please see the attached letter dated May 31, 2016 RE: Support for Alternative 2 in the Donlin Gold Project EIS, signed by Mr. Noman Resnick.

Thank you,

Marlis Luke
CALISTA CORPORATION
5015 Business Park Blvd., Suite 3000 | Anchorage, AK 99503
T: (907) 275-2877
F: (907) 275-2942

mluke@calistacorp.com
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CALISTA CORPORATION
www.calistacorp.com

May 31, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Dear Mr. Gordon:

Please accept this letter as my unwavering support for Alternative 2 in the Draft EIS for the Donlin Gold Mine Project. All responsible and objective environmental and other reports indisputably reflect that the Project can and will be constructed and operated in a manner that will protect and respect the Calista Region, its people, land, fish and wildlife, and the Region's subsistence lifestyle. It is incontrovertible that the Project will offer economic opportunities by furnishing high paying positions in an area that is one of the poorest in the nation. And, critically important is the fact that local men and women will learn new skills that will last a lifetime. The positive economic impacts will be experienced in the Region and elsewhere in the State of Alaska.

SER 13

Significantly, the natural gas pipeline will provide the Region with less expensive fuel which allow the Region to affordably continue with subsistence and related activities. As an employee of Calista Corporation, I am keenly aware of the economic and other challenges faced by many people in the Region. It would be shameful to hinder, delay or eliminate the vast and life changing prospects the Project offers.

Thank you for your courtesy and consideration in reviewing this letter and my concerns for the future of the Calista Region.

Sincerely,

Norman Resnick
Associate General Counsel

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

| | |
|---|---|
| **From:** | Kirsten Kinegak-Friday |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Comment Letter |
| **Date:** | Friday, May 27, 2016 1:18:03 PM |
| **Attachments:** | 52716 Gordon Letter Re Support for Alternative 2 in the Donlin Gold Project EIS.pdf |

Mr. Gordon,

Please see attached letter RE: Support for Alternative 2 in the Donlin Gold Project EIS. Thank you.

**Kirsten M. Kinegak-Friday** | Associate General Counsel
**Calista Corporation** | 5015 Business Park Blvd., Suite 3000 | Anchorage, AK 99503
Main: (907) 275-2800 | Direct: (907) 275-2840 | Cell: (907) 301-4489
kkfriday@calistacorp.com | Blockedwww.calistacorp.com

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CALISTA CORPORATION
www.calistacorp.com

May 27, 2016

*Submitted via email to: POA.donlingoldeis@usace.army.mil*

Keith Gordon, Project Manager
U.S. Army Corps of Engineers
Alaska District CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Support for Alternative 2 in the Donlin Gold Project EIS

Dear Mr. Gordon:

Thank you for the opportunity to submit the following comments in support of Alternative 2 in the Donlin Gold Project Draft Environmental Impact Statement ("EIS").

I was born and raised in Bethel, so I grew up on the Kuskokwim River. Although I haven't lived there in 13 years, my family is there, I go back often, and will always consider it to be home.

**The Economic Benefit to the Region Would Be Huge**. The Yukon-Kuskokwim Region suffers some of the highest unemployment rates and lowest income levels in the country. Included in the Region, the Kusilvak Census Area's per capita income makes it one of the poorest in the country; in 2014, it had the highest percentage of unemployed people in any census area in the U.S., at 23.7%.[1] That statistic is actually drastically under-representative, as it only includes the number of people actively looking for jobs in a region where few year-round, well-paying jobs exist. Many of the villages in the Region suffer Third World conditions, lacking running water or plumbing. Unsurprisingly, with few economic opportunities, the Region struggles with near epidemic rates of numerous social ills.[2]

PHL 8

SER 5

This project would provide a major economic boost to the Region, providing critical jobs and much-needed opportunities. Throughout the Donlin Gold project's 16-year exploration period, Donlin Gold successfully hired locally and focused on job skills training. Calista Shareholder hire rates during exploration reached 90% of Donlin Gold's workforce, including management-level jobs in operations and logistics. During exploration, Donlin Gold created a work culture based on responsibility, sobriety, training, safety, and personal pride. The Donlin Gold project would produce gold for more than 27 years, providing critical well-paying jobs, with a preference for Calista and TKC shareholder and Regional local hire.

As an economic engine for the Region, an estimated 3,000 jobs will be created during the approximate 4-year construction phase, and between 600 and 1,200 jobs during the estimated life of mine, plus post-production reclamation and monitoring jobs. As with any major project, the mine would have positive multiplier effects in the Region and across the state.

Good jobs will provide the income needed to purchase the equipment and fuel that allows the Region's people to engage in subsistence hunting and fishing, and other cultural and traditional activities. This will

[1] Labor Force Data by County, 2014 Annual Averages. U.S. Bureau of Labor Statistics.
[2] See Donlin Gold Project EIS Governance Capacity Technical Report, AECOM (April 2016), at 30.

allow our Shareholders to both preserve and keep our cultures vibrant and feed our families. These jobs will have a significant, very material, and positive impact on the economy of the Region and the state. The Donlin Gold project is a critically-needed major economic opportunity for our Region.

GAS 1 **High Energy and Transportation Costs Thwart Development in the Region.** In addition to the severe dearth of adequate employment opportunities, energy costs in the Region are several times higher than in urban Alaska and the rest of the nation. Extremely high energy and transportation costs arise from the Region's geographic isolation: there are no railways or roads connecting the area's 56 villages to the rest of the state: goods and materials must arrive by barge or air. The Donlin Gold project contains the potential for lower cost energy options in the Region, as the proposed natural gas pipeline is designed for excess capacity to allow for future access to natural gas for Regional energy needs. The buried pipeline as designed will have minimal impacts to the environment, Iditarod Trail use, and human or animal movement. The natural gas pipeline will greatly reduce the amount of fuel that would otherwise have to be barged in for the project, reducing the number of barge trips on the Kuskokwim River to 1-2 a day. This solution was designed in direct response to concerns expressed by local residents.

SER 2 **Section 7(i) and 7(j) Revenues will Benefit all ANCs.** Calista will distribute a significant percentage of the mineral royalties from the Donlin Gold project to all other Alaska Native Regional and Village corporations in Alaska, pursuant to ANCSA's Section 7(i) and 7(j) resource revenue-sharing provisions, providing much needed infusions of cash across Alaska. As a Region, Calista can then contribute to growth rather than overburden shrinking governmental budgets, in a time of drastic reductions to our State's oil-based economy.

SER 19 **The Tax Savings for Calista Could be Huge**. As described in Calista's CFO Sharon Lechner's letter submitted to you on March 28, 2016, when Donlin starts production, Calista would be entitled to reflect the value of the gold extracted as a depletion expense on its state and federal tax returns. Because the depletion allowance is huge compared to Calista's size, Calista would enjoy a tax holiday for about 50 years, saving a minimum of $500 million, at $10 million per year for 50 years. Calista would use those savings to provide higher dividends, scholarships, burial assistance, and to invest in profitable businesses to further support its shareholders and invest in economic opportunities both within and outside of the Region.

I support Alternative 2 in the Donlin EIS because it would provide so many direct and indirect benefits to one of the poorest parts of the country, as well as the whole state.

Sincerely,

Kirsten Kinegak-Friday
Associate General Counsel

| | |
|---|---|
| **From:** | George Owletuck |
| **To:** | donlingoldeis, POA |
| **Cc:** | George Owletuck |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, May 31, 2016 4:07:35 PM |
| **Attachments:** | image003.png<br>Donlin Creek comment Letter Owletuck.pdf |

George Owletuck, MA
Government Relations Liaison
CALISTA CORPORATION
5015 Business Park Blvd, Suite 3000
Anchorage, AK 99503-7146
Phone: (907) 275-2800

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''22 CFR Part 125.4 (b) (9) applicable.''

George Owletuck
PO Box 671103
Chugiak, AK 99567

May 31, 2016

Keith Gordon, Regulatory Division
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

Thank you for extending opportunity to submit comments on the Draft Environmental Impact Statement for the Donlin Creek mining project. My name is George Owletuck, from Marshall, AK on the lower Yukon River. I have been on the Board of Directors for the Marshall Village Corporation—Maserculiq, Inc.—an Alaska Native Corporation under the Alaska Native Claims Settlement Act, (ANCSA) 1993-2000, and 2001 to 2016. As a board member, it is my duty to facilitate economic development and job opportunity for shareholders. I was born in Bethel and raised in subsistence lifeways hunting, fishing and gathering at Marshall, AK—this commentary is presented as an individual from the region.

SUB 18 The Donlin Gold project would bring $100 million dollars in payroll a year to our region, employing up to 3,000 local residents. Those dollars would contribute to our subsistence lifestyle by allowing us to buy boats and motors to access the fish and game. Additionally, the employment will provide opportunity

PHL 7 for participation in private health insurance, significantly reducing the burden on the Indian Health Service at the Yukon-Kuskokwim Health Corporation in Bethel. Private health insurance will provide up to 3,000 local residents opportunity to seek health care from private health care providers in Anchorage.

GAS 2 The construction of a natural gas pipeline to Donlin Creek could be extended to add critical energy infrastructure to the region. A cost-benefit analysis should be conducted to extend this base infrastructure to the proposed Birch Tree Crossing Port—or Aniak—on the Kuskokwim River and be evaluated as a potential site for mega-wattage electric power generation using electric inter-ties and as a potential site to produce LNG for distribution to the region.

Local LNG production will reduce Diesel Barging with the use of LNG-Powered Haul Trucks, which would reduce impacts to fish and subsistence fishing in narrow reaches of the Kuskokwim River. Local

SUB 23 Traditional Knowledge is the best source for unbiased, authoritative expertise in the analysis of subsistence impacts by this project. Any assertions about potential impacts to subsistence should

SUB 23

George Owletuck
PO Box 671103
Chugiak, AK 99567

originate from the people who live in the region, not urban agencies with conclusions about subsistence impacts unsubstantiated by baseline data. Any subsistence analysis on ANCSA land under Section 810 of ANILCA should be done by the land owners, not by US Bureau of Land Management bureaucrats who have provided biased analysis that grossly overstates the proposed projects' impacts on subsistence. The Draft EIS completed by the Corps of Engineers better reflects the potential impacts of the project. However, no one understands the importance of subsistence and the economic benefit of this project better than the people who live in—and are from—the region.

SER 13

Annual Airport Operations at the Mine Airstrip are estimated at 5,154 total annual flight operations for the construction phase and 1,718 flight operations for the Operations phase. These flight operations should be viewed as an opportunity for partnership with the Yuut Yaqungviat flight school in Bethel, AK to recruit, train and hire local residents to begin careers in aviation.

The Donlin Creek ore-body is estimated to produce 34 million ounces of gold over 25 years valued at $40.14 Billion at a $1,216.5/oz spot-price for gold on May 2016.

GAS 2

Industry, the State of Alaska and the federal government should consider using public-private partnerships to underwrite the existing lack of infrastructure in the region for low-cost energy.

GAS 2

Federal/State legislation should be introduced to provide for industry tax-credits and other incentives to extend the gas pipeline beyond the Birch Tree Creek Port site, and to underwrite sub-regional mega wattage electrical power plants to serve multiple villages using high-power electric interties.

PUB 2

I support Alternative B and expect that the Donlin Creek mine will be developed safely and the jobs created will greatly under-write our region's subsistence culture. Finally, it is noted with gratitude the efforts of the US Army Corps to provide transparency and engage the public on commentary for the Donlin Gold Project Draft Environmental Impact Statement.

Thank you for the opportunity to comment.

Respectfully,

George Owletuck

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www.calistacorp.com

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AK REGULATORY

April 26, 2016

Keith Gordon, Regulatory Division
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

Thank you very much for giving me the opportunity to comment on my support for the Donlin Gold Mine Project and Alternative 2 of the Draft Environmental Impact Statement.

My name is Margaret Pohjola originally from Chuathbaluk, where I grew up. Chuathbaluk is a village on the Kuskokwim River in Alaska 100 miles upstream from Bethel. Today, there're around 123 people who live there.

I grew up in a subsistence household where we put up fish during the summer. My dad went trapping in the winter and sold the pelts to help support our family. I completely understand the concern for protecting the rivers and streams of the Yukon-Kuskokwim Region.

SUB 2 However, I believe Donlin has a plan in place to respond to any spills that help relieve concerns for protecting our subsistence way of life. The project is also far enough away from Chuathbaluk that it will have no impact on our berry picking.

I serve as the Chair of the Board of Directors of the Calista Corporation, which owns the land where the gold mine will be developed. The shareholders of the Calista Corporation expect responsible development that will provide job opportunities in the region. In addition, the infrastructure associated with the project has the potential to help reduce the high cost of living in our region.

I believe Donlin has taken the steps necessary to ensure responsible resource development in the region that will bring opportunity and benefits to the people of the region and hope the project will be allowed to move forward.

Sincerely,

Margaret Pohjola
Chair of the Board

5015 Business Park Blvd., Suite 3000, Anchorage, AK 99503
t: (907) 275-2800 • f: (907) 275-2919

| | |
|---|---|
| **From:** | Dave Cannon |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Comments From Dave Cannon For The Donlin Gold DEIS |
| **Date:** | Tuesday, May 31, 2016 12:23:30 AM |
| **Attachments:** | CannonDEISComments4_26.pdf |

Hello Keith/Sheila,

Please find attached my comments on the Donlin Gold DEIS.

Sincerely

Dave Cannon

May 30, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA–RD–Gordon
P.O. Box 6898
JBER, AK, 99506–0898
E: POA.donlingoldeis@usace.army.mil

Dear Mr. Gordon,

Thank you for the opportunity to comment on the Donlin Gold Draft Environmental Impact Statement. I'm a fish biologist who has lived and worked in the Kuskokwim Drainage for over eighteen years. During that time I've worked for the U.S. Fish & Wildlife Service, The Kuskokwim Native Association and the Native Village of Napaimute.

I'll begin by stating that I concur with the BLM's Section 810 Determination that states that there will be significant impacts to subsistence resources and/or subsistence users within the Kuskokwim River resulting from the operation of the Donlin Gold mine as described in all alternatives except Alternative 1.

As it stands now, the majority of the Corps of Engineer's draft determinations throughout the DEIS have been given a rating of minor to moderate. However, given the immensity of the size and scope of the proposed project (i.e., possibly the world's largest gold mine) the question that must be asked at the very least is just how many moderate impacts would combine to synergistically coalesce into a significant one?

**IMPACT TO THE KUSKOKWIM RIVER & SUBSISTENCE RESOURCES**

ANIL 9

The following is found in Section 3.21-166 of the DEIS: *Barging could potentially affect subsistence fishing by generating propeller wash and wakes that could interfere with fish nets, fish cutting rafts or fish wheels, and processing rafts, or erode river banks so that people either have to abandon or move fish camps*.

That statement alone supports the BLM's Section 810 Determination.

BARG 18

However, to support the increased barging required for construction and operation of the proposed project, a substantially larger cargo terminal will be necessary in Bethel. A direct impact from that terminal would be to the traditional drift spot located across the river.

The Bethel Native Corporation provided the following comments during the initial scoping statement period that were incorporated into the draft document:

*The "choke point" is magnified because the east bank of the Kuskokwim River, located opposite the proposed dock, is shallow and will become increasingly more shallow due to the natural flow*

*of the river and be accelerated by Knik's proposed dock expansion into the River. This site on the east bank is a traditional subsistence fishing site for BNC shareholders. The erosion caused by Knik's project would negatively impact BNC lands in the vicinity, including BNC lands and Indian trust lands on the east back [sic] through severe scouring or shoaling...* (Bethel Native Corporation 2014).

The draft document then had this to say regarding the potential hydrologic impacts that could alter a substantial section of river channel downstream of the terminal location, "*Additional discussion between the permit applicant and the Corps is underway regarding the potential hydrological effects."* (Section 3.21-159)

Section 3.13.2.2.1 states, "*Downriver of Aniak, the river is characterized by low gradient, interconnected meandering channels and sloughs. Tidal influence extends from Kuskokwim Bay upriver to Tuluksak (RM 136). Substantial lateral movement of the channel, which shifts continuously in response to changing levels of flow, has resulted in extensive natural bank erosion, riverbed scour, and high sediment loading*."

The following poster was provided by Donlin Gold in late April of 2016 at a meeting in Aniak and shows the construction of approximately 600 feet of riprap with a sheet pile bulkhead dock located at the existing Knik port site.

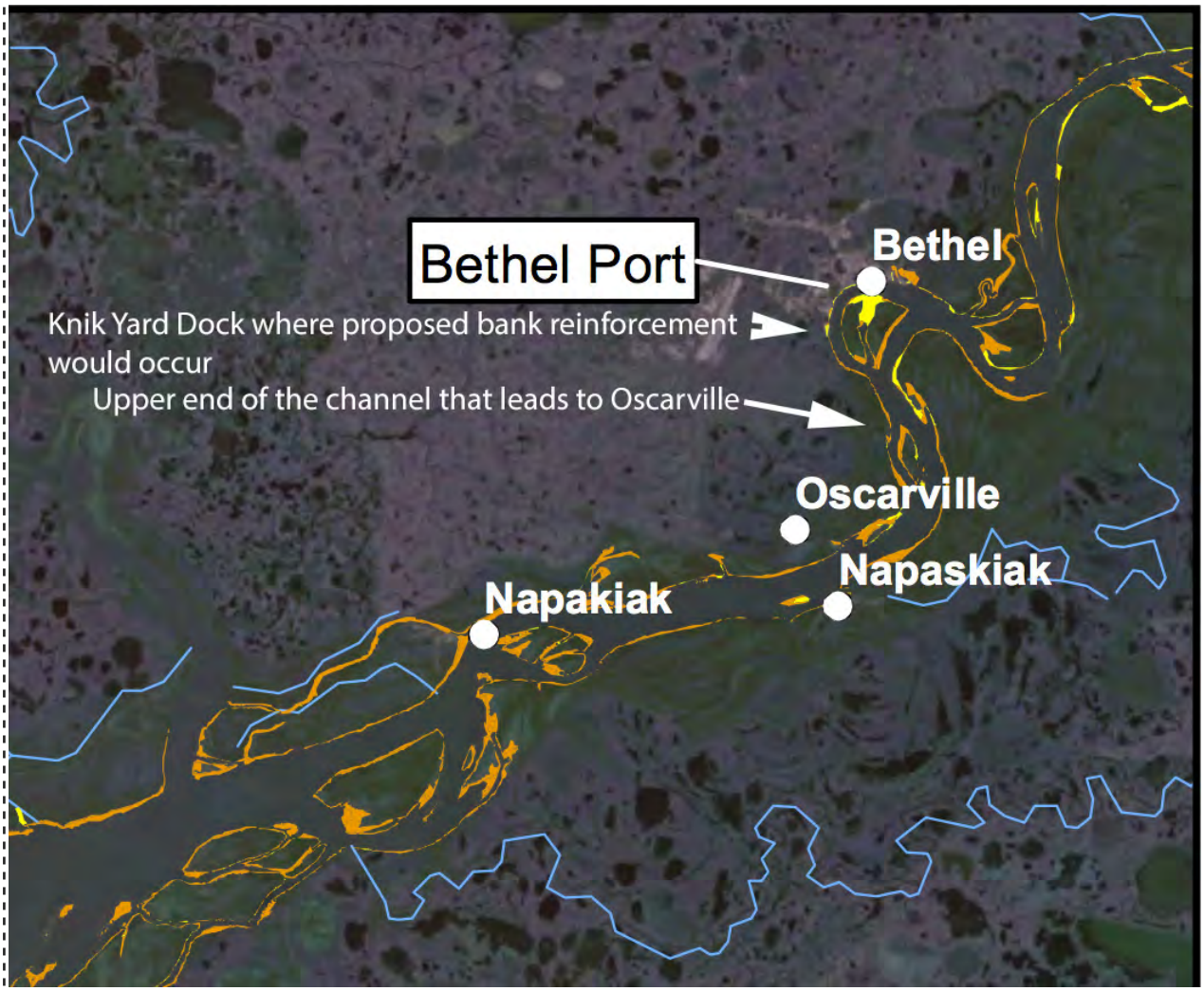
BARG 10

Such reinforcement of the bank will divert stream channel energy away from the newly constructed section that could possibly exacerbate and accelerate the natural erosional

BARG 10 processes in downstream reaches resulting in repercussions with the village of Oscarville…especially considering cumulative effects from further upriver already reinforced sections (i.e., the seawall protecting Bethel).

The figure below is taken from Figure 3.5-13 of the DEIS and denotes the depositional areas in yellow and the actively eroding sections of channel in orange. Note how the upper end of the side channel that flows past Oscarville (and is less than one mile below the proposed port site) is labeled as susceptible to erosion as well as much of the west bank of the Kuskokwim River between Bethel and Oscarville.

BARG 9




BARG 11 **A thorough analysis by a hydrologist who specializes in large river systems should have been included in the Draft EIS, and must be considered in the Final EIS so that residents of the region are fully aware of potential trade-offs.**

## IMPACTS TO CROOKED CREEK

The excerpt from the table below (Table 3.13-30) shows the likely impacts to Crooked Creek with the proposed alternative - Alternative 2. Other than the No Action alternative, the impacts would be the same for any alternative.



Table 3.13-30: Impact Levels of Alternative 2 by Project Component and Impact Type

| Impact-causing Project Component | Magnitude or Intensity | Duration | Geographic Extent | Context | Summary Impact* |
|---|---|---|---|---|---|
| Mine Site | | | | | |
| In-stream habitat removal and fish loss | American Cr. – High<br>Lewis Gulch – Med<br>Anaconda Cr – High<br>Snow Gulch – Med<br>Omega Gulch – Med | Permanent<br>Permanent<br>Permanent<br>Permanent<br>Permanent | Local<br>Local<br>Local<br>Local<br>Local | Important<br>Common<br>Important<br>Common<br>Common | Moderate<br>Minor<br>Moderate<br>Minor<br>Minor |
| Water management practices | MSA Tributaries - Med<br>Crooked Creek- Low | Permanent<br>Permanent | Local<br>Local | Important<br>Important | Minor<br>Minor |
| Water quality practices | Low | Permanent | Local | Important | Minor |
| Wetland and Riparian Buffer Removal | Medium to High | Short to Long-term | Local | Important | Moderate |
| Streamflow changes and overall aquatic habitat | Mid Reaches – Med<br>Lower Reaches – Low<br>Mid and Lower Reaches Under *High K* Scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Moderate<br>Minor<br>Major |
| Streamflow changes to off-channel aquatic habitat | Mid Reaches – Low to Med<br>Lower Reaches – Low<br>Mid/Lower Reaches *High K* Scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Moderate<br>Minor<br>Major |
| Streamflow changes and mainstem aquatic habitat | Medium<br>*High K* scenario - High | Long-term<br>Long-term | Local<br>Local | Important<br>Important | Moderate<br>Major |
| Streamflow changes and salmon spawning habitat | Medium<br>*High K* scenario - High | Long-term<br>Long-term | Local<br>Local | Important<br>Important | Moderate<br>Major |
| Streamflow changes and freezing of salmon spawning substrate | Middle Reaches – Low<br>Lower Reaches - Negligible<br>Mid/Lower Reaches *High K* scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Minor<br>Negligible<br>Major |
| Streamflow changes and Crooked Creek salmon production | Middle Reaches – Medium<br>Lower Reaches - Negligible<br>Mid/Lower Reaches *High K* scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Moderate<br>Negligible<br>Major |
| Stream temperature changes in Crooked Creek | Near MSA - Low to Medium<br>Lower Crooked Creek - Low | Permanent<br>Permanent | Local<br>Local | Important<br>Important | Minor to Moderate<br>Minor |

FISH 3

Section 3.13-109 states: *Should the underlying geology of Crooked Creek reflect a high level of hydraulic conductivity, flow reductions in Crooked Creek between American Creek and Crevice Creek could be as high as 85 to 100 percent during Year 20 of operations. Farther downstream in Crooked Creek, flow reductions of 40 to 31 percent could occur near Getmuna and Bell creeks,*

*respectively (BGC 2015c). In this case, predicted streamflow reductions of such a high intensity would result in major impacts to salmon production in the middle and lower reaches of Crooked Creek.*

Tom Myers (May 2016) notes that much of the area is geologically heterogeneous and that high K fault areas coupled with high K bedrock values could actually result in water losses of over three times that of the modeled scenarios provided by Donlin Gold.

Section 3.13-95 states: *The context of flow impacts is important since the Crooked Creek drainage from its mouth to the Donlin Creek drainage is regulated as EFH (Essential Fish Habitat) as it supports key life stages of salmon and other fish that are important to the Kuskokwim River subsistence community. Overall, streamflow reductions would result in aquatic habitat impacts that would range from moderate to minor and could be major under a High K scenario.*

Section 3.13-96 follows up with: *Reduced flows also could affect the frequency with which off-channel habitat maintains connection with the main channel. This is an important consideration because although off-channel habitats would likely re-connect to the main channel at some point during the year when the water stage increases, connections may no longer occur during very low flow periods in summer or winter resulting in temporary isolation of off-channel habitats from the main channel. This could affect rearing or spawning life phases of fish due to fish stranding and potential mortalities. Furthermore, a reduction in off-channel (or in-channel) winter habitat may adversely affect the survival of overwintering fish or incubating eggs if flows are reduced to the point where the water column becomes too shallow and freezes completely.*

FISH 3

FISH 3 The photograph above shows natural conditions in the Aniak River, and is used to demonstrate how if 1/3 or more of the water were to be removed from Crooked Creek during the winter months would negatively affect more than the eggs normally exposed to threatening conditions.

**HOW IMPORTANT IS CROOKED CREEK & MAINTAINING BIOLOGICAL DIVERSITY THROUGHOUT THE ENTIRE KUSKOKWIM?**

FISH 4 The draft document states that Crooked Creek produces between only 0.1 and 0.2 percent of the entire Kuskokwim River's king salmon drainage-wide escapement goal. Similarly, the document estimates that roughly only 0.3 to 0.8 percent of the chum salmon escapement goal is produced in Crooked Creek (although there is no chum escapement goal for the Kuskokwim River (Section 3.13-109)). None-the-less, both species contribute less than 1 % of their respective overall population for the entire drainage.

But those fewer fish - particularly Chinook salmon - may be vulnerable to subsistence or commercial harvest (i.e., incidentally during chum commercial openings) in the mainstem Kuskokwim, thereby lowering Crooked Creek's returns that much further.

The context of that is highlighted in Section 3.18-21 - *The oil and gas industry is also important to Alaska's fiscal health and overall economy because it is the funding source for the Alaska Permanent Fund, which is Alaska's largest financial asset……..The fund is invested in a diverse* ***portfolio*** *of stocks, bonds, and real estate, and has grown in value to nearly $46.3 billion as of August 2013 (Goldsmith 2010b; Alaska Permanent Fund Corporation 2013).*

Biologists use a similar strategy when it comes to preserving biological diversity; in this case, conserving that diversity of the different Chinook salmon stocks in the entire Kuskokwim drainage (Schindler et al. 2010). The Kuskokwim drainage has had at least two river systems where habitat alteration or heavy exploitation associated with historic dredge mining activities are known to have reduced their biological productivity potentials.

In the early 1900's the Takotna River was transformed into a major access route for the Yukon's Innoko Mining District while the village of Takotna became a staging area and supply point for the mining activities (Molyneaux et al. 2000). During the summer months Takotna was a summer kenneling area for the dog teams used to support the miners, which fed the dogs salmon. Between dredging in several sections of the Takotna drainage, disturbance from steamboat activity, and the over-exploitation of salmon for dog food, salmon were basically extirpated from the Takotna River. (Elison et al. 2009)

It was not until the 1980's did local residents begin noticing salmon returning to the Takotna River. The Department of Fish & Game decided to support the village of Takotna in documenting the return of the salmon, and a counting tower operated by students between 1995 and 1999. A weir replaced the tower in 2000 and operated until 2013 in a cooperative effort between the Takotna Tribal Council and ADF&G (Elison et al. 2009).

During the operation of the weir, the percentage of females returning to the Takotna River has averaged 25 percent (the range being 13 to 46%). The range of Chinook returning each year

has been between 97 to 721, with a steady decline the past seven years of operation. In 2010 only 25 females returned, 51 in 2011, 36 in 2012, and 25 in 2013.

From an investment perspective, the future of Takotna River Chinook salmon would be termed bearish…meaning on the downward slide. Hopefully, it doesn't bottom out completely.

Similarly, the future of the Tuluksak's Chinook salmon is just as tenuous. This river system has experienced a drastic reduction of productivity due to past dredge mining that resulted in substantial habitat destruction. Consequently, the degraded habitat in conjunction with recent poor ocean conditions have resulted in only 52 female Chinook salmon escaping past the weir in 2010, 75 in 2011, 183 in 2012, 75 in 2013, and only 96 in 2014. (Miller and Harper 2014)

Miller and Harper (2015) note that although the sockeye, chum, and silver salmon in the Tuluksak River have remained relatively stable – or actually increased, the Chinook salmon population is severely depressed; they wonder just how those limited females will be able to contribute to future runs.

In addition, recent increases in the number of Chinook salmon reaching McGrath and beyond the past two years due to the implementation of severe subsistence fishing restrictions, indicates that the heavy unrestricted subsistence fishing pressure (including the use of unlimited mesh size gear) in the lower river over the years likely has had a negative influence on the population structure of the upriver stocks; the term used by biologists to describe this practice as "front end loading". Ray Collins, a member of the Kuskokwim Salmon Management Working Group and other respected elders, have expressed concern of this occurring for at least fifteen years. This front end loading tends to occur in most in-river fisheries where there is heavy pressure in the lower portion of river, and is also thought to occur in the Yukon River to the north of us.

FISH 4

It's possible that each stream's individual fish population may be uniquely adapted genetically to their respective river, but it's not known if that's the case for Crooked Creek Chinook salmon. If a high K scenario played out, then Crooked Creek's salmon production would be reduced significantly as noted in Table 3.13-30, and if they were genetically unique, then that would lessen the diversity of the Kuskokwim's portfolio, thereby weakening the drainage's resilience when large-scale influences, such that climate change, might bring (Daniel Schindler, personal communication). This is something that needs to be considered in the Cumulative Effects section of the EIS.

**IMPACTS TO SMELT**

FISH 8

Another impact from the proposed activity would be on a major food item heavily relied on by subsistence users from Eek to Chuathbaluk as well as numerous coastal villages – and that would be to the smelt. Very little – even traditional knowledge - is known about the spawning habits of this small, but ecologically important fish.

The table below shows the impacts that tugs are expected to have on the smelt eggs.

Table 3.13-30: Impact Levels of Alternative 2 by Project Component and Impact Type

| Impact-causing Project Component | Magnitude or Intensity | Duration | Geographic Extent | Context | Summary Impact* |
|---|---|---|---|---|---|
| Erosion & sedimentation<br>Methylmercury emissions | Low to Medium<br>Low in wetlands<br>Medium in water | Long-term<br>Long-term<br>Long-term | Local<br>Regional<br>Regional | Important<br>Important<br>Important | Minor to Moderate<br>Minor to Moderate<br>Minor to Moderate |
| Contamination and Fuel Spills | Low | Long-term | Local | Important | Minor |
| Transportation Infrastructure | | | | | |
| Vessel wave energy impacts on nearshore erosion, turbidity, water temperature | Turbidity – Low<br>Water Temp – Low | Long-term<br>Long-term | Local<br>Local | Important<br>Important | Minor<br>Negligible to Minor |
| Fish displacement and stranding | Low to Medium | Long-term | Local | Important | Negligible to Moderate |
| Prop wash scour of riverbed substrates and fish spawning gravels | Medium to High | Long-term | Local | Important | Moderate to Major (in shallow, narrow channels) |
| Propeller-induced fish injury and mortality | Low to High | Long-term | Local | Important | Negligible to Moderate |
| Mine access road | Road work and stream | Long-term | Local | Important | Minor |

Baseline information for Crooked Creek has been collected for many years to provide a good understanding of the characteristics of an undisturbed population. For the smelt, however, there's **only been two years of data collected** as to where and when they spawned and what type of habitat they selected (Moulton and Morris 2015).

FISH 8 During those two study years there was quite a bit of variability between the run timing and location of spawning; it's believed that water temperature is the major variable affecting the run timing while the stream velocity and channel substrate influence where the smelt decide to spawn. In 2014 the smelt averaged 28-miles a day on their upstream migration, while the second year only averaged 16. During that first year the bulk of the smelt spawned upstream of the Kalskag villages on May 22nd in a section of river approximately 4-miles long, while the second year they spawned roughly 5-miles below Lower Kalskag on May 29 in a section of river 3-miles long (Moulton and Morris 2015).

However, studies done elsewhere have determined that on average, development takes roughly 21 days. Based on the water temperatures during the 2014 and 2015 studies, the eggs most likely developed within 11 and 19 days (Larry Moulton Owl Ridge Natural Resource Consultants - personal communication).

The graph below shows how low the Kuskokwim River water levels have been four of the last six years during the smelt run.

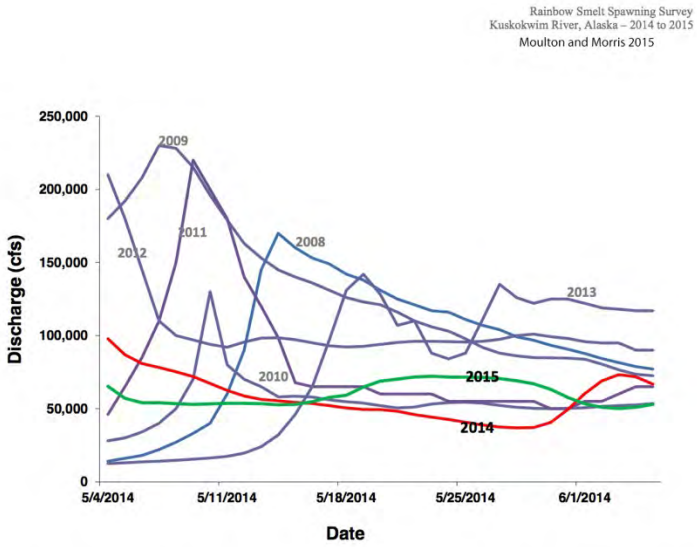



FIGURE 2: KUSKOKWIM RIVER DISCHARGE DURING MAY, 2008 TO 2015, SHOWING THE UNUSUAL POST-BREAKUP FLOW PATTERN IN 2014 AND 2015 (2014 DISCHARGE IN RED, 2015 IN GREEN).

The concern with the smelt is that for all practical intents and purposes, it is a single population that enters the mouth of the Kuskokwim at the same time as opposed to a long protracted run for chums, kings and other salmon species. They then travel in a group upstream to their relatively limited area or areas to spawn. If something were to happen that would reduce the spawning and egg development success for any given year, a significant proportion of the population could be in jeopardy. FISH 8

Looking back at Table 3.13-30 above, the Summary Impact level regarding the effects of riverbed prop wash scour on smelt eggs was determined to be moderate to major. In 2014 spawning occurred in pretty much one area approximately four miles long, with eggs found in depths from 4.9 feet to 13.7 feet; the majority (67%) were in water 5.9 feet to 8.8 feet deep. In 2015, smelt were documented using two areas in close proximity to spawn that totaled three linear miles, one in the main channel and the other in a side channel. The depth varied from 8.3 feet to 23.2 feet; 94% were documented to be in 8.5 feet to 18.3 feet of water (Moutlon and Morris 2015). However, with only two years of data, it is uncertain exactly what the geographic range is where smelt spawn.

On page 149 of the biological section of the analysis (Section 3.13), the draft document states the following based on computer modeling: *Impacts from prop wash could be reduced if barge traffic between late May to mid-June travels along the deepest portions of the channel in reaches where rainbow smelt spawning has been previously documented. Disturbance to substrates (and incubating eggs) would be* ***minimized if*** *barges travel along depth contours that would allow the tug to maintain a gross under keel clearance greater than 15-20 feet* (you must add 3 to 7.5 ft. to compensate for the draft of the tug). ***During the 2015 rainbow smelt spawning survey, spawning occurred as shallow as 8.7 feet along a relatively confined channel segment. In such locations, a medium to high level of injury or mortality to incubating eggs could have resulted from the propeller scour of passing tug traffic, depending on the tug's horsepower rating and engine speed. Because of the narrow width and relatively***

***shallow depth across this particular channel segment, it is unlikely that impacts to incubating rainbow smelt eggs could have been avoided by altering the line of travel of barge traffic*** (emphasis added). *Similar impacts to other resident fish species that could spawn in the mainstem channel also would be at risk.*

***Based on this analysis, prop wash from a tug in passage is expected to cause a medium to high intensity of scouring to gravel-size riverbed substrates at localized areas along the navigation route, particularly in waters with an under keel depth shallower than approximately 8 to 10 feet. Such impacts would extend over a long-term duration from construction through operation.*** (emphasis added)

Here are a few of the impact reducing design features noted on page 150 in the draft document in Section 3.13:

*To minimize or avoid impacts of prop wash forces on early life stages of fish and in recognition of ever-changing river conditions, a series of operational measures would be implemented that include:*

- *Maintaining detailed logs of river conditions, including measurements of depths and current speeds and directions at critical reaches, by tug captains during each trip with information made immediately available to other fleet captains;*
- *Restricting passages through shallow and narrow river segments with sharp bends to one-way traffic using radio check control when approaching and after completing such passages; and*
- *Use of electronic charts, GPS radar overlay, barge speed and location monitoring, continuous crew training, river navigation aids along the travel route, and an ongoing analysis and mapping of areas with potential operational and ecological risks.*

FISH 8

Page 143 of Section 3.13 state: *To minimize potential impacts of bed scour, barge traffic would be tracked using GPS and real-time river stage and depth monitoring systems to **ensur**e vessel passages are conducted through the deeper portions of the channel, especially in confined and shallow segments of the river.*

The use of the word **ensure** is inappropriate because there are no assurances that the tugs and barges will not deviate from the deepest sections…and the possibility exists that developing eggs would be in close proximity to the deepest section (i.e., thalweg), and that the water depth in the deepest section would be inadequate to protect the eggs from harmful prop turbulence.

One problematic scenario arises when two barges traveling in opposite directions pass each other in the area where the smelt have spawned (which can be at least 4-miles long). Each barge would likely straddle the thalweg, thereby coming even closer to, or directly over, developing eggs.

To reiterate what was stated several paragraphs above - ***During the 2015 rainbow smelt spawning survey, spawning occurred as shallow as 8.7 feet along a relatively confined channel segment. In such locations, a medium to high level of injury or mortality to incubating***

***eggs could have resulted from the propeller scour of passing tug traffic, depending on the tug's horsepower rating and engine speed. Because of the narrow width and relatively shallow depth across this particular channel segment, it is unlikely that impacts to incubating rainbow smelt eggs could have been avoided by altering the line of travel of barge traffic.***

No matter what technology is used (e.g., GPS tracking or depth monitoring), it's not possible to "***ensur****e vessel passages are conducted through the deeper portions of the channel*"; if that were the case, there would be far fewer barge strandings than currently occur in the
FISH 8 Kuskokwim River.

As noted above, there is no population estimate for smelt, and deriving an accurate one would be extremely difficult…if not impossible. Unfortunately, there would be no wiggle room to find a solution via adaptive management strategies for dwindling smelt numbers once they began to decline. **As far as mitigation, the only way to "ensure" that barging would not have an impact on the smelt population would be to cease barge travel in the section of river between Tuluksak and Aniak from the time that the smelt are known to be approaching Tuluksak and for a minimum of 24 days following the spawning event (to allow for outmigration of juveniles).**

**IS THERE A MAJOR FLAW IN THE DRAFT DOCUMENT?**

Not only is the word **ensure** inappropriately used in the excerpt above, but also numerous other instances throughout the draft document.

Several examples follow:

*At the completion of contouring of the WRF (waste rock facility) and TSF* (tailings storage facility), *a layer of unconsolidated material from the North and South overburden stockpiles would be spread over the surface that would be overlain with an additional layer of growth media (topsoil and overburden). This material would be tested to* ***ensure*** *it is non-PAG* (potentially acid generating)*. The WRF would be designed to maximize concurrent reclamation, minimize the effects of PAG materials, minimize infiltration and erosion, and promote controlled*
CLA 5 *surface runoff and revegetation.* (Section 3.10-58)

Regarding invasive plants, the draft document states: *Requiring infrastructure to provide for thorough cleaning, inspection, and documentation of equipment, vessels, vehicles, aircraft and materials used in the construction and operations phases; the purpose is to* ***ensure*** *all non-native invasive species propagules are removed at critical control points. Infrastructure may include wash stations, inspection stations, treatment tools, treatment equipment, storage facilities, identification training protocol, and staging locations;*

*Monitoring and evaluating success of revegetation, included as part of the Stabilization, Rehabilitation and Reclamation Plan; implementing a regular monitoring schedule during the Project and for three years after Project closure to* ***ensure*** *that any invasive species transported to the site are promptly detected and controlled.*

*Inspection of any materials to be used in reclamation at the site of origin to **ensure** they are free of invasive material before use and transport; treating or avoiding infested sources*. (Section 3.10-47)

Here's another case dealing with adaptive management where the word ensure is inappropriately used: *This plan recognizes that every project is unique and that no plan can forecast exactly how a specific site will respond to the proposed grading, planting, and alterations to the hydrologic regime over time. Adaptive management will be implemented based on the results of monitoring and site response to applied management actions.*

CLA 5 *Adaptive management of the mitigation measures in Crooked Creek would **ensure** they would be constructed and maintained to function optimally. Adaptive management can be employed at any time during planning, construction, or operation, if it becomes apparent the proposed mitigation site is not functioning properly.* (P44 V 19 of the hard copy)

If one is to count how many times the word ensure is used throughout the document, you'll find it over 230 times. Ensuring anything is a lofty goal, but the reality is that although many things can be insured, relatively few things in life can be assured. To be 100% certain that those things above will or won't happen is impossible. The reality is that over time, mitigation measures often become lax due to time constraints or cost overruns, or fall victim to implementation error and human error.

**WORST CASE SCENARIOS**

It appears that there is no worst-case scenario when it comes to a tailings dam failure…but considering how important subsistence resources, particularly numerous fish species from the Kuskokwim River are, there should be. It's disconcerting to us who live in the Kuskokwim to know that Donlin Gold is not in favor of such analysis. Here is an excerpt from a scoping letter Donlin Gold supplied to the Corps in March of 2013: *The CEQ regulations and relevant judicial decisions require consideration of reasonably foreseeable impact; however, agencies do not have to require remote and highly speculative consequences. This distinction is reflected in CEQ guidance which no longer requires evaluation of the so-called "worst case scenario" (see question 21 "Worst-Case Analysis" was withdrawn). Some participants at the scoping meetings stated that the EIS needs to address catastrophic failures such as pipeline breaks or dam failures. In considering the extent to which issues such as these should be addressed in the EIS,*

DAM 3 *if at all, we encourage the Corps to give due consideration to those impacts which are foreseeable and essential to the consideration of alternatives versus those which are remote and highly speculative. For example, we know of no other EISs that evaluated impacts due to a tailings dam failure, and we think that scenario should not be evaluated in the Donlin Gold EIS.*

That scoping letter was written before the catastrophic Mount Polley tailings dam failure in British Columbia and the more recent Brazilian collapse that killed over seventeen people…both relatively new projects, not legacy mines.

An expert panel who analyzed the causes of the Mount Polley breach concluded: *Tailings dams are complex systems that have evolved over the years. They are also unforgiving systems, in terms of the number of things that have to go right. Their reliability is contingent on consistently*

DAM 3

*flawless execution in planning, in subsurface investigation, in analysis and design, in construction quality, in operational diligence, in monitoring, in regulatory actions, and in risk management at every level. All of these activities are subject to human error* (Morgenstern et al. 2015).

Consequently, the current DEIS is woefully inadequate in regards to considering a major tailings dam failure and how that would affect aquatic resources as well as subsistence users.

Thank you for the opportunity to provide comments.

Dave Cannon
P.O. Box 355
Aniak, AK 99557

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May 30, 2016

Mr. Alan Bittner
Anchorage Field Office
Bureau of Land Management

Dear Alan,

Thank you for the opportunity to comment on the Donlin Gold Draft Environmental Impact Statement. I'm a fish biologist who has lived and worked in the Kuskokwim Drainage for over eighteen years. During that time I've worked for the U.S. Fish & Wildlife Service, The Kuskokwim Native Association and the Native Village of Napaimute.

I'll begin by stating that I concur with the BLM's Section 810 Determination that states that there will be significant impacts to subsistence resources and/or subsistence users within the Kuskokwim River resulting from the operation of the Donlin Gold mine as described in all alternatives except Alternative 1.

As it stands now, the majority of the Corps of Engineer's draft determinations throughout the DEIS have been given a rating of minor to moderate. However, given the immensity of the size and scope of the proposed project (i.e., possibly the world's largest gold mine) the question that must be asked at the very least is just how many moderate impacts would combine to synergistically coalesce into a significant one?

**IMPACT TO THE KUSKOKWIM RIVER & SUBSISTENCE RESOURCES**

ANIL 9

The following is found in Section 3.21-166 of the DEIS: *Barging could potentially affect subsistence fishing by generating propeller wash and wakes that could interfere with fish nets, fish cutting rafts or fish wheels, and processing rafts, or erode river banks so that people either have to abandon or move fish camps*.

That statement alone supports the BLM's Section 810 Determination.

BARG 18

However, to support the increased barging required for construction and operation of the proposed project, a substantially larger cargo terminal will be necessary in Bethel. A direct impact from that terminal would be to the traditional drift spot located across the river.

The Bethel Native Corporation provided the following comments during the initial scoping statement period that were incorporated into the draft document:

*The "choke point" is magnified because the east bank of the Kuskokwim River, located opposite the proposed dock, is shallow and will become increasingly more shallow due to the natural flow of the river and be accelerated by Knik's proposed dock expansion into the River. This site on the east bank is a traditional subsistence fishing site for BNC shareholders. The erosion caused by Knik's project would negatively impact BNC lands in the vicinity, including BNC lands and Indian*

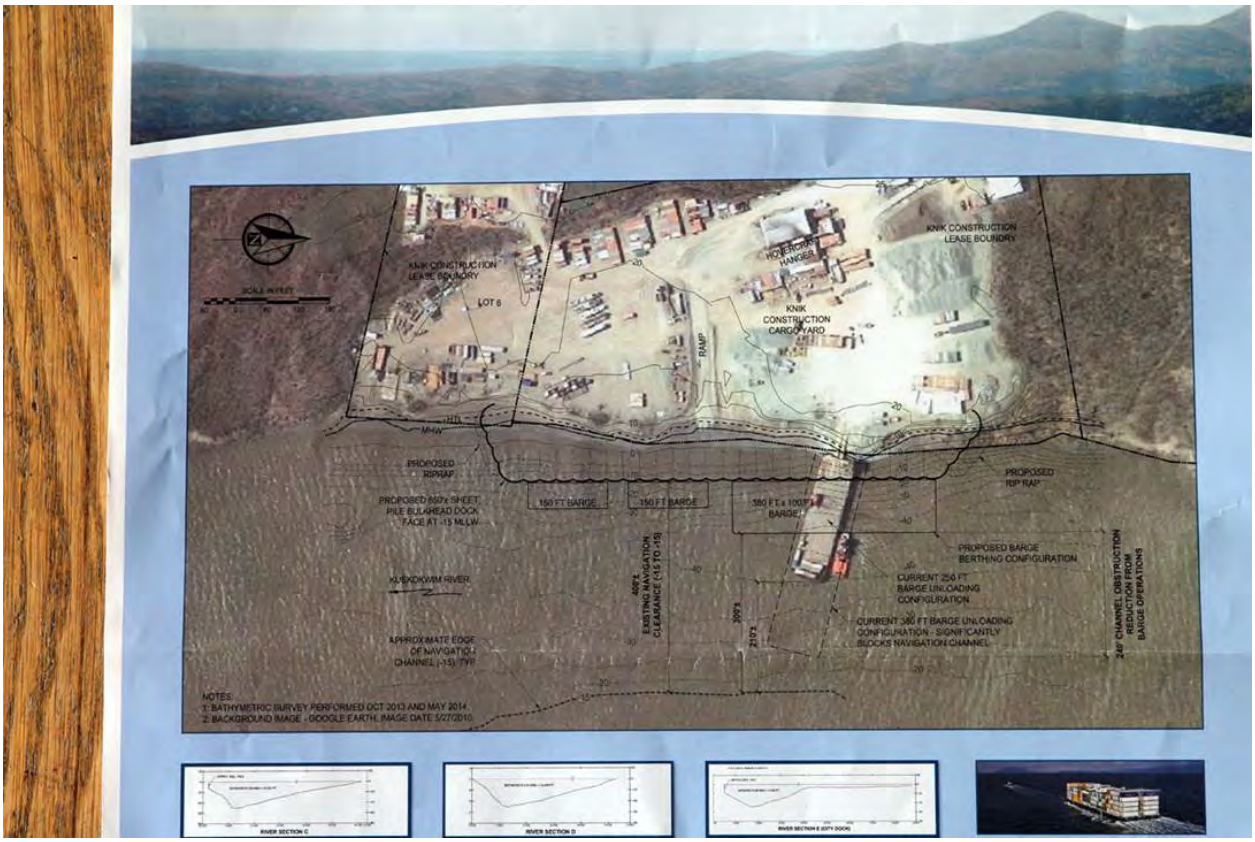
*trust lands on the east back [sic] through severe scouring or shoaling...* (Bethel Native Corporation 2014).

The draft document then had this to say regarding the potential hydrologic impacts that could alter a substantial section of river channel downstream of the terminal location, "*Additional discussion between the permit applicant and the Corps is underway regarding the potential hydrological effects."* (Section 3.21-159)

Section 3.13.2.2.1 states, "*Downriver of Aniak, the river is characterized by low gradient, interconnected meandering channels and sloughs. Tidal influence extends from Kuskokwim Bay upriver to Tuluksak (RM 136). Substantial lateral movement of the channel, which shifts continuously in response to changing levels of flow, has resulted in extensive natural bank erosion, riverbed scour, and high sediment loading*."

The following poster was provided by Donlin Gold in late April of 2016 at a meeting in Aniak and shows the construction of approximately 600 feet of riprap with a sheet pile bulkhead dock located at the existing Knik port site.

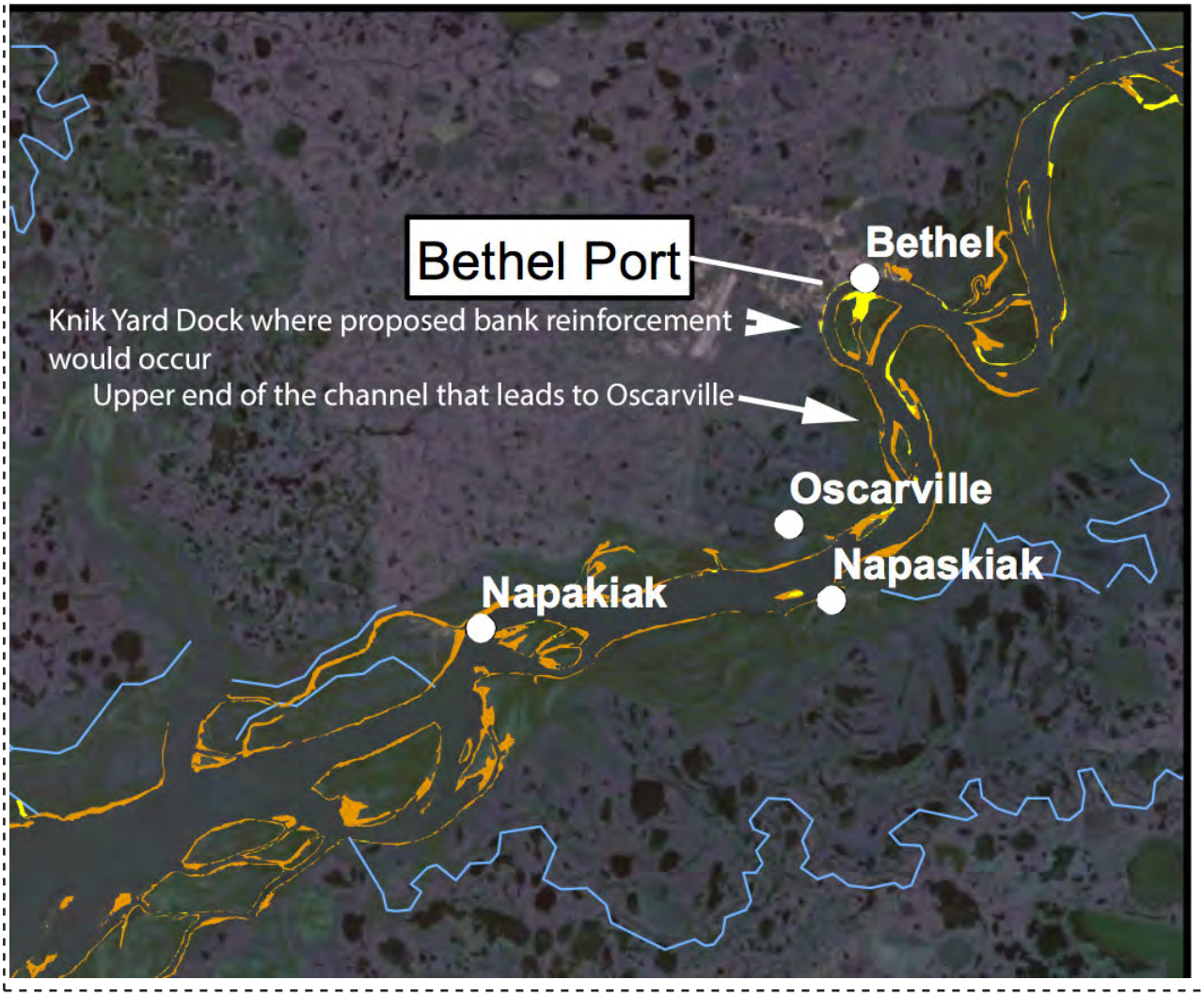
BARG 10




Such reinforcement of the bank will divert stream channel energy away from the newly constructed section that could possibly exacerbate and accelerate the natural erosional processes in downstream reaches resulting in repercussions with the village of Oscarville…especially considering cumulative effects from further upriver already reinforced sections (i.e., the seawall protecting Bethel).

The figure below is taken from Figure 3.5-13 of the DEIS and denotes the depositional areas in yellow and the actively eroding sections of channel in orange. Note how the upper end of the side channel that flows past Oscarville (and is less than one mile below the proposed port site) is labeled as susceptible to erosion as well as much of the west bank of the Kuskokwim River between Bethel and Oscarville.

BARG 9




BARG 11

**A thorough analysis by a hydrologist who specializes in large river systems should have been included in the Draft EIS, and must be considered in the Final EIS so that residents of the region are fully aware of potential trade-offs.**

FISH 3

**IMPACTS TO CROOKED CREEK**

The excerpt from the table below (Table 3.13-30) shows the likely impacts to Crooked Creek with the proposed alternative - Alternative 2. Other than the No Action alternative, the impacts would be the same for any alternative.



Table 3.13-30: Impact Levels of Alternative 2 by Project Component and Impact Type

| Impact-causing Project Component | Magnitude or Intensity | Duration | Geographic Extent | Context | Summary Impact* |
|---|---|---|---|---|---|
| Mine Site | | | | | |
| In-stream habitat removal and fish loss | American Cr. – High<br>Lewis Gulch – Med<br>Anaconda Cr – High<br>Snow Gulch – Med<br>Omega Gulch – Med | Permanent<br>Permanent<br>Permanent<br>Permanent<br>Permanent | Local<br>Local<br>Local<br>Local<br>Local | Important<br>Common<br>Important<br>Common<br>Common | Moderate<br>Minor<br>Moderate<br>Minor<br>Minor |
| Water management practices | MSA Tributaries - Med<br>Crooked Creek- Low | Permanent<br>Permanent | Local<br>Local | Important<br>Important | Minor<br>Minor |
| Water quality practices | Low | Permanent | Local | Important | Minor |
| Wetland and Riparian Buffer Removal | Medium to High | Short to Long-term | Local | Important | Moderate |
| Streamflow changes and overall aquatic habitat | Mid Reaches – Med<br>Lower Reaches – Low<br>Mid and Lower Reaches Under *High K* Scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Moderate<br>Minor<br>Major |
| Streamflow changes to off-channel aquatic habitat | Mid Reaches – Low to Med<br>Lower Reaches – Low<br>Mid/Lower Reaches *High K* Scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Moderate<br>Minor<br>Major |
| Streamflow changes and mainstem aquatic habitat | Medium<br>*High K* scenario - High | Long-term<br>Long-term | Local<br>Local | Important<br>Important | Moderate<br>Major |
| Streamflow changes and salmon spawning habitat | Medium<br>*High K* scenario - High | Long-term<br>Long-term | Local<br>Local | Important<br>Important | Moderate<br>Major |
| Streamflow changes and freezing of salmon spawning substrate | Middle Reaches – Low<br>Lower Reaches - Negligible<br>Mid/Lower Reaches *High K* scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Minor<br>Negligible<br>Major |
| Streamflow changes and Crooked Creek salmon production | Middle Reaches – Medium<br>Lower Reaches - Negligible<br>Mid/Lower Reaches *High K* scenario - High | Long-term<br>Long-term<br>Long-term | Local<br>Local<br>Local | Important<br>Important<br>Important | Moderate<br>Negligible<br>Major |
| Stream temperature changes in Crooked Creek | Near MSA - Low to Medium<br>Lower Crooked Creek - Low | Permanent<br>Permanent | Local<br>Local | Important<br>Important | Minor to Moderate<br>Minor |

FISH 3

Section 3.13-109 states: *Should the underlying geology of Crooked Creek reflect a high level of hydraulic conductivity, flow reductions in Crooked Creek between American Creek and Crevice Creek could be as high as 85 to 100 percent during Year 20 of operations. Farther downstream in Crooked Creek, flow reductions of 40 to 31 percent could occur near Getmuna and Bell creeks, respectively (BGC 2015c). In this case, predicted streamflow reductions of such a high intensity*

*would result in major impacts to salmon production in the middle and lower reaches of Crooked Creek.*

Tom Myers (May 2016) notes that much of the area is geologically heterogeneous and that high K fault areas coupled with high K bedrock values could actually result in water losses of over three times that of the modeled scenarios provided by Donlin Gold.

Section 3.13-95 states: *The context of flow impacts is important since the Crooked Creek drainage from its mouth to the Donlin Creek drainage is regulated as EFH (Essential Fish Habitat) as it supports key life stages of salmon and other fish that are important to the Kuskokwim River subsistence community. Overall, streamflow reductions would result in aquatic habitat impacts that would range from moderate to minor and could be major under a High K scenario.*

Section 3.13-96 follows up with: *Reduced flows also could affect the frequency with which off-channel habitat maintains connection with the main channel. This is an important consideration because although off-channel habitats would likely re-connect to the main channel at some point during the year when the water stage increases, connections may no longer occur during very low flow periods in summer or winter resulting in temporary isolation of off-channel habitats from the main channel. This could affect rearing or spawning life phases of fish due to fish stranding and potential mortalities. Furthermore, a reduction in off-channel (or in-channel) winter habitat may adversely affect the survival of overwintering fish or incubating eggs if flows are reduced to the point where the water column becomes too shallow and freezes completely.*

FISH 3

FISH 3 The photograph above shows natural conditions in the Aniak River, and is used to demonstrate how if 1/3 or more of the water were to be removed from Crooked Creek during the winter months would negatively affect more than the eggs normally exposed to threatening conditions.

**HOW IMPORTANT IS CROOKED CREEK & MAINTAINING BIOLOGICAL DIVERSITY THROUGHOUT THE ENTIRE KUSKOKWIM?**

FISH 4 The draft document states that Crooked Creek produces between only 0.1 and 0.2 percent of the entire Kuskokwim River's king salmon drainage-wide escapement goal. Similarly, the document estimates that roughly only 0.3 to 0.8 percent of the chum salmon escapement goal is produced in Crooked Creek (although there is no chum escapement goal for the Kuskokwim River (Section 3.13-109)). None-the-less, both species contribute less than 1 % of their respective overall population for the entire drainage.

But those fewer fish - particularly Chinook salmon - may be vulnerable to subsistence or commercial harvest (i.e., incidentally during chum commercial openings) in the mainstem Kuskokwim, thereby lowering Crooked Creek's returns that much further.

The context of that is highlighted in Section 3.18-21 - *The oil and gas industry is also important to Alaska's fiscal health and overall economy because it is the funding source for the Alaska Permanent Fund, which is Alaska's largest financial asset……..The fund is invested in a diverse* ***portfolio*** *of stocks, bonds, and real estate, and has grown in value to nearly $46.3 billion as of August 2013 (Goldsmith 2010b; Alaska Permanent Fund Corporation 2013).*

Biologists use a similar strategy when it comes to preserving biological diversity; in this case, conserving that diversity of the different Chinook salmon stocks in the entire Kuskokwim drainage (Schindler et al. 2010). The Kuskokwim drainage has had at least two river systems where habitat alteration or heavy exploitation associated with historic dredge mining activities are known to have reduced their biological productivity potentials.

In the early 1900's the Takotna River was transformed into a major access route for the Yukon's Innoko Mining District while the village of Takotna became a staging area and supply point for the mining activities (Molyneaux et al. 2000). During the summer months Takotna was a summer kenneling area for the dog teams used to support the miners, which fed the dogs salmon. Between dredging in several sections of the Takotna drainage, disturbance from steamboat activity, and the over-exploitation of salmon for dog food, salmon were basically extirpated from the Takotna River. (Elison et al. 2009)

It was not until the 1980's did local residents begin noticing salmon returning to the Takotna River. The Department of Fish & Game decided to support the village of Takotna in documenting the return of the salmon, and a counting tower operated by students between 1995 and 1999. A weir replaced the tower in 2000 and operated until 2013 in a cooperative effort between the Takotna Tribal Council and ADF&G (Elison et al. 2009).

During the operation of the weir, the percentage of females returning to the Takotna River has averaged 25 percent (the range being 13 to 46%). The range of Chinook returning each year

has been between 97 to 721, with a steady decline the past seven years of operation. In 2010 only 25 females returned, 51 in 2011, 36 in 2012, and 25 in 2013.

From an investment perspective, the future of Takotna River Chinook salmon would be termed bearish…meaning on the downward slide. Hopefully, it doesn't bottom out completely.

Similarly, the future of the Tuluksak's Chinook salmon is just as tenuous. This river system has experienced a drastic reduction of productivity due to past dredge mining that resulted in substantial habitat destruction. Consequently, the degraded habitat in conjunction with recent poor ocean conditions have resulted in only 52 female Chinook salmon escaping past the weir in 2010, 75 in 2011, 183 in 2012, 75 in 2013, and only 96 in 2014. (Miller and Harper 2014)

Miller and Harper (2015) note that although the sockeye, chum, and silver salmon in the Tuluksak River have remained relatively stable – or actually increased, the Chinook salmon population is severely depressed; they wonder just how those limited females will be able to contribute to future runs.

In addition, recent increases in the number of Chinook salmon reaching McGrath and beyond the past two years due to the implementation of severe subsistence fishing restrictions, indicates that the heavy unrestricted subsistence fishing pressure (including the use of unlimited mesh size gear) in the lower river over the years likely has had a negative influence on the population structure of the upriver stocks; the term used by biologists to describe this practice as "front end loading". Ray Collins, a member of the Kuskokwim Salmon Management Working Group and other respected elders, have expressed concern of this occurring for at least fifteen years. This front end loading tends to occur in most in-river fisheries where there is heavy pressure in the lower portion of river, and is also thought to occur in the Yukon River to the north of us.

FISH 4

It's possible that each stream's individual fish population may be uniquely adapted genetically to their respective river, but it's not known if that's the case for Crooked Creek Chinook salmon. If a high K scenario played out, then Crooked Creek's salmon production would be reduced significantly as noted in Table 3.13-30, and if they were genetically unique, then that would lessen the diversity of the Kuskokwim's portfolio, thereby weakening the drainage's resilience when large-scale influences, such that climate change, might bring (Daniel Schindler, personal communication). This is something that needs to be considered in the Cumulative Effects section of the EIS.

**IMPACTS TO SMELT**

FISH 8

Another impact from the proposed activity would be on a major food item heavily relied on by subsistence users from Eek to Chuathbaluk as well as numerous coastal villages – and that would be to the smelt. Very little – even traditional knowledge - is known about the spawning habits of this small, but ecologically important fish.

The table below shows the impacts that tugs are expected to have on the smelt eggs.

Table 3.13-30: Impact Levels of Alternative 2 by Project Component and Impact Type

| Impact-causing Project Component | Magnitude or Intensity | Duration | Geographic Extent | Context | Summary Impact* |
|---|---|---|---|---|---|
| Erosion & sedimentation<br>Methylmercury emissions | Low to Medium<br>Low in wetlands<br>Medium in water | Long-term<br>Long-term<br>Long-term | Local<br>Regional<br>Regional | Important<br>Important<br>Important | Minor to Moderate<br>Minor to Moderate<br>Minor to Moderate |
| Contamination and Fuel Spills | Low | Long-term | Local | Important | Minor |
| Transportation Infrastructure | | | | | |
| Vessel wave energy impacts on nearshore erosion, turbidity, water temperature | Turbidity – Low<br>Water Temp – Low | Long-term<br>Long-term | Local<br>Local | Important<br>Important | Minor<br>Negligible to Minor |
| Fish displacement and stranding | Low to Medium | Long-term | Local | Important | Negligible to Moderate |
| Prop wash scour of riverbed substrates and fish spawning gravels | Medium to High | Long-term | Local | Important | Moderate to Major (in shallow, narrow channels) |
| Propeller-induced fish injury and mortality | Low to High | Long-term | Local | Important | Negligible to Moderate |
| Mine access road | Road work and stream | Long-term | Local | Important | Minor |

Baseline information for Crooked Creek has been collected for many years to provide a good understanding of the characteristics of an undisturbed population. For the smelt, however, there's **only been two years of data collected** as to where and when they spawned and what type of habitat they selected (Moulton and Morris 2015).

FISH 8 During those two study years there was quite a bit of variability between the run timing and location of spawning; it's believed that water temperature is the major variable affecting the run timing while the stream velocity and channel substrate influence where the smelt decide to spawn. In 2014 the smelt averaged 28-miles a day on their upstream migration, while the second year only averaged 16. During that first year the bulk of the smelt spawned upstream of the Kalskag villages on May 22nd in a section of river approximately 4-miles long, while the second year they spawned roughly 5-miles below Lower Kalskag on May 29 in a section of river 3-miles long (Moulton and Morris 2015).

However, studies done elsewhere have determined that on average, development takes roughly 21 days. Based on the water temperatures during the 2014 and 2015 studies, the eggs most likely developed within 11 and 19 days (Larry Moulton Owl Ridge Natural Resource Consultants - personal communication).

The graph below shows how low the Kuskokwim River water levels have been four of the last six years during the smelt run.

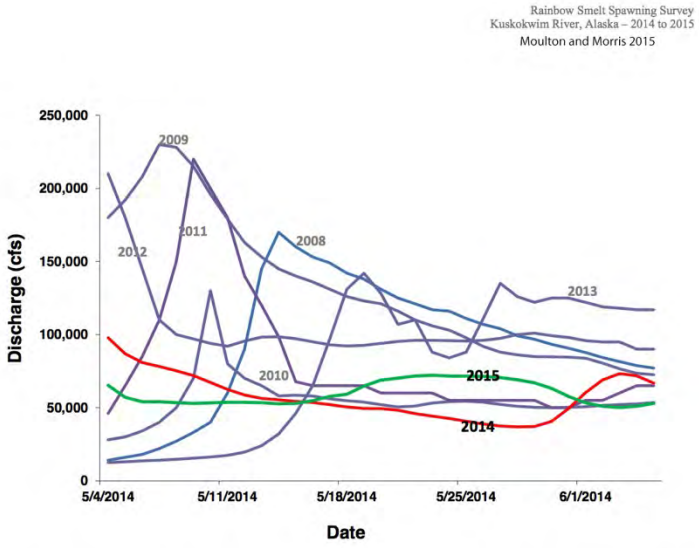



FIGURE 2: KUSKOKWIM RIVER DISCHARGE DURING MAY, 2008 TO 2015, SHOWING THE UNUSUAL POST-BREAKUP FLOW PATTERN IN 2014 AND 2015 (2014 DISCHARGE IN RED, 2015 IN GREEN).

The concern with the smelt is that for all practical intents and purposes, it is a single population that enters the mouth of the Kuskokwim at the same time as opposed to a long protracted run for chums, kings and other salmon species. They then travel in a group upstream to their relatively limited area or areas to spawn. If something were to happen that would reduce the spawning and egg development success for any given year, a significant proportion of the population could be in jeopardy.

FISH 8

Looking back at Table 3.13-30 above, the Summary Impact level regarding the effects of riverbed prop wash scour on smelt eggs was determined to be moderate to major. In 2014 spawning occurred in pretty much one area approximately four miles long, with eggs found in depths from 4.9 feet to 13.7 feet; the majority (67%) were in water 5.9 feet to 8.8 feet deep. In 2015, smelt were documented using two areas in close proximity to spawn that totaled three linear miles, one in the main channel and the other in a side channel. The depth varied from 8.3 feet to 23.2 feet; 94% were documented to be in 8.5 feet to 18.3 feet of water (Moutlon and Morris 2015). However, with only two years of data, it is uncertain exactly what the geographic range is where smelt spawn.

On page 149 of the biological section of the analysis (Section 3.13), the draft document states the following based on computer modeling: *Impacts from prop wash could be reduced if barge traffic between late May to mid-June travels along the deepest portions of the channel in reaches where rainbow smelt spawning has been previously documented. Disturbance to substrates (and incubating eggs) would be* ***minimized if*** *barges travel along depth contours that would allow the tug to maintain a gross under keel clearance greater than 15-20 feet* (you must add 3 to 7.5 ft. to compensate for the draft of the tug). ***During the 2015 rainbow smelt spawning survey, spawning occurred as shallow as 8.7 feet along a relatively confined channel segment. In such locations, a medium to high level of injury or mortality to incubating eggs could have resulted from the propeller scour of passing tug traffic, depending on the tug's horsepower rating and engine speed. Because of the narrow width and relatively***

***shallow depth across this particular channel segment, it is unlikely that impacts to incubating rainbow smelt eggs could have been avoided by altering the line of travel of barge traffic*** (emphasis added)*. Similar impacts to other resident fish species that could spawn in the mainstem channel also would be at risk.*

***Based on this analysis, prop wash from a tug in passage is expected to cause a medium to high intensity of scouring to gravel-size riverbed substrates at localized areas along the navigation route, particularly in waters with an under keel depth shallower than approximately 8 to 10 feet. Such impacts would extend over a long-term duration from construction through operation.*** (emphasis added)

Here are a few of the impact reducing design features noted on page 150 in the draft document in Section 3.13:

*To minimize or avoid impacts of prop wash forces on early life stages of fish and in recognition of ever-changing river conditions, a series of operational measures would be implemented that include:*

- *Maintaining detailed logs of river conditions, including measurements of depths and current speeds and directions at critical reaches, by tug captains during each trip with information made immediately available to other fleet captains;*
- *Restricting passages through shallow and narrow river segments with sharp bends to one-way traffic using radio check control when approaching and after completing such passages; and*
- *Use of electronic charts, GPS radar overlay, barge speed and location monitoring, continuous crew training, river navigation aids along the travel route, and an ongoing analysis and mapping of areas with potential operational and ecological risks.*

FISH 8

Page 143 of Section 3.13 state: *To minimize potential impacts of bed scour, barge traffic would be tracked using GPS and real-time river stage and depth monitoring systems to **ensur**e vessel passages are conducted through the deeper portions of the channel, especially in confined and shallow segments of the river.*

The use of the word **ensure** is inappropriate because there are no assurances that the tugs and barges will not deviate from the deepest sections…and the possibility exists that developing eggs would be in close proximity to the deepest section (i.e., thalweg), and that the water depth in the deepest section would be inadequate to protect the eggs from harmful prop turbulence.

One problematic scenario arises when two barges traveling in opposite directions pass each other in the area where the smelt have spawned (which can be at least 4-miles long). Each barge would likely straddle the thalweg, thereby coming even closer to, or directly over, developing eggs.

To reiterate what was stated several paragraphs above - ***During the 2015 rainbow smelt spawning survey, spawning occurred as shallow as 8.7 feet along a relatively confined channel segment. In such locations, a medium to high level of injury or mortality to incubating***

***eggs could have resulted from the propeller scour of passing tug traffic, depending on the tug's horsepower rating and engine speed. Because of the narrow width and relatively shallow depth across this particular channel segment, it is unlikely that impacts to incubating rainbow smelt eggs could have been avoided by altering the line of travel of barge traffic.***

No matter what technology is used (e.g., GPS tracking or depth monitoring), it's not possible to "***ensur****e vessel passages are conducted through the deeper portions of the channel*"; if that were the case, there would be far fewer barge strandings than currently occur in the
FISH 8 Kuskokwim River.

As noted above, there is no population estimate for smelt, and deriving an accurate one would be extremely difficult…if not impossible. Unfortunately, there would be no wiggle room to find a solution via adaptive management strategies for dwindling smelt numbers once they began to decline. **As far as mitigation, the only way to "ensure" that barging would not have an impact on the smelt population would be to cease barge travel in the section of river between Tuluksak and Aniak from the time that the smelt are known to be approaching Tuluksak and for a minimum of 24 days following the spawning event (to allow for outmigration of juveniles).**

**IS THERE A MAJOR FLAW IN THE DRAFT DOCUMENT?**

Not only is the word **ensure** inappropriately used in the excerpt above, but also numerous other instances throughout the draft document.

Several examples follow:

*At the completion of contouring of the WRF (waste rock facility) and TSF* (tailings storage facility), *a layer of unconsolidated material from the North and South overburden stockpiles would be spread over the surface that would be overlain with an additional layer of growth media (topsoil and overburden). This material would be tested to* ***ensure*** *it is non-PAG* (potentially acid generating)*. The WRF would be designed to maximize concurrent reclamation, minimize the effects of PAG materials, minimize infiltration and erosion, and promote controlled*
CLA 5 *surface runoff and revegetation.* (Section 3.10-58)

Regarding invasive plants, the draft document states: *Requiring infrastructure to provide for thorough cleaning, inspection, and documentation of equipment, vessels, vehicles, aircraft and materials used in the construction and operations phases; the purpose is to* ***ensure*** *all non-native invasive species propagules are removed at critical control points. Infrastructure may include wash stations, inspection stations, treatment tools, treatment equipment, storage facilities, identification training protocol, and staging locations;*

*Monitoring and evaluating success of revegetation, included as part of the Stabilization, Rehabilitation and Reclamation Plan; implementing a regular monitoring schedule during the Project and for three years after Project closure to* ***ensure*** *that any invasive species transported to the site are promptly detected and controlled.*

*Inspection of any materials to be used in reclamation at the site of origin to **ensure** they are free of invasive material before use and transport; treating or avoiding infested sources*. (Section 3.10-47)

Here's another case dealing with adaptive management where the word ensure is inappropriately used: *This plan recognizes that every project is unique and that no plan can forecast exactly how a specific site will respond to the proposed grading, planting, and alterations to the hydrologic regime over time. Adaptive management will be implemented based on the results of monitoring and site response to applied management actions.*

CLA 5 *Adaptive management of the mitigation measures in Crooked Creek would **ensure** they would be constructed and maintained to function optimally. Adaptive management can be employed at any time during planning, construction, or operation, if it becomes apparent the proposed mitigation site is not functioning properly.* (P44 V 19 of the hard copy)

If one is to count how many times the word ensure is used throughout the document, you'll find it over 230 times. Ensuring anything is a lofty goal, but the reality is that although many things can be insured, relatively few things in life can be assured. To be 100% certain that those things above will or won't happen is impossible. The reality is that over time, mitigation measures often become lax due to time constraints or cost overruns, or fall victim to implementation error and human error.

**WORST CASE SCENARIOS**

It appears that there is no worst-case scenario when it comes to a tailings dam failure…but considering how important subsistence resources, particularly numerous fish species from the Kuskokwim River are, there should be. It's disconcerting to us who live in the Kuskokwim to know that Donlin Gold is not in favor of such analysis. Here is an excerpt from a scoping letter Donlin Gold supplied to the Corps in March of 2013: *The CEQ regulations and relevant judicial decisions require consideration of reasonably foreseeable impact; however, agencies do not have to require remote and highly speculative consequences. This distinction is reflected in CEQ guidance which no longer requires evaluation of the so-called "worst case scenario" (see question 21 "Worst-Case Analysis" was withdrawn). Some participants at the scoping meetings stated that the EIS needs to address catastrophic failures such as pipeline breaks or dam failures. In considering the extent to which issues such as these should be addressed in the EIS,*

DAM 3 *if at all, we encourage the Corps to give due consideration to those impacts which are foreseeable and essential to the consideration of alternatives versus those which are remote and highly speculative. For example, we know of no other EISs that evaluated impacts due to a tailings dam failure, and we think that scenario should not be evaluated in the Donlin Gold EIS.*

That scoping letter was written before the catastrophic Mount Polley tailings dam failure in British Columbia and the more recent Brazilian collapse that killed over seventeen people…both relatively new projects, not legacy mines.

An expert panel who analyzed the causes of the Mount Polley breach concluded: *Tailings dams are complex systems that have evolved over the years. They are also unforgiving systems, in terms of the number of things that have to go right. Their reliability is contingent on consistently*

DAM 3

*flawless execution in planning, in subsurface investigation, in analysis and design, in construction quality, in operational diligence, in monitoring, in regulatory actions, and in risk management at every level. All of these activities are subject to human error* (Morgenstern et al. 2015).

Consequently, the current DEIS is woefully inadequate in regards to considering a major tailings dam failure and how that would affect aquatic resources as well as subsistence users.

Thank you for the opportunity to provide comments.

Dave Cannon
P.O. Box 355
Aniak, AK 99557

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-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Wednesday, May 18, 2016 8:21 AM
To: Isaacs, Jon; Bellion, Tara
Subject: DEIS Comment FW: [EXTERNAL] Donlin Gold Draft EIS comment

-----Original Message-----
From: Brenda Carmichael [mailto:brendamjoekay@yahoo.com]
Sent: Tuesday, May 17, 2016 2:43 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

TWL 2

I don't like the idea of the mine, because even a little risk of damage to our environment, is too big of a risk for me. I want my children and grandchildren to have the chance to live the way i am living now, in both western and traditional ways depending on fish as i do.

Brenda Carmichael

Sent from my iPhone

**From:** Craig, Bill
**To:** Bellion, Tara; Evans, Jessica
**Subject:** FW: [EXTERNAL] EXTEND EIS COMMENT PERIOD
**Date:** Wednesday, March 30, 2016 10:22:51 AM

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-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Wednesday, March 30, 2016 6:24 AM
To: Craig, Bill; Newman, Sheila M POA
Subject: FW: [EXTERNAL] EXTEND EIS COMMENT PERIOD

-----Original Message-----
From: doug carney [mailto:dougcarney@fastmail.fm]
Sent: Monday, March 28, 2016 2:19 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] EXTEND EIS COMMENT PERIOD

Doug Carney's Comments

NEP 1

Listed here are important Reasons to Extend the Donlin EIS Comment Period for ONE YEAR

* The EIS was available to the public on Nov 6. 2015, and is scheduled to be over April 30, 2016 – allowing ONLY a 6-month comment period.
* This EIS Draft is quite long – and became available very recently, for people to read and study

* Most people in the area do not have computers and are not computer literate, nor have they even seen the EIS.

* It is due to the information contained in the EIS, that people are just beginning to become aware of some of the impacts that either will or easily could affect habitat and subsistence – mercury emissions, acid mine drainage, the possibility of a tailings dam failure.

* The people who live on the Kuskokwim River and its tributaries are those that will be affected the most directly by Donlin mining operations.

* Now that they are becoming aware, these people want learn more and to speak out about it

* Official BLM comments in Appendix N say that negative impacts from the mine will affect subsistence, which the primary concern, in every context.

* January, 2019 is the most recent date given by Donlin LLC representatives for a decision on whether or not the mine project will go forward.

* With that in mind – there is no hurry to close the comment period on the EIS, and no good reason not to extend it.

Thanks for your attention.

Doug Carney
PO Box 33
Sleetmute, AK 99668
907-449-4209
dougcarney@fastmail.fm <mailto:dougcarney@fastmail.fm>

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doug carney
dougcarney@fastmail.fm <mailto:dougcarney@fastmail.fm>

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica; Smith, Neal |
| **Subject:** | FW: [EXTERNAL] Request to extend public comment period |
| **Date:** | Thursday, April 21, 2016 12:21:36 PM |
| **Attachments:** | CSP2 comment period extension request.pdf |

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Thursday, April 21, 2016 12:19 PM
To: Craig, Bill
Cc: Newman, Sheila M POA
Subject: FW: [EXTERNAL] Request to extend public comment period

-----Original Message-----
From: kzamzow@gmail.com [mailto:kzamzow@gmail.com] On Behalf Of Kendra Zamzow
Sent: Thursday, April 21, 2016 12:10 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Cc: Dave Chambers <dchambers@csp2.org>
Subject: [EXTERNAL] Request to extend public comment period

Dear Keith:

CSP2 would like to submit the attached letter requesting an extension of the public comment period.

Thank you,

Kendra Zamzow, PhD
Center for Science in Public Participation PO Box 1250 Chickaloon Alaska 99674
907.354.3886 cell

**CENTER for SCIENCE in PUBLIC PARTICIPATION**
PO Box 1250 Chickaloon, AK 99674
Phone (907) 354-3886 / web: www.csp2.org / e-mail: kzamzow@csp2.org
*"Technical Support for Grassroots Public Interest Groups"*

April 21, 2016

Keith Gordon, Project Manager
US Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, PO Box 6898
JBER, AK 99506-0898

Re: Comment period extension

Dear Mr. Gordon:

The Center for Science in Public Participation provides technical advice to public interest groups, nongovernmental organizations, and indigenous communities on the environmental impacts of mining. We have been involved with development of the Donlin draft EIS in the role of technical consultant to the Native Village of Chuathbaluk for over two years. However, our letter here is with regards to our role as a public entity commenting during the public comment period.

There are two documents that are not yet available which would serve the public well to review in conjunction with the draft EIS:

FISH 9 1. The BLM study on metal concentrations in fish within the Kuskokwim River drainage, including the George River, conducted as part of the Red Devil cleanup investigation.

PHL 2 2. The Alaska state Health Impact Assessment for the Donlin mine.

The BLM 810 Analysis included as Appendix N within the draft EIS highlights the extent to which different conclusions can be reached with regards to impacts on this very large project – which includes not only the mine footprint, but 200 river miles of the Kuskokwim River and 315 miles of pipeline.

It would be extremely relevant to have the above studies in hand while reviewing the Donlin draft EIS impact evaluation to determine potential discrepancies, which could then be addressed during the final EIS. While this evaluation could occur during the cooperating agency meetings, it would serve the public better if they were available during the public comment period.

NEP 1 Additionally, although the five month public comment period is generous, it does take considerable time to review the amount of material, particularly when also reviewing original documents DEIS statements are based upon, and the public must find time for the review in between the hours outside their regular work. Even organizations that have been involved as cooperators (Native Village of Chuathbaluk, Native Village of Napaimute, CSP2) have had to work in review time around several other ongoing projects and have found they need more time.

We would like to support the request of the Native Village of Chuathbaluk and other tribal and NGO groups to extend the public comment period. I can assure you that the time will be well-spent and will result in additional review and comments that we would be unable to make otherwise.

Regards,

Kendra Zamzow, PhD

| | |
|---|---|
| **From:** | kzamzow@gmail.com on behalf of Kendra Zamzow |
| **To:** | donlingoldeis, POA |
| **Cc:** | Dave Chambers |
| **Subject:** | [EXTERNAL] CSP2 public comments on Donlin DEIS |
| **Date:** | Tuesday, May 24, 2016 3:11:05 PM |
| **Attachments:** | 2016 05 23 CSP2 comments, Donlin DEIS.FINAL.pdf |

Dear Keith:

Please find attached our comments on the Donlin draft EIS. I have built a navigation pane in the pdf for the reader to easily move between the sections.

Thank you for the opportunity to comment, and for the additional time provided by the Corps for the comment period.

Please let us know if you have any questions.

Regards,

Kendra Zamzow, PhD
Center for Science in Public Participation
PO Box 1250 Chickaloon Alaska 99674
907.354.3886 cell

"What we observe is not nature itself, but nature exposed to our method of questioning." -- Werner Heisenberg

“Is there any knowledge in the world which is so certain that no reasonable man could doubt it?” -- Bertrand Russell, 1912

**CENTER for SCIENCE in PUBLIC PARTICIPATION**
PO Box 1250 Chickaloon, AK 99674
Phone (907) 354-3886 / web: www.csp2.org / e-mail: kzamzow@csp2.org
"Technical Support for Grassroots Public Interest Groups"

May 24, 2016

US Army Corps of Engineers
Keith Gordon, Project Manager
PO Box 6898
JBER, Alaska, 99506-0898
POA.donlingoldeis@usace.army.mil

Re: Donlin draft EIS, public comments

Dear Keith:

The Center for Science in Public Participation provides technical advice to public interest groups, nongovernmental organizations, regulatory agencies, mining companies, and indigenous communities on the environmental impacts of mining. CSP2 specializes in hard rock mining, especially with those issues related to water quality impacts and reclamation bonding. This letter represents our comments regarding the Donlin draft EIS (DEIS).

## Introduction

The Donlin mine, if approved, will be the largest mine in Alaska. Similar to other gold mines, the gold is bound with arsenic and antimony in the ore. Unique to Alaska, the gold is also bound with mercury sulfides, necessitating a process of heating ore under pressure to release the gold – and in doing so also liberate the mercury. Barrick, a 50% partner in Donlin Gold LLC, has experience in processing this type of ore and capturing mercury in Nevada – however, those mines were not adjacent to wetland habitat. Additionally, mine ownership frequently changes hands. This is important to consider in the operation of mercury-capture equipment and in maintaining a facility that will need to pump and treat water in perpetuity.

In addition to the mine footprint, risks spread across an almost unimaginable breadth of landscape – over 300 miles of pipeline corridor east-west from Cook Inlet across the Alaska Range, and 200 miles of river transport north-south through a wildlife refuge and along one of the most important subsistence rivers in Alaska.

In addition to chemical risks at the mine site, pipeline, and barge route, there are physical risks associated with the tailings dam and financial risks.

The scale of infrastructure and ore processing, and the unique character of the ore, require a thoughtful environmental analysis process. It would not be unreasonable for the process to take substantially longer than previous mine proposals in order to best analyze chemical, physical, and financial impacts and alternatives.

Key Findings

PAA 22

- There is not enough information to compare the impacts of Alternative 2 (proposed by the mine proponent) and Alternative 4 (Birch Tree Crossing – an alternative with a shorter barge transport route but longer road). In particular there is not enough information to compare the impacts on fish, wildlife, wetlands, and subsistence.

FSR 15
- The Spill section needs to be re-worked with clear quantifiable information and maps. The discussion of impacts is difficult to read as it is split between impacts to specific resources.

PAA 16
- The DEIS does not appear to compare closure of the tailings storage facilities (Alternative 2, wet slurry; Alternative 5A, dry stack) in comparable manners (covers, progressive reclamation), making it difficult to assess and adequately compare the potential long-term impacts of the alternatives.

FSR 15
- Low probability-high risk project components such as a tailings dam failure, mercury deposition, or barge spills deserve a detailed third party review.

NEP 6
- Incomplete analysis of Financial Assurance, Wetlands, and other key components of the DEIS may warrant a supplemental EIS.

BER 4
- No Reclamation and Closure Plan is included in the Appendices, making it difficult to find and digest the closure components and impacts.

## Incomplete and Inadequate Sections

Wetlands (Appendix J)

CWA 1
The 404 application is incomplete. The amount of wetlands impacted may be 7,000 acres or closer to 10,000 acres – a significant difference in acreage and potentially significant in wetland functional value. Additional field work will be needed, and it is anticipated that the final will be submitted in the fourth quarter of 2016.

CWA 1
This provides no opportunity for public review, and may make the DEIS incomplete. The DEIS would be well-served to have a complete, and substantially less confusing, section on the Rivers and Harbors Act/Clean Water Act permits than is provided in Appendix J.

A significant portion of wetlands would be beneath the TSF (over 1,700 acres) and WRF (over 1,400 acres), which are unlikely to be placed in different locations. However, five stretches of the pipeline remove over 1,100 acres – two 50 mile stretches remove over 500 acres each – and a public review could provide information relative to pipeline routing to reduce the area of impacted wetlands.

CWA 1
There are also questions regarding the value of the wetlands, which is critical to establishing mitigation, and an updated wetland Reclamation and Closure plan which would replace outdated information (Table 1 in Appendix J, p5-6, lists several outdated figures, tables, and statements).

- **Recommendation: Provide a complete and consistent 404 application, including wetland acreage, wetland value, reclamation plans, and compensatory mitigation plans. These need to be provided in a manner that allows public review and comment.**

Alternative 4 (Birch Tree Crossing)

PAA 22 There has been only a cursory analysis of potential impacts of the 76 mile road that would be required for the Birch Tree Crossing Alternative, primarily on the number of borrow sites needed. There is no description of the fish species or abundance in the 40 streams that would need to be crossed (8 large enough to require bridges), no description of the vegetative communities or wetlands that could be impacted, no discussion of wildlife movement through the area that would be crossed. Although a list of possible borrow sites is provided, there is no discussion of whether there is likely to be enough non-leaching material available to build the road (DEIS p 3.15-54).

**Impacts on fish, habitat, and wetlands**

1. Is it appropriate to have only a draft of Essential Fish Habitat (EFH) at this stage? Preparing a final *after* the draft EIS comment period allows no opportunity for the public to comment.

FISH 11 2. This statement appears to be incorrect:

> *Under Alternative 4, many of the drainages crossed by the mine access road originating from the BTC Port site are used by anadromous and resident fishes for rearing and spawning and are classified as EFH under the Magnuson-Stevens Act. Appendix Q contains the Draft Essential Fish Habitat Assessment, which includes an assessment of potential effects on these resources.* (DEIS p 3.13-66)

There is no assessment of essential fish habitat for Alternative 4 in Appendix Q.

3. There does not appear to be any assessment of fish along the Alternative 4 BTC road (DEIS 3.13.2.2.2), although it will cross 40 streams, with 8 large enough to require bridges. Without an assessment, it is difficult to see how the following statement in the DEIS can be substantiated, particularly given that some areas are, apparently, Essential Fish Habitat:

FISH 11

> *Similar to Alternative 2, potential impacts to anadromous and resident fish populations and EFH would be of a medium intensity and noticeable at certain times and locations, affecting localized sections of drainages downgradient of stream crossings on a long-term basis.* (DEIS p3.13-174)

4. Similarly there did not appear to be a comparison of riparian areas or wetlands. It is also difficult to understand how the Comparison of Impacts table (Table 3.13-31, p3.13-181) is able to state that the impacts on the roads for Alternatives 2 and 4 are identical ("minor") for aquatic resources, with only a higher probability due to higher road length without some of this basic information.

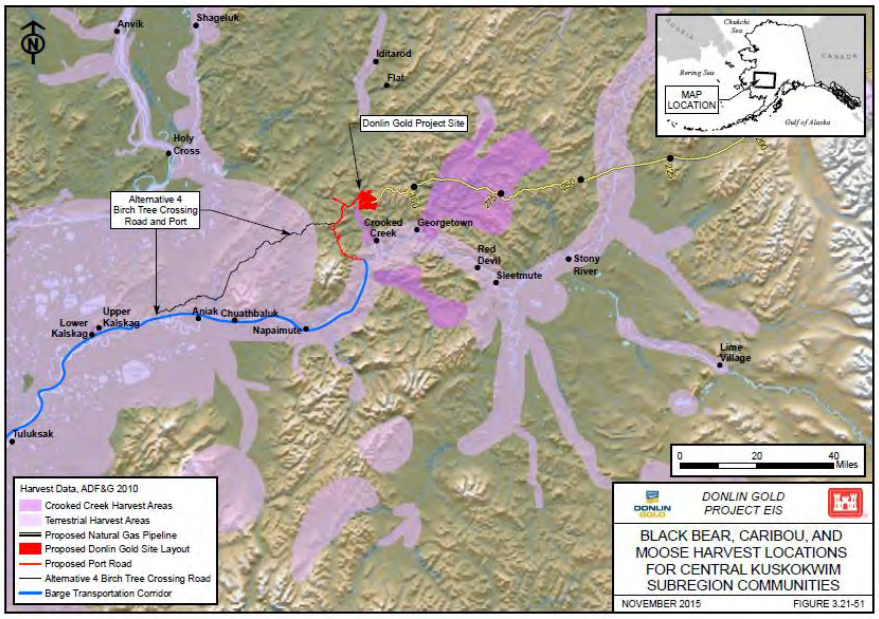
With no assessment of fish resources or EFH for Alternative 4, there is no way to compare the potential impacts of Alternatives 2 and 4.

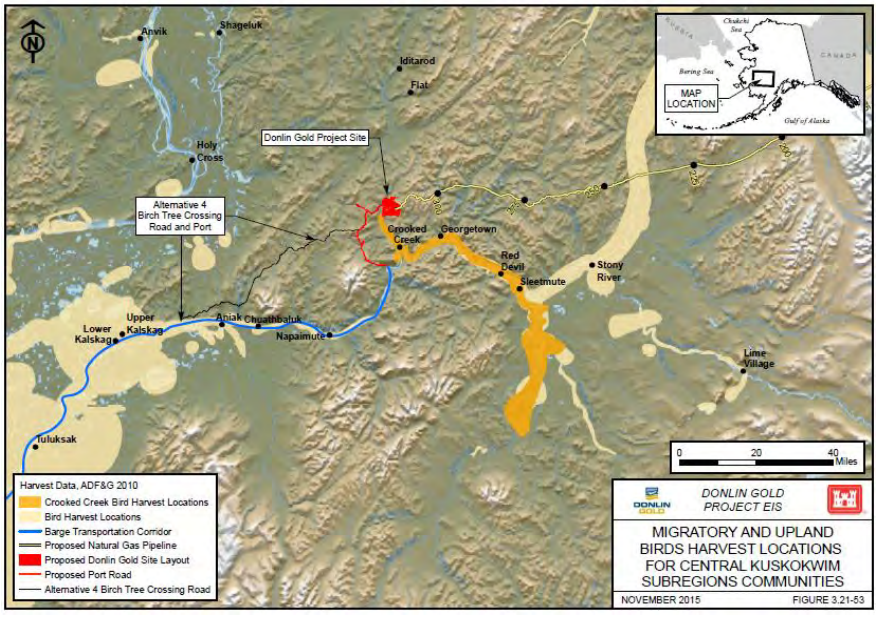
**Impact on subsistence use**

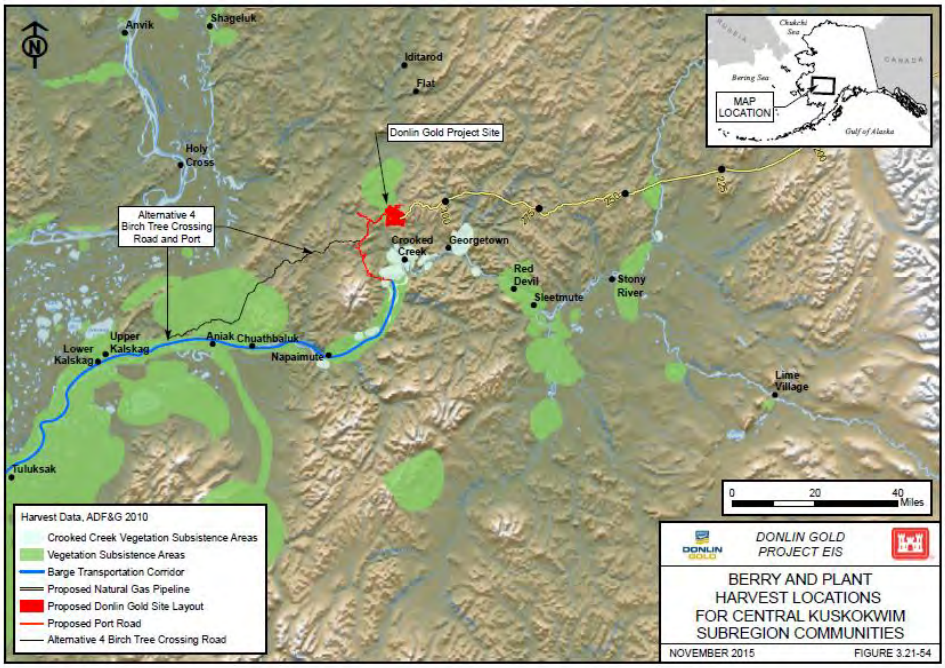
SUB 10

The statement "the summary impact of Alternative 4 on subsistence would be minor" and that the area is only for "casual summer subsistence use" (p 3.21-190, 3.21-194) belittles the importance of the area to the Native Village of Chuathbaluk and Aniak. There will be permanent impacts that will restrict subsistence use first by prohibiting hunting and trapping in the road area and then by increasing competition by opening up access to other users through the permanent maintenance of the BTC port and road. Rather, what the BTC port/road option does is trade temporary impacts to fish (in the Kuskokwim River, reduced in Alternative 4) for permanent impacts on hunting, trapping, and gathering at a very large subsistence use area.

It is important to note the extensive use of the BTC road area for subsistence relative to the very minor subsistence use along the proposed road from the Jungjuk port (Figures 3.21-51, 3.2.1-53, and 3.21-54, shown below).






**Land ownership and management**

*Land ownership*

A series of maps in Chapter 3.15 (Figures 3.15-1A to 1E) show general land ownership, but there is no map that adequately shows the ownership along the BTC road. A detailed ownership map, such as is provided for the proposed Crooked Creek Road in Alternative 2 (Figure 3.15-3) should be provided for the BTC road.

LAND 2 This is particularly important given that much of the area is heavily used for subsistence, and the road will become a permanent feature providing access for hunting, fishing, recreation, and mineral development that could impact current users, particularly the Native Village of Chuathbaluk and Aniak. Table 3.15-4 shows that under Alternative 2 ownership along the Crooked Creek road is 277 acres under Kuskokwim Corporation and/or Calista Corporation ownership; under Alternative 4, the Birch Tree road, there are 490 acres owned by these corporations. Calista corporation ownership includes the subsurface. Depending on the geologic resources, there could be greater potential for mineral development if the BTC road is built.

Because there will be people that may benefit and people that may be negatively impacted by increased access and/or mineral development along a proposed BTC road, a clear map of ownership should be provided.

*BLM management*

LAND 10 There is no discussion of how BLM management plans could impact the road; BLM owns 914 acres of land that the road would cross in Alternative 4 while it owns no land in the road used in Alternative 2. The DEIS states:

*BLM lands in this area are managed by the Southwest MFP which acknowledges that the development of renewable and non-renewable resources within the planning area would require the development of a surface transportation network, and makes public lands available for such purposes (BLM 1981).* (DEIS p 3.15-53)

However, this is inaccurate. The 1981 Southwest MFP is outdated and undergoing revision:

*The new Bering Sea-Western Interior (BSWI) Resource Management Plan (RMP) and associated Environmental Impact Statement (EIS) will replace portions of the existing Southwest Management Framework Plan (MFP), approved in 1981 and portions of the Central Yukon RMP Record of Decision (ROD), approved in 1986.*

LAND 10

*Although the 1981 Southwest MFP provides land and resource use and development recommendations, it fails to establish the conditions under which land and resource use and development may occur throughout the entire Planning Area. The MFP is considerably outdated, is not in compliance with current planning regulations and policies, and was never analyzed under the National Environmental Policy Act (NEPA). Consequently,* ***some of the decisions in the MFP are no longer valid*** *or have been superseded by requirements that did not exist when the MFP was prepared.* *https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=36665&dctmId=0b0003e8804de363*

The BSWI is mentioned in DEIS Cumulative Impacts, Table 4.2-1.

- **Recommendation: Provide adequate information for comparison of Alternatives 2 and 4.** There will be permanent and potentially substantial impacts to subsistence users who hunt, fish, and gather in the BTC road area (Chapter 21 p 3.21-189-190); this may provide BLM with a reason to revise land management in the area. Without an assessment of fish, fish habitat, wildlife and wetlands, and with the potential for land management decisions to change, it is not possible to compare potential impacts of Alternative 4 with Alternative 2, particularly regarding impacts to subsistence.

Financial Assurance (Appendix A)

**Coordinated State Process**

BER 2

Establishing the value of the financial assurance for the project is very important for several reasons. First, just the magnitude of the financial assurance is so large that it needs to disclosed and analyzed as a part of the EIS. There is no valid reason for segmenting this analysis, other than to make the work of the regulatory agencies easier. This should not be adequate reason for delaying this important analysis, which could easily be presented for the EIS, then amended when the final permits are issued. The Alaska Department of Natural Resources has established a separate arm for the purpose of coordinating large

mine projects to facilitate permit review and issuance, yet this significant element, for which multiple agencies are required to issue permits, is not included in the EIS process.

A detailed analysis of the financial assurance that would be required for the project is NOT presented in the DEIS. The rationale for not including this analysis is:

> *ADNR (Alaska Department of Natural Resources) and ADEC (Alaska Department of Environmental Conservation) generally wait to issue the final authorizations and permits until after the final EIS is issued since this provides clarity in the selected alternative and allows the State to incorporate applicable mitigation measures into its authorizations and approvals. At this point (after the Final EIS is issued), more accurate and complete reclamation and closure costs can be developed.*

However, it is also noted:

BER 2

> *Financial assurance must be established to cover the cost of implementing the Reclamation Plan. A mining operation cannot commence until the Reclamation Plan and financial assurance are approved by ADNR.*

and;

> *The waste management regulations require that proof of financial responsibly be established to cover the costs of closure and monitoring (18 AAC 60.265). A mining operation cannot begin until the IWMP (Integrated Waste Management Permit – ADEC) is issued and financial assurance is established.*

and;

> *The Dam Safety regulations require that applicants obtain approval of the method of demonstrating or providing financial assurance after submitting the preliminary design package and before submitting the final construction package (11 AAC 93.171(d)). After ADNR reviews and approves the type of financial assurance, then the final construction package must include a certified cost estimate and posting of approved financial assurance (11 AAC 93.171(f)(4)(F)).*

Three major permits depend on the analysis of the financial assurance, but this analysis is not included in the EIS process.

**Long-Term Post-Closure Cost Estimate**

To illustrate two of the issues that need to be discussed before the permits are issued, consider:

BER 7

> *Costs for long-term post closure activities were estimated out to 200 years after closure of the operation. The 200-year time period is sufficient to demonstrate that the post-closure trust fund can be self-sustaining in perpetuity, should long term water management be required post closure. To make the trust fund self-sustaining and able to cover annual post-closure costs, a total of approximately $73 million dollars is required to be in place at the time of mine closure. ...*

*In order to build the trust fund to $73 million dollars at closure, Donlin would make annual contributions of approximately $2.3 million per year into the trust fund during Project construction and operations.*

First, a 200-year time period for analysis of the net present value calculation is adequate only if the net interest rate on the money in the long-term trust fund is typically higher than most public institutions can earn because of risk-avoidance requirements. The interest rate assumed is not disclosed in Appendix A.

BER 7 Second, to underwrite the trust fund, an annual $2.3 million contribution is proposed. However, if the mine were to go into bankruptcy after several years of operation, the trust fund would likely not be large enough to cover the now-perpetual costs of treating water that have been incurred by early mine operation. How large is this amount and is the public now liable for this difference? Why wasn't a financial assurance required to cover the difference until the mine contributions to the post-closure trust fund are large enough to cover the financial obligation?

These are several, but not nearly all, of the issues that can be easily discussed at this stage of the mine analysis, and there is no practical reason why they shouldn't be open to public discussion now.

- **Recommendation: Provide a detailed analysis of the financial assurance, including estimated operational costs, estimated closure and long-term costs, and interest rates.**

Spill Scenarios

**Partial Tailings Dam Failure**

The tailings dam failure modeling scenario chosen for the DEIS only assumes a spill of 2.6 million cubic yards of tailings (2 million $m^3$) (DEIS 3.24.2.5.9). The capacity of the tailings storage facility is 568 million metric tonnes, which translates into approximately 355 million cubic yards.[1] Using this conversion factor, the 2.6 million cubic yards represents 0.73% release of tailings.

DAM 4 In a typical catastrophic rupture of a tailings impoundment, approximately 20% of the tailings are released from the impoundment.[2] The mitigation of dam design does not remove from the proponent the need to analyze the environmental impacts should there be a tailings facility accident. First the impact needs to be assessed, then the mitigation needs to be proposed. There can be no assurance that the original dam design will be followed as new lifts are added over the years, nor that the current water management plans to reduce water volume in the TSF will be followed throughout mine life and throughout any potential mine expansion. For example, plans currently call for the area under the dam foundation to be excavated to bedrock – but there can be no guarantee that this will be followed through when lifts are added. Therefore, for EIS analyses, a failure of the impoundment at maximum capacity should be assumed. There is no justification given for the assumption of a partial tailings dam failure.

[1] Assume 1.6 metric tonnes per cubic meter (~100 pounds per cubic foot) for tailings at closure.

[2] Floods from tailings dam failures, M. Rico, G. Benito, A. D´ıez-Herrero, Journal of Hazardous Materials, 2008, Figure 4, p. 83.

A more substantial failure than the modeled 2.6 million cubic yards has implications for exceptionally high environmental damage: scour, erosion, deposition of tailings along a long stretch of Crooked Creek with resulting long term water quality degradation and habitat loss, potential blockage to tributaries to Crooked Creek (Getmuna, Bell, etc.) that have high fish populations, etc. Such an event would cause much greater impact to fish and aquatic resources than the current assessment of loss to "relatively few spawning redds" (DEIS p 3.24-156).

A larger spill also has implications for human risk. The Emergency Response section for a tailings dam failure focuses entirely on earthmoving equipment (e.g.):

> *This area is not currently being mined; therefore, no plan or capacity for response is presently available for this area. New plans and response capacities would be required for the proposed project, which would be detailed in the EAP required under ADNR dam safety permitting (Section 3.24.1.5). These would involve the extensive use of excavation and earthmoving equipment from the mine itself.* (DEIS p 3.24-11)

DAM 4

Modeling a 0.73% release estimates that released water would reach Crooked Creek within a day, and raise the creek by one foot (Table 3.24-10); a greater release could reach the village much sooner and raise the creek much higher. To understand the times and depths, and therefore appropriate emergency actions for human health and safety, would require modeling. Should there be greater risk than is currently estimated, the Emergency Action Plan (EAP), which is not available for review, should require a communication and alert system to be in place that is sufficient to warn people in Crooked Creek and boaters on the Kuskokwim near Crooked Creek of the potential need to move out of the area.

**DSTF Operating Pond Spill**

Although a Dry Stack Tailings Facility (DSTF) is provided as an alternative to the proposed mine plan (indeed, it is the ONLY mine plan alternative), there is no assessment of the potential impact of a failure of the DSTF operating pond. Although one section of the DEIS says

> "*Under Alternative 5A, the volumes of water and slurry stored behind the tailings main dam during the operational period would be lower relative to Alternative 2 (DEIS p 3.7-194)",*

another section says the DSTF operating pond would be approximately 131,500 acre-feet (42.8 billion gallons) (DEIS Figure 2.3-43), significantly **larger** than the TSF pond of 24,000 acre-feet (7.8 billion gallons) (Table 3.7-37 footnotes 5 and 6). If the sentence in italics above refers to water entrained in the tailings, not water in the operating pond, which would be behind a dam, this should be clarified.

DAM 6

Presumably the water quality would be similar to the TSF pond, although that has not been modeled (DEIS p 3.7-192).

A discussion of the relative risks of a potential failure of the TSF dam "water only release" to the DSTF pond would better allow reviewers to assess the potential risks. Is the DSTF dam built all at once, or in stages like the TSF dam? What are the potential failure modes for the DSTF operating pond? Just as the TSF spill scenario needs to be redone with a realistic volume failure, certainly something much higher

than the 0.73% modeled, a DSTF pond failure should also be modeled with a realistic figure – a 2 million $m^3$ water release would represent only 0.0012% of the volume the pond is anticipated to need to hold.

DAM 6

- **Recommendation: Provide a scenario of dam failures at both the TSF and DSTF, with at least a 20% release of material from the storage facility.**

**Fuel spill (3.24.3.1)**

The section on fuel spill scenarios is entirely lacking in quantification of spill frequency and in detail on fate and transport of the spilled material, which would be needed to determine potential impacts and mitigation.

*Spill frequency*

There is no quantification of expected "rates of occurrence" of different sized spills (Table 3.24-1). Footnotes say "very high relative rate of occurrence has a probability approaching one….very low has a probability approaching zero."

First, what is a "*relative* rate"? Relative to what? Why is it not simply a rate based on miles traveled or per-ton mile. The reference for this section is ERM 2014, which notes that the rate of petroleum product spills averages 4.78 x $10^{-7}$ spills per ton-mile in the State of Alaska, and that 90% of these were less than 50 gallons of product (ERM 2014, Executive Summary). This is quantitative. This is a rate (not a "relative rate"). It would be helpful to know the range of rates as well as the average, to be able to bound a worst and best case scenario, but at least we have a figure we can work with.

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The table below shows what is in the DEIS (Table 3.24-1) and what ERM actually said in their report:

| Relative rate of occurrence (DEIS) | Spill size < 10 gal | Spill size 10-99.9 gal | Spill size 100-1,000 gal | Spill size 1,000 – 10,000 gal | Spill size >10,000 gal |
|---|---|---|---|---|---|
| Vessels (Barges) | High | Medium | Low | Very Low | Very Low |

| Spill record (ERM 2014) | Spill size < 5 gal | Spill size 5-50 gal | Spill size 50-1,000 gal | Spill size 1,000 – 10,000 gal | Spill size >10,000 gal |
|---|---|---|---|---|---|
| # of spills per year, historical | 1-9 per year | 0.01-2.5 per year | (not found in ERM) | 1 in 33 years to 1 in 1,000 years | Has not occurred |
| % from a total of 1,705 spills, 1995-2013 | 74% | 20% | 5.7% | 0.2% | na |

*Table 4-2 in ERM 2014 on ADEC historical records of fuel spills from barges in Alaska

Notice the difference? The upper table tells us nothing. In fact, when ERM developed a similar table (Table 5-1, ERM 2014), it was done to determine if there was a spill size that was "Not Reasonably Foreseeable" – not to categorize the sizes in qualitative terms.

The lower table is something we can use. For example, we could calculate that if 5.7% of 1,705 spills of size 50 gallon to 1,000 gallon spill occurred over 18 years (1995-2013), this is 97 spills that occurred. We could estimate based on this that – without additional mitigation – 146 spills between 50 and 1,000 gallons would occur during the 27 year life of mine. The estimate would actually be higher, as construction time pre-mine and construction barges (running on diesel) for the entire mine life should be included.

However, there is critical information missing – of the historic number of spills per year, what percent of vessel trips (or ton-miles) does this represent? That is, of the vessels carrying fuel, how many had spills?

Also, the range stated of "1 in 33 years to 1 in 1,000 years" is an extraordinary range of variability. The spill size should be narrowed to smaller ranges to provide something more useful. One can imagine a mine life extending to 33 years (indeed, in reality with construction and reclamation, it will reach that), and possibly to 50-70 years if more of the deposit is developed, but not 200, 500, or 1,000 years.

While the DEIS is quick to point out that a 1,000 – 10,000 gallon spill would not be expected to occur during the 27 year mine life, they do *not* note the potential for 146 spills between 50-1,000 gallons.[3] The difference between cleaning up a 50 gallon spill and a 1,000 gallon spill is significant. Would ocean barges delivering to Bethel or river barges delivering to an upriver port carry and maintain equipment to clean up a 1,000 gallon spill?

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Presumably with mitigation (double hulls, pilots on ocean barges, channel markers in the river, etc.) the risk would be reduced, but since we do not know how many of the historical spills used to come up with the probabilities had these mitigations in place, we do not know the extent to which the risk will be reduced.

Despite caveats, the ERM method is useful. It uses a defensible factor, spills per ton-mile. The rate of spills appears to be reasonably calculated as $4.78 \times 10^{-7}$ spills per ton-mile for petroleum barges and $3.37 * 10^{-8}$ spills per ton-mile for all cargo (ERM 2014 Table 4-4). They estimated 144,281 tons of petroleum will be transported annually at Donlin (based on 40 million gallons of petroleum), and the number of river miles can be estimated base on the distance from the mouth to Bethel added to the distance from Bethel to Jungjuk or Birch Tree port. This is a method that allows us to also see how changing the location of the upstream port could change the potential number of spills on the river. ERM states that without Donlin, about 5 spills could be expected on the river annually; with Donlin, there could be about 18 spills annually. Of the additional potential spills related to Donlin, nine would be less than 5 gallons, three would be 5-50 gallons, and one would be 50 gallons-1,000 gallons (ERM 2014 p57-58). Spills of less than 50 gallons should not be difficult to clean up or pose a large environmental hazard, although multiple annual spills could potentially cause cumulative damage if they occur in the same location. It would be useful to know what the risk of a 500-1,000 gallon spill would be, as that is likely to be more difficult to contain.

[3] 5.7% of 1,705 spills = 97 spills in 18 years. ((97 spills/18 years) * 27 year mine life) = 146 spills over mine life

Lastly, ERM found that most spills were caused by human error (overfilling, poorly secured loads, etc.) or equipment malfunction (corrosion, valve failures, hull failures, etc.), particularly overfilling; the largest human-error spill in the 1995-2013 Alaska data set was 500 gallons and the largest due to equipment failure was 2,604 gallons (ERM 2014 p39-40). Nationwide for 2002-2013 the largest human-error spill was 1,690 gallons and the largest equipment malfunction spill was 2 million gallons (ERM 2014 p47).

It will never be possible to eliminate risks from these causes. It is helpful that the steps to be taken if a barge grounds are provided in the DEIS (DEIS p2-46); this page should be referenced in the Spills chapter. As just one example of human error, there was a recent spill of 6,000 – 7,500 gallons (20,000 – 30,000 liters) at the Victoria (BC) port. Of interest in the article are these points (http://www.timescolonist.com/news/local/cleanup-underway-after-barge-runs-aground-in-esquimalt-harbour-1.2249845):

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- the spill occurred even though the barge company had a 100 year history of no spills,
- construction barges can spill diesel (and should be included in a ton-mile spill frequency risk analysis),
- it took two hours to lay out boom even though the spill occurred IN a major harbor,
- shoreline assessment team was deployed after the spill,
- and no statement that the area was "clean" would be made until all stakeholders, including First Nations, agreed

➢ **Recommendation: State the probability for spills greater than 50 gallons in a meaningful way, include construction barges in the ton-mile spill frequency calculations, and clearly state how the probabilities were determined. Note whether construction barges will be double-hulled.**

*Spill distribution*

The 109 page ERM 2014 "Oil Spill Risk Assessment" report devotes about 1.5 pages of text to the fate and transport of spilled fuel at Jungjuk or Birch Tree Crossing ports. Although the method appears to be adequate, there is only a table to indicate how quickly a spill could move downstream (no map or text) and even this information does not seem to be in the DEIS. Depending on flow, a spill could travel 62 miles in 10-20 hours. A map and description of the distance the spill could travel should be provided in the DEIS.

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Additionally, there was no analysis of an ocean barge spill below Bethel in the ERM report. There are no references for the Ocean Barge scenario (DEIS 3.24.5.1) so we have no idea where the material for this section came from.

NOAA has a method for determining the fate of spilled fuel (http://response.restoration.noaa.gov/about/media/how-does-noaa-model-oil-spills.html?utm_source=OR%26R+Update%3A+May+2016&utm_campaign=OR%26R+Update+May+2016&utm_medium=email).

> *To better prepare response communities for oil spills, OR&R develops several software and map tools for spill response and planning. These include **GNOME**, a trajectory forecasting tool; **ADIOS**, an oil weathering model; **Environmental Sensitivity Index (ESI) maps**, that identify vulnerable resources and habitats; and **ERMA®**, a GIS-based tool that consolidates key response data.* (http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills)

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These methods should be applied to analyze a lower Kuskokwim spill to determine where a spill could travel under different weather conditions, the fate of the oil, and vulnerable habitats in the lower and middle Kuskokwim and at Dutch Harbor. It should also be applied to middle Kuskokwim locations – at Jungjuk or Birch Tree to see how similar the results are to the ERM analysis, and at a narrow reach, which could be a location more at risk for groundings.

- **Recommendation: Apply NOAA software and map tools for a spill scenario in the lower and middle Kuskokwim, including in a narrow reach.**

*Impact versus mitigation*

The spill scenarios (3.24.5.1 and 3.24.5.2) do not describe how far a spill could travel (and what influences that distance) or what resources would be put at risk. Instead, they describe how a spill would be responded to. While this is useful, it confuses *assessment of impact* with mitigation. First the impact must be described (spill frequency, size, fate of material, resources impacted), *then* mitigation proposed and evidence that mitigation will reduce the impact.

FSR 15

The impacts of a fuel spill are scattered throughout section 3.26 (which makes it very difficult to get a good sense of the impact) and summarized in the DEIS 3.24.7 table. In the table it is stated that the seafloor could be contaminated with diesel, but there is no mention of that for the river. Why would the river bottom not be contaminated with diesel? This is important, as diesel contamination could impact fish eggs. Under impacts to sediment, this statement is confusing: "*Impacts could result from adsorption of diesel in the water column, and could exceed sediment quality guidelines.*"

Possible mitigations to prevent fuel spills include double hulled barges, placing pilots on barges traversing the lower Kuskokwim River up to Bethel, marking river channels, keeping spill response equipment on board, and having capacity with each 4-barge tow to transfer fuel from one leaking barge to an intact barge (ERM 2014 p75). Is there specific information on how double hulled barges and/or adding pilots prevent or reduce spills? If these change the rate of spills, we should see the rate before and after double hulled barges are placed in service.

FSR 11

There are other statements that need supporting material.

FSR 15

*The likelihood of a large spill from a barge going to Donlin is very low for several reasons. The potential effects of severe weather will be minimized because the season for shipping is limited to the ice-free period on the Kuskokwim River.* (DEIS p3.24-13)

FSR 15

- **Recommendation. Provide information on what defines "severe weather" and the difference in the number of severe weather days between June 1 – October 1.** Given that break up is likely going to be earlier than June 1 on most years with the impact of climate change (note, for example, the very early breakup this year in April), **also provide the number of severe weather days historically from May 1 – June 1.** Again, this will help provide a more quantitative picture of the difference in risk.

*From 1990 to 2011, only 10 instances of a vessel suffering hull failure, grounding, or sinking were recorded on or in the vicinity of the Kuskokwim River. Eight of the 10 incidences resulted in the release of 20 gallons or less of petroleum products (ARCADIS 2013a).* (DEIS p3.24-13)

What were the sizes of the other two spills? What were the impacts – at a minimum anecdotal information must be available. Also, a vessel that sunk near Bethel continues to remain a shipping hazard – how many other shipping hazards are there now along the route? When (when may be more likely than "if") vessels unrelated to the mine project sink along the barge route, how will that be addressed? There does not appear to be a state mechanism to pay for removal of derelict vessels (APRN May 13, 2016 http://www.alaskapublic.org/2016/05/13/what-can-be-done-about-alaskas-derelict-vessels).

*Double hulled tank vessels provide an additional layer of spill prevention—in the case of hull rupture caused by a grounding or collision, usually the outer hull absorbs the damage and the inner hull remains unharmed with contents intact (NOAA 2014c).*

FSR 11

The reference is a news article (NOAA. 2014c. A Final Farewell to Oil Tankers with Single Hulls. Accessed August 13, 2015. http://response.restoration.noaa.gov/about/media/final-farewell-oil-tankers-singlehulls.html) which does not appear to be on the main page any longer. Something more in the way of a report would be more re-assuring. There is a reference that is relevant to loads less than 5,000 gallons (NOAA. 2014a. Small Diesel Spills (500 – 5,000 gallons). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service. Office of Response and Restoration. http://response.restoration.noaa.gov/oil-and-chemical-spills/oilspills/resources/small-diesel-spills.html -- link is broken). Barges will be carrying 300,000 – 2.94 million gallons each (ERM 2014 p4-5). Are there references on the effectiveness of double hulls when these larger volumes are carried? Possibly there may be references along for transport along the Mississippi or Ohio rivers for river barges, or in the Galveston/Gulf Coast area for ocean barges carrying refined fuel or crude oil (although the impact of a spill of crude is different than one of diesel, the rate of failures of vessels carrying the oil should not be different).

- **Recommendation: Provide clear information on the effectiveness of double hulls in reducing oil spills.**

*In general, small and medium-sized spills evaporate and disperse naturally within a day or less, even in cold water (NOAA 2006)* (DEIS p3.24-32)…… *For example, almost all (more than 90 percent) of the diesel in a small spill incident from a barge in marine waters would evaporate or naturally disperse into the water column in a matter of hours or days*. (DEIS p3.24-33)

FSR 15 This mis-represents what was stated in the ERM 2014 report and in the DEIS impacts section (DEIS p 3.24-65), which was: *"After 4 days, approximately 39% and 59% of the diesel has been evaporated for 0 °C and 13°C, respectively. The rate of evaporation may increase depending on wind speed*." (ERM 2014 p70). The two sections of the DEIS should be reconciled, and maps of where a spill could travel over 6, 12, 24 hours should be provided if a spill occurred at Bethel, Jungjuk, Birch Tree, or a narrow reach.

- **Recommendation: Provide supporting material, clarify, reconcile, or change the sections noted above.**

**Transportation route**

PAA 22 Alternatives

The description of Alternative 4 does not mention how many river miles are traversed on the route from Bethel to Birch Tree Crossing (DEIS Section 2.3.5.2).

Impacts to Wildlife

BIRD 4 Bank erosion may be accelerated due to barges (DEIS p 3.12-149). Bank swallows, a species protected under the Migratory Bird Treaty Act, are one of the birds found in the study area (DEIS p 3.12-147, Table 3.12-15). Why are they not listed in Table 3.12-33 as "Species …known to nest along shorelines", and therefore potentially impacted by the increase in barge traffic?

According to the University of Alaska, in the Wood-Tikchik State Park, they nest along river-cut banks, and bank collapse – potentially made worse by additional barge traffic – is a common source of nest failure (http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/05/Riparia_riparia_report.pdf).

PAA 22
- **Recommendation: Provide road and river mile lengths and descriptions of pertinent sections (stream crossings, narrow river reaches, essential fish habitat, etc.) in the descriptions of each Alternative.**

BIRD 4
- **Recommendation: Ensure adequate impact analysis for birds that utilize river banks.**

**Mine Design**

Earthquakes (3.3.3.2.1)

**Seismic Hazard Analyses and Selection of MCE/MDE**

The proponent has conducted both a deterministic and probabilistic study to determine the Maximum Credible Earthquake (MCE) for seismic analysis for the Tailings Storage Facility dam. Use of the MCE is appropriate for seismic analysis for the dam. However, it is noted in the DEIS:

> *The probabilistic analysis simply says there is a 1 in 10,000 chance that the pga will be 0.44g.*
>
> *Donlin Gold has elected to rely on the deterministic model, using the MCE of 0.36g (5,000-year event) to generate the MDE for the purposes of numerical seismic deformation analyses. This decision is consistent with the relevant guidance and regulations; however, final acceptance of the MDE decision would be made by ADNR as part of dam safety permitting.*

GEO 3 Seismologists know that there are many active faults that have not been mapped or have been mapped inaccurately, that some faults believed to be inactive may actually be active, and that there are many inactive faults that may become active again. Because of these considerations, probabilistic methods are the more conservative way to determine the magnitude of a Maximum Credible Earthquake for dam analysis.

For tailings dams the most conservative choice for the location of the Maximum Design Earthquake would be what is sometimes referred to as a 'floating earthquake' on an undiscovered fault that passes very near the site of the dam. This is a way of recognizing that we do not know the present, future, and even the past locations of significant faulting, and associated earthquakes.[4]

There is a significant difference in the magnitude of the 0.44g established from the probabilistic analysis, than the "0.36g (5,000-year event)" established from the deterministic analysis, and chosen by the proponent as the Maximum Design Event (MDE). In addition to the inappropriate choice of the deterministic 0.36g for the MDE, a "5,000-year event" is not a Maximum Credible Earthquake, which is considered a 10,000-year event.[5]

- **Recommendation: The probabilistic method-determined 10,000-year MCE of 0.44g should be used as the Maximum Design Event for the Donlin dam.**

Climate (3.26.3.2.1)

CLIM 4 Hydrology and permafrost melt will be impacted by climate change. The DEIS uses University of Alaska SNAP data to look at precipitation through 2099, which indicates a 17-25% increase in precipitation in the latter part of that time frame, which would be during post-closure.

[4] Safety of Dams, Flood and Earthquake Criteria, Committee on Safety Criteria for Dams, Water Science and Technology Board, Commission on Engineering and Technical Systems, National Research Council, National Academy Press, Washington, D. C., 1985, pp. 67-68

[5] Earthquake Safety of Existing Dams for Irrigation and Water Supply in Rural Areas, Dr. Martin Wieland, Chairman, Committee on Seismic Aspects of Dam Design; International Commission on Large Dams (ICOLD), December 2001

This winter and spring we are experiencing temperatures greater than those predicted by SNAP for the 2090-2099 period. Models should assume that, at a minimum, the 2090-2099 predictions will be in effect in the early years of the mine, affecting hydrology and potentially permafrost melt.

CLIM 4 In addition to applying the 2090-2099 expectations to streamflow (and resulting temperature in summer, freezing reaches in winter), they should be applied to determine the risk for waste rock slumping due to permafrost melt. Although waste rock itself may insulate the ground, seepage from waste rock could accelerate any thawing initiated by temperature increases due to climate change and weather patterns.

- **Recommendation: Assume SNAP 2090-2099 precipitation and temperatures as a base case for mine design.**

**Mine Site – Operations**

Impacts to Wildlife

Hair (moose, vole), feathers, fish tissue, and sculpin whole body grind should be required as part of the monitoring system. Analysis should be conducted for arsenic, antimony, selenium. If uranium is present
WILD 3 in dust, surface water, or groundwater, then the suite of analytes should also include uranium.

- **Recommendation: An adequate selection of species should be monitored for key contaminants throughout mine life. Non-invasive sample collection should be used whenever possible (hair, feathers, carcasses).**

Water Quality

**Baseline water quality**

The DEIS notes that surface water quality data has been collected through 2015 (DEIS p 3.7-9); however, the reference they cite throughout the section is Arcadis 2012b, which only contains data from 2005-2010. Summary water quality tables have no citation at all. The dates are relevant in that additional sites (CCBB, BELL, GETM2) were added in 2013 (DEIS p 3.7-9) and additional analytes (dissolved mercury,
WAQ 29 methyl mercury) were added in 2013 and 2014 (DEIS p 3.7-32).

Additionally, there appears to be no documents that have the actual water quality results. Arcadis 2012b provides only a summary, not tables of data, and there is no section in the DEIS or DEIS appendices that has the data.

- **Recommendation: Provide up-to-date water quality data in both a summary form and in tables that show actual location/date/analyte results. Tables should preferably be provided in an Excel or Access format that can be manipulated.**

**AWT operation**

This sentence is misleading:

> *The effluent water from the previous step may have TDS and some other constituents at concentrations above AWQC. In that case, RO will be used as the final polishing step.* (DEIS p 3.7-140)

WAQ 25 The Reverse Osmosis (RO) system will be required to remove virtually all trace elements. The first step (high rate clarifier, HRC) removes iron, most of the aluminum and arsenic, and some antimony and manganese. The next step (Greensand Filter) removes the remaining manganese and some arsenic. The RO is expected to remove to water quality criteria: aluminum, ammonia, antimony, arsenic, cadmium, lead, manganese, mercury, molybdenum, selenium, sulfate, and total dissolved solids (Table 1 attached at end of letter, based on Hatch 2015, Section 4.4.3, Tables 4-12 to 4-14).

The treatment process will produce waste from three different treatment units: sludge from the high rate clarifier and greensand is to be placed in the TSF, with RO brine returned to the process plant (DEIS p 3.7-140). Where will the HRC and greensand waste be placed if the DSTF (Alternative 5A) is the preferred alternative? Presumably these waste products would be placed in the pit lake at closure; how could this change pit lake water quality? This is an important question since the WTP may need to be operated in perpetuity and the "bad water" in the pit lake cannot be expected to be isolated at the bottom of the pit lake in perpetuity.

- **Recommendation: Provide a complete comparison of Alternatives 2 and 5A.** This should include implications for water treatment and disposal of treatment waste. Provide information on the risks of relying heavily on an RO system, including frequency and cost of maintenance under different pit lake water quality scenarios.

**AWT sizing**

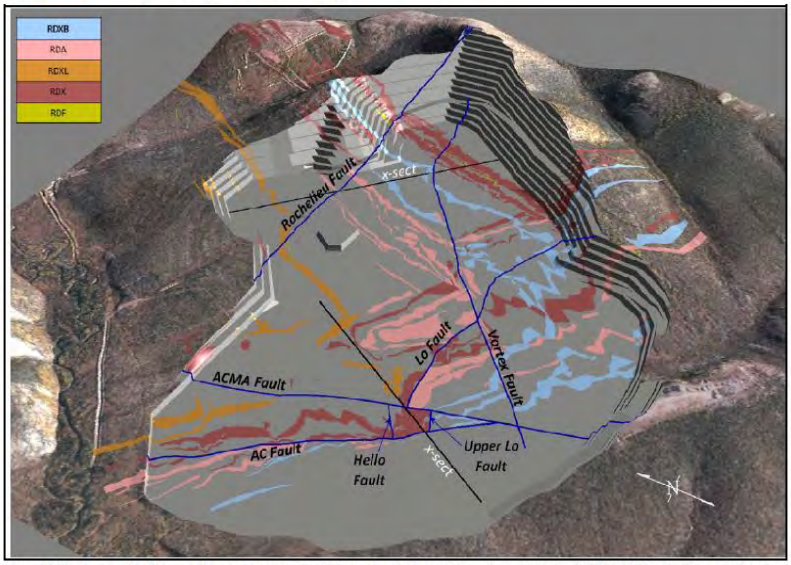
WAQ 10 The volume / rate of pit dewatering is dependent on bedrock conductivity, which can vary from 500 to 5,000 gallons per minute (gpm). The other potentially major source of water to the AWT water treatment plant (WTP) is the seepage recovery system (SRS), which is partly seepage through the TSF liner (2-16 gpm) and partly water captured from the mine area in the tailings facility underdrain (800-1,000 gpm for ten years declining to 575 gpm in year 25).

The WTP is not designed to have the capacity to be able to treat high flow periods or treat dewatering volumes if high conductivity bedrock is encountered. Even if the AWT expanded to the maximum design capacity (1,500 $m^3$/h = 6,604 gpm, DEIS p 3.7-141), it would not be able to deal with the volume of pit water, if high conductivity bedrock is encountered, from years 3-19; the design of 1,061 $m^3$/h (4,672 gpm)

would not be able to deal with the volume of pit water, if high conductivity is encountered, in ANY year (see Tables 2 and 3 in attachment at end of letter).

The pit contains many fault lines (figures below, from NovaGold 2012 NI 43-101 Technical Report on the Second Updated Feasibility Study); these could increase or pose barriers to fluid movement. The nature of conductivity along the faults is not understood well enough, and is critical to understanding water management.

**Figure 7-4: 100 m Bench Level Geology**




Note: Oblique view looking north-eastward of the 3D geological model projected on the 328 ft (100 m) pit bench level and the Mineral Reserves (DC9) pit outline. Note: Figure courtesy Donlin Gold.

WAQ 10

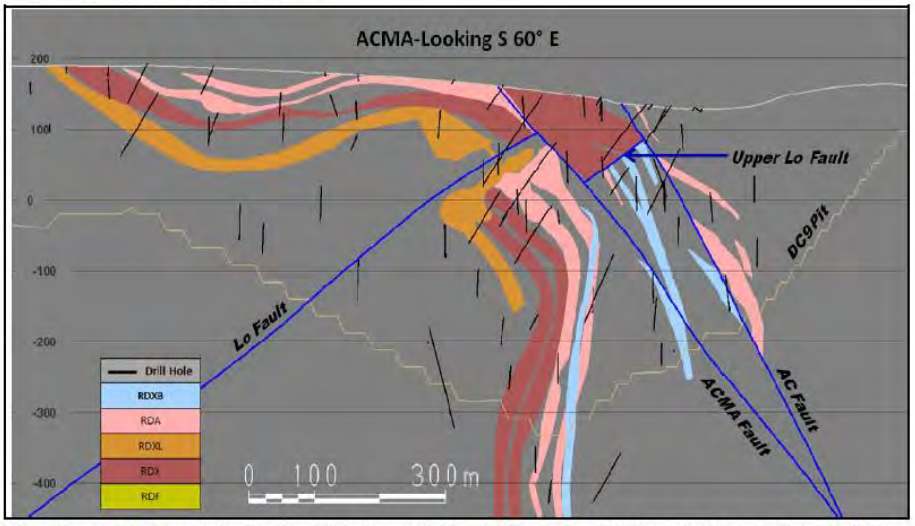
Possible mitigations could involve running the water treatment plant for 12 months a year, instead of the proposed 8 months, and/or storing water in the Contact Water pond or TSF; however, this potential increases the risk of overflow or failure at the TSF. Also, there may be operational issues at the WTP:

*"To eliminate potential issues with operation and maintenance of the WTP during the winter months, it is assumed that treatment is restricted to the April to November period"* (BGC 2015j, p2).

If the Dry Stack Tailings Facility becomes the preferred option, the DSTF operating pond or the Contact Water pond could need to be expanded to hold the additional dewatering water if the WTP is not sized appropriately.

- **Recommendation: Discuss adaptive measures under high conductivity scenarios.**

**Figure 7-6: ACMA Area Section**




Note: Shows intrusive rocks, faults, drill holes, and Mineral Reserves (DC9) pit, looking southeast. Note: Figure courtesy Donlin Gold.

Mercury assessment

There has been a good effort at understanding the current sources of mercury to the Crooked Creek watershed, modeling has been conducted to estimate the potential increase in mercury concentrations to soil and water, and sampling has been conducted to determine the potential for methylation in the watershed.

The environmental impact is dependent on

- Is the estimated amount of local and regional deposition (wet and dry, including drivers such as fog, clouds, rain, and snow) from mercury gas emissions at the processing plant correct?
- Is the potential for methylation in depositional environments accurate?

The DEIS notes the importance of source (historic mine sites as sources to sculpin and juvenile Dolly Varden) and hints at the importance of wetlands as methylation regions by noting the high concentrations of mercury in grayling, pike, and burbot at the George River– presumably this is due to the extensive wetlands, although this is not mentioned (DEIS Section 3.13.2.2.4, p 3.13-66 to 3.13-67).

If gaseous plant emissions do not deposit, or deposit in locations without methylation potential, then the mass of mercury emitted is globally important but not locally important and therefore not necessary to assess in the EIS.

The modeling and sampling has been conducted by contractors hired by Donlin Gold (Enviromin, Arcadis). Because of the importance of these issues, a competent third party should review the information. Some potential reviewers to look at the atmospheric chemistry of mercury per potential to deposit locally might be Dan Jaffe or Sarah Strode (at one time both were with University of Washington).

WAQ 21

- **Recommendation: Have an independent third party review mercury deposition modeling and reports on the potential rates of mercury methylation.**

The results of such a review should produce a map showing the probable or potential range of deposition. Methylation potential should be assessed *within this range.* For example, if there is potential for deposition in the George River wetlands, that environment should be included in the assessment of methylation rates. The potential reactions if fugitive dust containing HgS enters the environment should also be discussed – if it enters low pH wetland/riparian areas, is there potential for the sulfide to break down, releasing mercury to the soil and water?

An assessment should discuss the current levels of mercury in different fish species within different environments within the depositional area, and the potential for those concentrations to increase. Such an assessment would be assisted by the information in the upcoming report by the BLM on fish metal concentrations and fish population movements in the Central Kuskokwim (Matthew Varner, BLM, personal communication), which would be more recent and updated information from the studies conducted 2010-2011 (DEIS Section 3.13.2.2.4).

Some fish, such as grayling, move significant distances. There could be potential for them to take up mercury in environments in areas such as the George River wetlands and “deposit” mercury in other

locations where they spawn and die. The ecological food web and the human connections within it should be part of the conceptual model of mercury that an environmental impact would be based upon.

Currently, the information to assess the potential impacts from mercury are scattered throughout the Soils (DEIS Section 3.2), Surface Water Quality (DEIS Section 3.7), Wildlife (DEIS Section 3.12), Fisheries/Aquatic Resources (DEIS Section 3.13), and Human Health (DEIS Section 3.22) sections. While this conforms to the chapter format required by the EIS, it makes it difficult to understand and comment on potential impacts due to mercury.

WAQ 21

- **Recommendation: Provide an independent third party review assessment of mercury – dust and processing plant emissions (including atmospheric chemistry related to deposition) as sources to soil, water bodies, and wetlands with potential impacts to fish, wildlife, and human health – as a companion document to the DEIS.**

Some statements do not seem to have any data supporting them:

> *It is anticipated that only a small fraction of the inorganic mercury dispersed from the mine site would be available for methylation (Marvin-Dipasquale et al. 2009)* (DEIS p 3.13-122).

This reference is a general one, and is not based on a site specific study in the Donlin area.

> *Due to higher concentrations of mercury and higher flow rates, the mercury load in Crooked Creek increases during spring flow and storm flow conditions relative to base flow (Tetra Tech 2013). Higher stream discharge is usually associated with higher flow velocity, which entrains particulate material from the substrate (Tetra Tech 2013). Thus the data suggest that a substantial fraction of the total mercury load in the Crooked Creek watershed (measured as total mercury in the water) is associated with particles entrained from the substrate during high flow events.* (DEIS p 3.7-32).

The hypothesis could be easily verified by analyzing total and dissolved mercury in water samples. Indeed, the DEIS notes that total mercury, methylmercury (MeHg) on unfiltered (total fraction) samples, and dissolved mercury were analyzed in surface water samples in 2013-2014, at least a year prior to release of the DEIS, but results are not presented or utilized to verify the quote above (DEIS p 3.7-32).

WAQ 21

While other statements may misrepresent the citations:

> *Wetland systems studied elsewhere that have similar C:N ratios and lower soil pH also show relatively low methylmercury production rates. For example, Tjerngren et al. (2012) showed that systems with a C:N ratio of approximately 35 to 38, and soil pH approximately 4.5, were characterized as "nutrient poor" and were less productive in terms of methylation activity relative to systems with lower C/N ratios.*(DEIS p 3.7-149).

First, a soil pH of 4.5 should not inhibit the activity of sulfate reducing bacteria (SRB) that methylate mercury (personal experience).

Second, with regards to the C/N ratio, a thorough reading of Tjerngren shows that the sites that were "nutrient rich" were the same ones that had higher sulfate and higher temperatures – factors known to increase the activity of the SRB. Tjerngren notes:

*the availability of electron donors and acceptors for methylating and demethylating bacteria may play a role behind the link between acidity/nutrient status and net MeHg production and yield….the interrelations are clearly not simple* (Tjerngren et al 2012, p 8057).

Third, ALL wetlands in the Tjerngren study, except an alder swamp, generated (exported) methylmercury.

WAQ 21 Lastly, the study did not track wetlands from before and after inputs from a nearby industrial source of mercury, which is essentially what Donlin will be, generating both dust containing mercury and gaseous emissions that could deposit mercury. While the study has relevance, suggesting that the high C/N ratio in soils will keep methylation rates from Donlin mercury emissions low is not substantiated. The C/N ratio as a reason for "low rate of methylmercury production" in this section and in the Cumulative Effects chapter (DEIS section 4.3.1.7.2) should be removed.

- **Recommendation: Remove unsubstantiated statements or provide data to support them.**

The argument that sulfate is low in soils (DEIS p 3.7-149, citing Arcadis 2014) is more relevant to methylation rates than the C/N ratio argument. Soils were collected at four sites, which were also surface water quality sampling sites, and analyzed for sulfate, sulfide, and different forms of mercury (Arcadis 2014). However, there appears to have been a bias in site selection.

First, the mean highest sulfate was at Category 2 (mineralized background) sites (DEIS p 3.7-26, also Arcadis 2012b p 14), but Arcadis did not sample any Category 2 sites (see figure below, from TetraTech 2013).

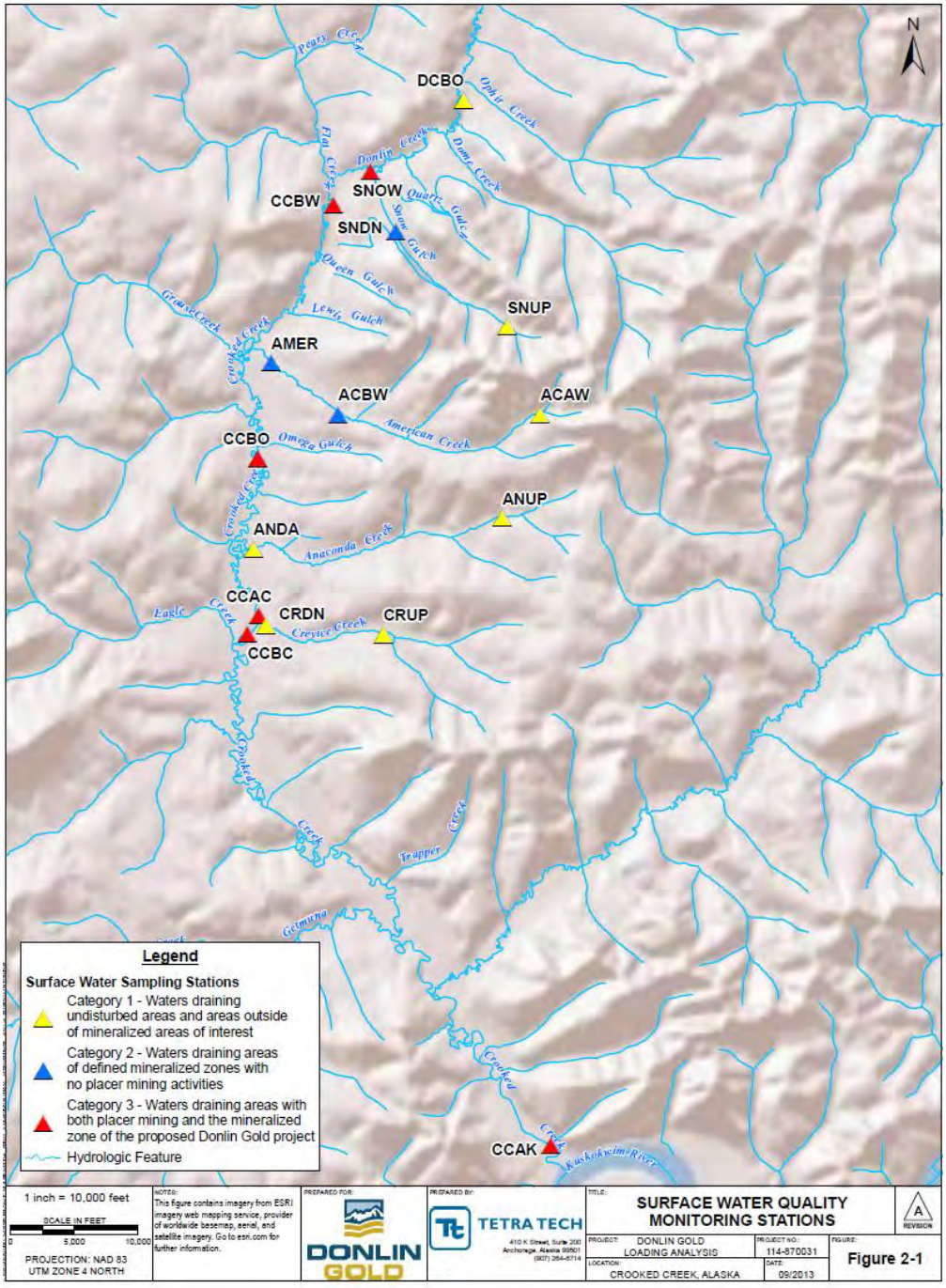
Second, a comparison of sulfate concentrations in surface water at soil sample sites indicate the soil sites were biased to low sulfate locations (Arcadis 2012b, TetraTech 2013). Sulfate concentrations in surface water samples at Arcadis sample sites averaged 3-17 mg/L (TetraTech 2013). The averages for spring runoff and baseflow were: DCBO (8, 11 mg/L), CCAC (10,13 mg/L), CCBW (10, 17), ANUP (3 mg/L).

SOL 3

Sulfate concentrations in surface water at other sample sites averaged 22-42 mg/L. Averages during spring runoff and baseflow were: ACAW (22, 29 mg/L), SNDN (31, 40 mg/L), SNOW (32, 38 mg/L), SNUP (37, 42 mg/L).

Although photographs are provided in the report, it is difficult to determine if samples were collected in environments that could promote methylation (wet, anaerobic terrestrial sites; backwaters, muddy stream sites). If environments likely to promote methylation are within the geographical grid of a potential deposition area (dust or atmospheric), they should be sampled. Sulfate, dissolved organic carbon, and redox are all good indicators to assess for methylation potential, in addition to direct measurement of different forms of mercury (total, dissolved, methyl).

- **Recommendation: Sampling should not exclude sites that could promote methylation.** Sample sites for analysis for sulfate in soils, and other indicators relevant to methylation rates should be based on a geographical grid of environments that mercury may enter, through dust or atmospheric deposition.


N
DCBO
SNOW
CCBW
SNDN
SNUP
AMER
ACBW
ACAW
CCBO
ANUP
ANDA
CCAC
CRDN
CRUP
CCBC
CCAK
Peary Creek
Donlin Creek
Ophir Creek
Flat Creek
Dome Creek
Quartz Gulch
Snow Gulch
Queen Gulch
Lewis Gulch
Granite Creek
Crooked Creek
American Creek
Omega Gulch
Anaconda Creek
Eagle Creek
Crevice Creek
Trapper Creek
Geimina Creek
Kuskokwim River
Legend
Surface Water Sampling Stations
Category 1 - Waters draining undisturbed areas and areas outside of mineralized areas of interest
Category 2 - Waters draining areas of defined mineralized zones with no placer mining activities
Category 3 - Waters draining areas with both placer mining and the mineralized zone of the proposed Donlin Gold project
Hydrologic Feature
1 inch = 10,000 feet
SCALE IN FEET
0
5,000
10,000
PROJECTION: NAD 83
UTM ZONE 4 NORTH
NOTES:
This figure contains imagery from ESRI imagery web mapping service, provider of worldwide basemap, aerial, and satellite imagery. Go to esri.com for further information.
PREPARED FOR:
DONLIN GOLD
PREPARED BY:
TETRA TECH
410 K Street, Suite 200
Anchorage, Alaska 99501
(907) 264-5774
TITLE:
SURFACE WATER QUALITY MONITORING STATIONS
PROJECT:
DONLIN GOLD
LOADING ANALYSIS
PROJECT NO.:
114-570031
LOCATION:
CROOKED CREEK, ALASKA
DATE:
09/2013
FIGURE:
Figure 2-1
A
REVISION

Human Health

The ADHSS definition of "health" does not allow for an assessment of what it is that keeps a community together in a healthy manner. It allows for the examination of quantifiable "mortality, morbidity, and disability" – where health is therefore necessarily the *absence* of these. The "determinants" of health focus on access to food, clean water, and healthcare; income; accidents; exposure to hazardous materials. While these are important, the ***positive*** aspects of community are not stressed – sharing (of food, childcare, equipment, etc.), ties with the same friends for many years or a lifetime . A stakeholder was quoted as wanting a health assessment in part to know the health status of "physical health, emotional health, spiritual health" (DEIS Section 3.22.3.2).

PHL 6

It seems that a change in "health" could be determined by whether these negative aspects increase, but can a change in health be observed by a decrease in the positive aspects that tie a community together? For example, "Maternal and Child Health" is assessed by infant mortality or birth weight, teen pregnancies, and substance abuse during pregnancy. There is no assessment of positive aspects such as the ability to be with your child, or have a trusted network of people to provide care (DEIS Section 3.22.3.4.1).

In general, I would be interested in knowing how communities that have different likely exposures to mine impacts (Lower Kuskokwim – exposure via ocean barge traffic, Middle Kuskokwim – exposure via worker influx, river barge traffic and potentially the BTC road, villages nearest the mine – perceived exposure to chemical risks) view their own current health status, both the positive and negative, and what they would consider to be an improvement in health patterns in the future.

**Baseline**

*Hazardous chemicals*

Under "Air Quality", one possible measure of baseline health would be the number of homes reporting problems with black mold.

Regarding "Water Quality", the following statement

> *In 2005, out of the 60 regulated public water systems in the Y-K basin, 19 exceeded arsenic screening levels (ADEC 2010, as cited in NewFields 2015).* (DEIS p3.22-19)

PHL 16

is not very helpful without knowing the locations, how much above screening levels the concentrations were, whether the water treatment systems required additional equipment, whether such equipment has been installed; that is, are there currently still 19 public water systems that are at risk, and how much of an issue is this for health? It would also be helpful to know how this compares to other parts of Alaska – for example, Fairbanks and parts of southcentral Alaska are known to have elevated arsenic in groundwater.

*Food*

The fact that there are no signs of nutritional deficiency and low diabetes is very good, and likely reflects the extent to which wild food make up diets, although *"it is not known what percent of residents' food supply comes from subsistence activities (NewFields 2015)"* (DEIS p3.22-21). It is distressing to see that

PHL 12

"food security" is relatively low. It would be helpful to understand why this is the case – is it related to declines of fish in the Kuskokwim River or other changes to subsistence food patterns, due to a lack of money to pursue subsistence habits, or due to a shift towards store foods that are expensive?

PHL 12 This information should be provided in the final Health Impact Assessment, to make it easier to evaluate *why* changes occur in the future, if they do. It would be helpful to understand how communities themselves view food sources, variety, and abundance now, and what they would like to see in the future. An increase in income *could* increase food security, but may not; it could be important to know if communities' perceptions of whether they have sufficient and sufficient variety changes over time. If there is an interest in more gardens, that would take little funding. If there is lack of money to pursue subsistence, then employment would help. I don't know that it should be assumed that more income (presumably related to the mine) would increase food security or nutrition.

*Water and Sanitation*

PHL 8 It is good to have the baseline information on water and sanitation; providing more communities with these services, or upgrading current ones, could be an important benefit of income from the mine to villages. This aspect of health may tie into Climate. That is, could sewage lagoon situations get worse due to river erosion, flooding, and more extreme events?

*Mental Health*

PHL 10 This is based on "self-reported" mental health, and it is noted that these may be artificially low. Again it seems that it would be important to know from people what contributes to them feeling happy, fulfilled, "mentally healthy". It seems odd that the "positive" mental health is simply the lack of negative reports.

*Lack of comparison*

PHL 19 Under Table 3.22-5 "Accidents and Injuries", how is it that there is only data for the Y-K and not for Alaska or the nation for most categories?

PHL 19 Under Table 3.22-7 "Exposure", how is it that there is not information on child blood levels for Alaska, or regions in Alaska outside the Y-K?

PHL 19 Under Table 3.22-9, "Infections diseases", how is it that there is not information on the immunization rate for Alaska children statewide?

PHL 19

- **Recommendation: Discuss the positive aspects of current baseline health. Provide information on the root causes of current health/lack of health. Where possible, aggregate information on what communities themselves see as "health". All tables should provide information on local quantifiable determinants in comparison with statewide or other regions.**

**Mitigation**

*Protection of foods that affect human health*

PHL 12 All the design features listed (DEIS p3.22-97) are required of the mining company regardless of any human health issues. Other design features that are likely required regardless of human health probably include including impacts to fish and wildlife populations or movements due to noise, changes in soil or vegetation from dust or atmospheric emissions, and changes in water quality (turbidity, chemical, salinity, temperature) or quantity (lower creek levels, elimination of ponds and wetlands during groundwater drawdown).

To address community health concerns, monitoring fish tissue (as suggested by the Corps, DEIS p3.22-97) and bird carcasses should be conducted in a manner that examines them for changes that could be related to mining activity – primarily increases in mercury or selenium and determining whether physical deformities are occurring in birds or fish related to selenium.

*Increasing opportunities and social health*

PHL 11 Additional design features that could be included might be: cultural training for non-Native employees to ensure a respectful and good working environment, sexual harassment training, employing Alaska Natives as counselors at the work site, and providing apprenticeship and other training opportunities to ensure local people have a pathway to the best jobs on site (including management jobs).

Other mitigations might include: financial training and financial advisors for employees and their families, opt-in for automatic paycheck deduction or 401(k) for savings, and training modules that could be completed at home during time off the work site which would improve skills or opportunities.

*Water and sanitation*

PHL 8 Regarding health benefits and/or mitigation, is there a potential for increased health through some funding mechanism that allows for planning, upgrading, and moving (if necessary) basic water and sanitation structures?

*Exposure to hazardous chemicals*

MIT 27 Spill prevention and response plans should have annual drills that include local people and their boats from all up and down the river, similar to the "Spill Drills" conducted in Prince William Sound. This will provide a means for the people closest to a spill to be able to respond while waiting for larger response units to arrive, if necessary. These should include spill scenarios at ports, spills from ocean barges, and spills from river barges. They should include fuel spills, but also training in what to expect if there is a spill of hazardous chemicals – where it may or may not be advisable for people to attempt to respond.

Although workers at the mine site are excluded from this analysis (DEIS p3.22-58), the "Health and Safety Plan" that protection for workers would fall under is not available. Therefore this seems the best

MIT 27 place to note that mercury monitors should be placed at locations in the workplace where mercury vapor is collected, to ensure that workers are not exposed by inhalation.

- MIT 2 **Recommendation: Consider additional mitigations that reduce fear of subsistence foods, confront racism and increase the successful integration of local residents into mine operations and auxiliary activities.**

**Alternative 4 (Birch Tree Crossing)**

The sentence "human health impacts to surface transportation would be similar to Alternative 2 since the road would not be accessible from communities in the vicinity or open to the public" seems unrealistic (DEIS Section 3.22.4.5.2). First, snowmachines would likely access the road in winter. Second, mineral exploration could occur in that area and make it unrealistic to maintain a private road.

PHL 13 Similarly the impact on subsistence resources, summarized as "similar to Alternative 2, except for lower intensity of effects to subsistence fishery resources and greater impact from the mine access road to habitat for terrestrial subsistence resources" (DEIS Section 3.22.4.5.3) does not acknowledge that the BTC road goes through an area that is utilized a great deal more for subsistence than the area the Crooked Creek-Jungjuk port road would cross.

Impacts related to climate change (DEIS Section 3.22.4.5.4) should state whether the increase in truck emissions would be similar to the reduction in barge emissions. There may also be a difference in climate impacts related to the amount and type of wetland removed to build the roads.

**Alternative 5 (Dry Stack Tailings)**

There is likely to be more dust with the Dry Stack than with the wet slurry tailings beach; it would be helpful to put some information on expected dust amounts, directions, and mitigations for worker health
PHL 17 and the health of nearby residents in this section (DEIS Section 3.22.4.6).

- **Recommendation: Further consider the impacts of the BTC road. Provide a better comparison of dust impacts to human health for Alternatives 2 and 5A.**

**Mine Site – Closure, Reclamation, and Monitoring**

Revegetation

Why is the "Summary of Impacts for Alternative 2" regarding vegetation (DEIS p 3.10-57) primarily a litany of mitigation efforts? Impacts should be listed in one section, mitigation in another.

The proposed "additional mitigation" idea to

> *"Develop and maintain a native species seed bank for reclamation and restoration practices. Develop and implement test vegetation plots to determine potential revegetation success with native and local plant material and seeds (including lichens and mosses)"* (DEIS p 3.10-59)

MIT 20 should be put into place this summer. This is the type of activity that could and should involve local elders and local youth, possibly in conjunction with a local college course as part of educational outreach and training. A seed bank could be nurtured through a local nursery as part of promoting small business in the region.

The proposed "additional mitigation" idea to

> *"Promote allowing native vegetation and native seed planting vegetation growth (on overburden piles) to keep topsoil viable until it is needed during final reclamation"* (DEIS p 3.10-60)

should be done, not only to keep soil viable, but also to reduce the ability of invasive plants to take hold.

- **Recommendation: Discuss impacts, then mitigation. Coordinate with local colleges or businesses to implement revegetation studies.**

Tailings Storage Facility

**Reclamation (2.3.2.1.12)**

On closure the tailings pond will have a synthetic liner on the bottom, with an underdrain system meant to pass seepage from the buried Anaconda Creek. Any seepage that makes it through the lower tailings pond liner will report to the Anaconda Creek underdrains. This underdrain seepage will be monitored, and collected and treated post-closure if necessary.

PAA 46 Post-closure the tailings pond will be drained and reclaimed so that runoff will not be contaminated, and infiltration of meteoric waters will be restricted, but still allowed. This means that a portion of the tailings will remain saturated indefinitely. Since gravity will largely drive the movement of water in the tailings over the long term, the tailings in the lowest part of the impoundment – nearest the dam itself – are most likely to remain saturated.

> *The Mt Polley Expert Panel, convened to critique the tailings dam failure in 2014, recommends:*[6]
>
> *The goal of BAT for tailings management is to assure physical stability of the tailings deposit. This is achieved by preventing release of impoundment contents, independent of the integrity of any*

[6] Report on Mount Polley Tailings Storage Facility Breach, Independent Expert Engineering Investigation and Review Panel, Province of British Columbia, January 30, 2015, p. 121.

*containment structures. In accomplishing this objective, BAT has three components that derive from first principles of soil mechanics:*

*1. Eliminate surface water from the impoundment.*

*2. Promote unsaturated conditions in the tailings with drainage provisions.*

*3. Achieve dilatant conditions throughout the tailings deposit by compaction.*

PAA 46 The current design in Alternative 2 – to drain the tailings pond and pump water from the tailings facility to the open pit over an estimated 52 years – will not remove as much water as mechanical compaction, which can achieve 95-98% of the maximum density (as noted in BGC 2015d, where placement of dry stack tailings was estimated to be at 97% saturation). Additionally, the presence of saturated tailings may mean the pumping system, required to move water to the open pit, cannot be decommissioned. As long as the pumping system is in place, there is a risk of water contamination through the failure of pumps and pipelines, particularly as the system ages.

Dry tailings was considered as an alternative (Alternative 5A), but in reality it was analyzed in a way that all but made it impossible to succeed.

PAA 9 Another "dry" alternative that will work, but which could require more water treatment is much safer in the long run than the wet closure which is planned for the Tailings Storage Facility. Drains can be placed under the tailings, on top of the liner, and after closure of the mine the drains can be used to dewater the tailings in the impoundment. The dewatered tailings will now be significantly more stable than the saturated tailings under the present proposal. The objective of this disposal alternative is to significantly reduce the potential for mobilizing the tailings in the impoundment in the event the tailings dam should fail.

The downside to this alternative is that it could require the treatment of more water in perpetuity. The objective then becomes minimizing the amount of seepage through the tailings impoundment. This can be best accomplished by integrating a low permeability cover, such as a geomembrane clay layer (GCL), with the drainage system on top of the impoundment.

This approach combines best practice for long-term impoundment safety, while minimizing the leaching of acid rock drainage and metals leaching contaminants.

BER 4 Reclamation and closure information appears to be dispersed throughout the DEIS documents. It is very difficult to locate all of the information on the Tailings Storage Facility without reading the entire document. Logically it may make sense to discuss reclamation issues when they come up in consideration of the alternatives, but it makes reviewing the reclamation and closure objectives and planning virtually impossible.

This is why there should be at least an appendix on the Reclamation and Closure Plan which is required by the Alaska Department of Natural Resources prior to mine operation and is mentioned in the DEIS (e.g. p 3.10-42).

PAA 9 ➢ **Recommendation: Consider alternatives that reduce saturation in tailings.**

BER 4 ➢ **Recommendation: Provide an appendix containing the Reclamation and Closure Plan.**

**Risk to Wildlife (3.12.2.1, Appendix H)**

The DEIS Chapter 3.12.2.1 "Attraction to mine site open water areas" summarizes the findings of Arcadis 2013 and ERM 2015. Arcadis examined the ecological risk at the pit lake while the ERM document was to consider exposure to tailings pond and contact water pond during operations.

However, this was a cursory exercise and did not consider the ecological risk of these water bodies during a temporary closure scenario. The pit lake will have contributions from the tailings facility, waste rock facility, groundwater and clean runoff/precipitation and is therefore not the same water quality as the tailings pond. For example, the tailings pond would be expected to contain cyanide in higher concentrations than would be found in the pit lake.

WILD 5

The Lower CWD also represents a potential risk if there is a temporary closure. About 11% of the lower CWD water comes from the waste rock seepage (Appendix H, Section 3.4), which will be heavily influenced by how well the waste rock NAG and PAG are mixed (Appendix H, Section 3.2). Additionally, selenium concentrations could increase dramatically, from one prediction of about 150 ug/L (Appendix H, Table H-5) to a prediction of 80,000 ug/L (Appendix H, p H-19 and Table H-5 footnote 3). The year at which potential water quality could be at its worst in the CWD should be modeled to determine potential risk to wildlife at a temporary closure, given the extreme toxicity of selenium to birds.

- **Recommendation: Perform an ecological risk analysis of the tailings pond and CWD, considering the expected water quality and period of worst potential water quality, to determine potential risk during temporary closure.**

Dry Stack Tailings Facility Closure (2.3.6.1; 3.7.3.6.2)

The section describing the closure of the DSTF (DEIS p 2-160 to 2-161 and p 3.7-196 to 3.7-197) needs substantial reworking to determine what is going on and to be able to appropriately compare Alternative 5A to Alternative 2.

- There is no comparison of the covers that would be placed on the TSF and DSTF, but it appears that the covers assessed were different. DEIS Section 2.3.2.1.12 makes no mention of the TSF cover, although according to DEIS Section 3.7.3.2.2 it would be

WAQ 25

> *"an engineered cover overlain by a peat/mineral growth media mix. The engineered cover would promote runoff and reduce the potential for runoff or precipitation to contact the consolidated tailings*" (DEIS p 3.7-157).

There is a cursory description of the DSTF cover in DEIS Section 2.3.6.1:

> *During closure, the tailings would be covered with soil, an LLDPE cover, and vegetated* (DEIS p 2-161).

Were the infiltration rates for the TSF and DSTF modeled assuming the same kind of cover? It appears that one reference (BGC 2015d, cited at DEIS p 3.7-197) presumes a low-permeability (BGC 2015d p1) or impermeable (BGC 2015d p3) cap on the DSTF – but it did not make a comparison of the DSTF cover with the TSF cover. In fact, it specifically noted that it would not do a comparison with the type of engineered cover discussed in DEIS 3.7.3.2.2.

- The three paragraphs devoted to Dry Stack Seepage (DEIS p 3.7-197) are insufficient to provide an image of what is occurring. A cross section of the proposed Option 1 and Option 2 would be much more useful than a plan layout figure in this section. At a minimum, the diagram from BGC 2015d should be included:

WAQ 25

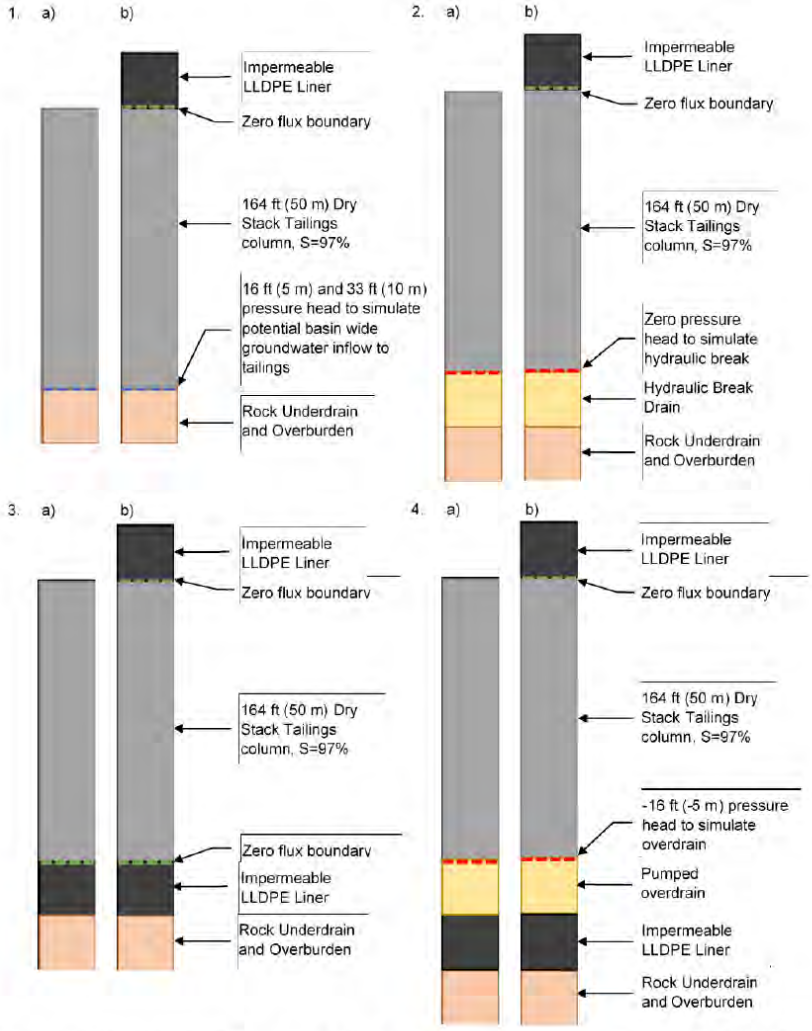



**Figure 4-1. Scenarios for tailings facility configurations, illustrating conceptual model of materials and boundary conditions applied to the top and bottom of the tailings column; at a) operation conditions, b) closure conditions. Not to scale.**

- BGC 2015d assumes the liner for Alternative 5A Option 2 would have hydraulic conductivity of $8.5 \times 10^{-10}$ ft/day. How does this compare to the liner leakage for the TSF liner, which was determined using EPA methods – but the rate was not provided (DEIS Section 3.7.3.2.2, p 3.7-135)?

- BGC 2015d (p14) notes that if an impermeable LLDPE liner is placed under the DSTF, it will cause water to mound up to a height of 100 feet during the 27 years of operation; although the mounding would stop when the cover was placed, it would not go down. It is not clear whether this statement considered the progressive reclamation of the DSTF that is proposed (so that covers are continually being placed, limiting the surface area that can receive infiltration). The document did say that if an engineered soil cover was placed, as apparently is proposed for the TSF, the height of the water mound would flux or increase. It is also not clear whether this mounding could pose stability issues. This is important information that should be included in the DEIS description of closure of the DSTF.

- The required time to closure for the TSF and DSTF is based on the amount of leakage/seepage from the covered and reclaimed tailings – at a specific rate, it is estimated to be low enough that dilution from groundwater and upstream runoff that enters the underdrain will allow water quality to be clean enough to discharge. This concept is not at all clearly explained in the DEIS.

    - With no cap, DSTF seepage is 78 gpm. At this rate, there is so much "bad" water that dilution by other water in the underdrain will not achieve water quality criteria. I was unable to find a clear statement of the seepage rate if an engineered soil cover cap were to be placed, in either BGC 2015d or in the DEIS.

WAQ 25

    - With a cap, the DSTF seepage reduces to 18 gpm over 200 years (BGC 2015d p 15), the rate achieved by the TSF in years 11-51 (DEIS Figure 3.5-27 and 3.5-28); this could be much more clearly stated and compared. Also, the BGC 2015d estimates did not transfer to the DEIS. In the water balance schematics, Alternative 5A Option 1 and Option 2 show seepage at the much higher rate of 39 gpm (DEIS Figure 3.5-37, Figure 3.5-41).

    - Presumably the goal is to achieve seepage that is a small percentage of the total; BGC 2015d notes that groundwater in the underdrain is expected to be 400 gpm, although the schematics in the DEIS show lower rates of around 200 gpm (DEIS Figures 3.5-35 and 3.5-36). For the TSF, DEIS Figure 3.5-27 estimates 431 gpm.

Importantly, the DEIS statement that

> "*Thus, the main difference between Alternative 5A-Option 1, Alternative 5A-Option 2, and Alternative 2 with respect to surface water quality is the time it takes for the SRS water to clean up to the point that it can be discharged to Anaconda Creek, that is, roughly 200 years under Option 1, and about 10 to 50 years under Option 2 and Alternative 2"*

seems to be at odds with BGC 2015d. If I understand the BGC document correctly, an unlined option (Option 1) will achieve the low, desired seepage rate of 18 gpm in about 200 years, but the time for

draindown with the lined option (Option 2) is complicated by the mounded water inside the tailings and no time to an 18 gpm seepage rate was provided. I do not understand how the DEIS comes to an estimate of 10 years to the time when the SRS can be decommissioned under a pumped overdrain scenario. The surface water hydrology section seems to indicate that pumping will be needed for at least 47 years (DEIS Section 3.5.3.6.1, p 3.5-144), if not in perpetuity (DEIS Figure 3.5-37 of Option 1 shows 498 gpm pumped from the SRS to the pit from year 42 on; DEIS Figure 3.5-41 of Option 2 shows 39 gpm pumped from the tailings overdrain to the pit from year 47 on; DEIS Figure 3.5-28 of the TSF Alternative 2 option shows no water pumped to the pit after year 52).

WAQ 25

- **Recommendation: It is imperative to reconcile Chapter 3.5 (Hydrology) with Chapter 3.7 (Water Quality) with regards to the volume of flows and the length of time that tailings water would need to be pumped to the pit.**

- **Recommendation: Provide a clear description of TSF and DSTF closure.** This should include the time to the decommissioning of the SRS at the TSF compared to DSTF Option 1 and DSTF Option 2, along with clear explanations of the tailings covers at closure, infiltration rates (and covers used to determine the infiltration rates, and whether progressive reclamation was considered) and the liner seepage rates.

One of the key differences in Alternative 2 and Alternative 5A is that the Dry Stack can be progressively reclaimed during operations while the wet slurry TSF cannot. This provides an opportunity to place an impermeable cover on sections of the DSTF, which would stop meteoric water from entering those sections and allow those sections to begin to drain down. By the time the mine begins closure, there may only be a small section that has not been covered. Therefore, the volume of water entrained in tails in a traditional TSF could be much higher than that entrained in a DSTF at the end of mine life, resulting in a difference in the amount of time needed to achieve a low rate of seepage (18 gpm). Was this considered?

GRD 7

Lastly, there needs to be a better discussion of two related topics: the time until the seepage pump system for the DSTF or TSF can be decommissioned (thus removing this risk of failure/water contamination) and the time until the water treatment plant needs to begin treating pit lake water (thus beginning the risk of water contamination from pit overflow or WTP breakdown).

With the current DEIS, it is not possible to reasonably compare the risks of Alternative 2 and Alternative 5A.

<u>Pit Lake Closure -- Risks to Wildlife (2.3.2.1.12, 3.12.3.2.2)</u>

The pit lake is anticipated to be maintained at 33' below the spill crest to maintain enough freeboard to contain high precipitation/snowmelt events. However, this will pose a risk to terrestrial wildlife. No mitigation to protect wildlife from the open pit after closure has been proposed (p3.12-38).

WILD 5

- **Recommendation: Provide mitigation measures to reduce risk to wildlife at the pit lake.** Closure plans should consider blocking the area to wildlife, through placement of boulders around the pit edge or fencing. Initial construction or closure activities could design upper

benches to be laid back to heights that would allow wildlife to leave and haul roads could be left and/or new ramps added to allow wildlife to walk up and out of the pit.

WILD 5

There are also chemical risks that have not been fully considered. Ecological risk assessment by Arcadis (Arcadis 2013) notes that there is "large uncertainty in the predicted concentrations of pit lake water". To what degree was this uncertainty reduced with the Lorax 2015 modeling? Although the ecological risks are considered minimal (some risk to waterfowl and voles) and conservatism has been built into the model (e.g. assuming waterfowl spend all year on the pit lake), there has been no assessment of the risk of exposure to multiple metals.

- **Recommendation: Provide a multiple metals ecological assessment.** This can be done with bioassays using water that would mimic pit lake metals concentrations after the lake is full.

WAQ 9

The DEIS (Appendix H, Geochem) notes that the upper layer of the pit lake is likely to become more dilute (snowmelt) as the lower layers become more dense, and while this is a good thing in maintaining stratification, it could eventually allow the worse water to get shallower and promote overturn. They suggest (page H-13):

> *"Thus, in order to maintain the surface water concentrations within a relatively narrow band of water quality over the long term, it may be necessary to seasonally adjust the depth from which water is pumped, for example, to pump water from below the icemelt layer each spring."*

But this just addresses keeping input WQ to WTP relatively similar, not the potential for overturn.

There is a near certainty that the pit lake will overturn, and that the water quality will be worse in the surface layers, even after the pycnocline re-establishes (DEIS p 3.7-132).

There is no "overturn" scenario.

WILD 5

- Overturn would expose wildlife to worse water than was modeled
- Could overturn expose the backfilled waste rock to oxygen (from the formerly reduced, anoxic state) and how could that change pit lake chemistry? Would it at all impact the surface chemistry that wildlife is exposed to?

- **Recommendation: Discuss the implications of pit lake overturn on the water treatment plant (reagent consumption, sludge volume and disposal, potential need for expansion) and on ecological risk.**

BER 6

<u>In-perpetuity water treatment</u>

Alaska is entering new territory with mine permitting – proposed mines are bigger than ever before (Pebble, Donlin, Chuitna), disposing of tailings in natural lakes (Kensington), and requiring water treatment "*in perpetuity"*(Pebble, Donlin), that is, for at least hundreds of years into the future.

Alaskans should think hard about whether they are comfortable with *in perpetuity* water treatment being allowed and permitted. DNR will consider what will constitute adequate financial assurance to fund

water treatment, but Alaska residents need to consider fully what *in perpetuity* means and the precedent that would be set.

The pit lake will fill and overflow if a pump and treat system is not operating. Pit lake water is very poor, and will not improve over time – indeed, it could worsen on a time span of hundreds of years. The pit lake will contain high concentrations of arsenic, cadmium, copper, aluminum, lead, selenium, mercury and more. There is no assessment of what will happen if pit lake water spills over into Crooked Creek,
BER 6 allowing arsenic, cadmium, copper and other contaminants to flow into the Kuskokwim.

There is no clear statement in the DEIS that this will be the FIRST mine in Alaska to require *in perpetuity* water treatment.

- **Recommendation: The DEIS should state that, if permitted, this will be the first time Alaska has permitted a mine that will need water treatment for hundreds of years or longer. The DEIS should discuss mines that have allowed this, and how many have operated water treatment plants after mine closure, along with the water quality requiring treatment, any financial or technical issues encountered and for how long the plants have operated.**

## Cumulative effects

Briefly, it should be noted that not all the impacts from cumulative effects of the Donlin project – which includes the transportation and pipeline infrastructure – can possibly be analyzed or understood. The full cumulative impacts – on biological, physical, and social resources – of the industrialization of the regions of which the Donlin project is part will not be analyzed in this project application but will certainly be greater than what is analyzed in this DEIS.

Reasonably Foreseeable Actions

**Reasonably Foreseeable Actions Considered (Table 4.2-1)**

*Self – determination*

CLA 32 Governmental capacity should be expanded to include the Kuskokwim River Inter-Tribal Fisheries Commission and/or the Kuskokwim River Salmon Management Working Group (http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.kswg) as bodies for co-management of fisheries.

*Energy and Utilities*

WILD 4 Table 4.2-1 (DEIS p 4-6) should include the impact on marine mammals that will be expected due to oil and gas exploration and production. An example of this is the "takings" of marine mammals, including the endangered Cook Inlet beluga whales, which would occur if Exxon conducts geophysical exploration

WILD 4

for natural gas in Cook Inlet. The takings have been authorized by NMFS (February 2016 draft EA for incidental harassment takings, http://www.nmfs.noaa.gov/pr/permits/incidental/energy/cook_inlet_ihas_draft_batched_ea_2016.pdf) and are being fought by the US Marine Mammal Commission (http://www.mmc.gov/wp-content/uploads/ExxonMobil-LNG-Cook-Inlet-IHA.pdf) . The DEIS cannot combine the analysis of the Donlin Gold pipeline with Exxon's drilling impacts; the impacts from the Donlin pipeline, new natural gas drilling in addition to current drilling and potential impacts from a Chuitna coal mine port would all be analyzed separately for impacts without acknowledging the cumulative effects that would in fact be experienced by marine mammals. This is the classic history of degrading and permanently altering ecosystems while leaving no one particular company with responsibility.

CLA 32

*Mineral exploration*

In Table 4.2-1 (DEIS p 4-5), Nixon Fork is listed as a historical mine. It is a current mine that is in temporary closure (http://dnr.alaska.gov/mlw/mining/largemine/nixonfork/).

Additional projects that should be added to the list include: Vinasale, Cristo, Copper Joe, and Terra Gold (http://www.groundtruthtrekking.org/mines/).

CLA 3

**Reasonably foreseeable impacts not considered**

*Bethel port*

The expansion of the Bethel port is not only reasonably foreseeable, it is necessary to the implementation of the project. This should be included in the cumulative impacts.

CLA 4

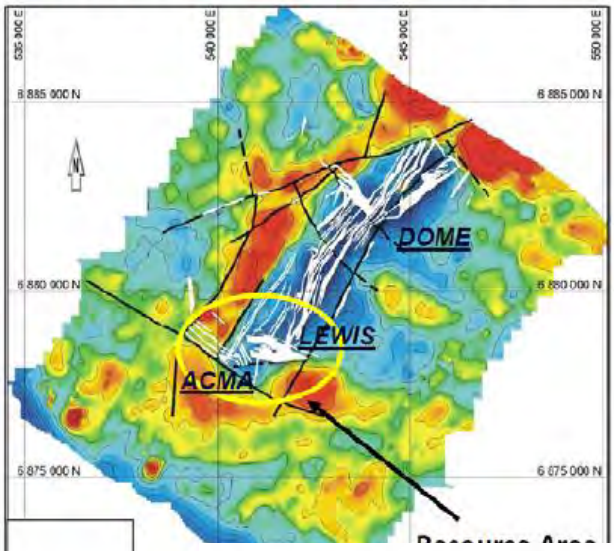
*Donlin mine expansion*

Given the geophysical imagery and statements to investors, there is every reason to believe that if the mine is constructed, it will be expanded.

> *Yes, it's a big deposit but it's still got a lot of room to grow. You know looking at this illustration we've only extensively explored less than half of the gold bearing system. When the time is right, we'll resume exploration and have the potential to significantly add to our reserves and resources.* (NovaGold CEO Greg Lang, Transcript of Q1 2016 earnings call, April 5, 2016 http://seekingalpha.com/article/3963317-novagold-resources-ng-ceo-greg-lang-q1-2016-results-earnings-call-transcript?part=single)

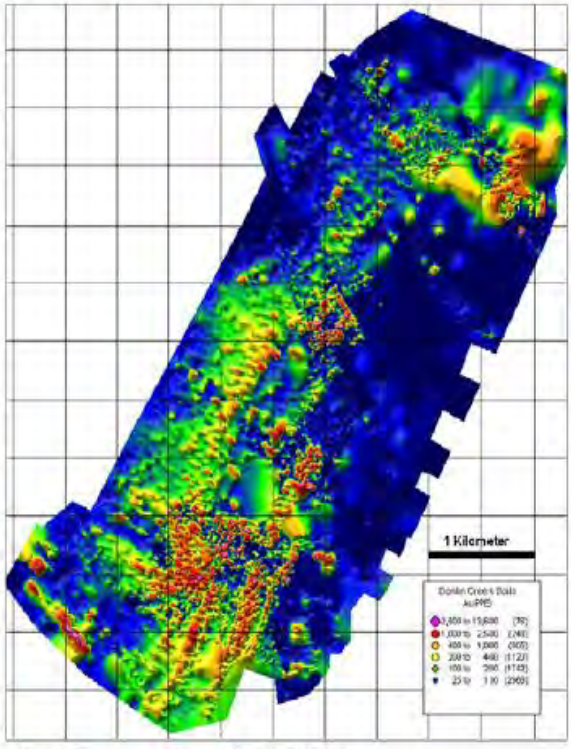
And as shown in a 2012 geophysical image (2012 NovaGold NI 43-101 Technical Report on Second Updated Feasibility Study):

**Figure 9-1: Regional Magnetic Image Showing Magnetic Low Intensity Zone**




Note: Figure courte

**Figure 9-2: Gold-in-Soils Compilation Plan**




Note: Figure courtesy Donlin Gold

CLA 4

CLA 4

While it is understandable that the permitting system allows an initial project to be permitted, then expanded, with impacts assessed at the time of application for expansion, nonetheless, this process could underestimate cumulative impacts – for example spill risks relative to the years that fuel, chemicals, and materials would need to be barged or the length of time a pipeline will need to operate. If these are quantitatively assessed (pipeline miles over x number of years, river miles over x number of years), risks over the life of the full expanded mine will "start" at a higher risk level. If the mine expands, all aspects that are "continuing aspects" from the original project should be assessed for the full life span, not for the additional expected life span.

Impacts to resources

GEO 5

**Paleontological**

There does not seem to be evidence to support a conclusion of "minor" cumulative impacts to paleontological resources for Alternative 2 but "moderate" impact due to Alternative 4. How would Alternative 4 have "large scale changes in resource character and availability" that would not be present in Alternative 2? There also does not appear to be a reason for concluding that Alternative 3A would have "minor to moderate" cumulative effects.

HYD 12

**Surface water hydrology**

An ice road is suggested from Crooked Creek to the mine site to construct the BTC road, if Alternative 4 is chosen. This would require water withdrawals. Was that considered when analyzing impacts to surface water in the Surface Water Hydrology (DEIS 3.5.3.5, 3.5.3.8), Surface Water Quality (DEIS Section 3.7.3.5, 3.7.3.8), Cumulative Impacts (DEIS Section 4.3.1.5.3) sections?

AIQ 6

**Water quality**

The statement that

> *"The additive, incremental cumulative impacts attributable to Alternative 2 would range from minor to moderate in the mine site vicinity"*

is based on modeling that indicates the large amounts of gaseous mercury emissions from the processing plant (larger than the amount currently released by the entire state of Alaska) will move out of the area without depositing. The modeling should be reviewed by an independent expert in atmospheric chemistry of mercury. Additionally, there are concerns about the methods used to conclude that mercury methylation rates are low, and certainly there is no evidence to conclude that they would be low for Alternative 2 (DEIS p 4-31) but higher for Alternative 5A (DEIS p 4-32).

WAQ 28

There also does not appear to be any reason to presume the pit lake would have higher concentrations of metals under Alternative 5A than Alternative 2 (DEIS p 4-32), given that we are told the DSTF operating

WAQ 28

pond will have similar chemistry to the TSF pond – and after the initial TSF or DSTF draindown, the major contributor to pit lake water is the Waste Rock Facility regardless of the alternative chosen. There is no justification for Alternative 5A to have "moderate to major" cumulative impacts on water quality rather than the "minor to moderate" cumulative impact rating of Alternative 2.

**Fish, wildlife, and subsistence**

SUB 10

If Alternative 4 is chosen, the BTC road will become a permanent feature and provide new access to fish and wildlife. This area is more abundant in subsistence resources than the area that would be crossed by the Alternative 2 road, which would also become a permanent feature. This indicates that the impacts to fish, wildlife, and subsistence will be felt over a wider geographical area on a permanent time scale, and therefore the cumulative impact would be at least moderate.

SUB 19

Also, this sentence

"*The reasonably foreseeable future actions relevant to impacts to visual resources include…" (*DEIS p 4-51)

needs to be replaced with

"*The reasonably foreseeable future actions relevant to impacts to* ***subsistence*** *resources include…"*

**Socioeconomics and Environmental Justice**

SER 23

It is interesting that the cumulative impact of the Donlin mine is not expected to be large:

*The contribution of Alternative 2 to cumulative effects on socioeconomics is considered moderate, and little additional impact is anticipated from reasonably foreseeable future actions* (DEIS p 4-48)

and how ALL alternatives have potential adverse environmental justice impacts, including the no-mine alternative (Alternative 1) and the proposed mine alternative (Alternative 2) (DEIS p 4-49).

This emphasizes the need for the region to look hard at how to moderate the "bust" impacts when the mine closes, and also should be food for thought for communities and regional leaders to consider how to leverage a possible "one time" income influx into some long-term, steadier economic opportunities.

## Mitigation and Alternatives Dismissed

Mitigations considered

**Design features (Table 5.2-1)**

**A27.** *Recyclable materials, including equipment and metals, will be handled in accordance with the Donlin Waste management plan. Materials will be recycled to the extent practicable.*

- Villages along the river corridor may struggle with moving recyclables out. Donlin should consider working with communities to recycle and take advantage of the increased scale of materials.
- Donlin currently proposes to landfill much of their equipment (generators, etc.) on site at closure. They should work with communities to make equipment and parts available at closure, and remaining material should be shipped off site for recycling or disposal.

**A28.** *Monitoring activities would be conducted to include water quality, biological, vegetation, and mass stability.*

- Biological monitoring should include fish tissue, feathers, and hair to detect any changes in contaminant concentrations.
- Mass stability monitoring should occur at the waste rock facility and the tailings dam in order to detect potential movement.

**M22.** *At the completion of contouring of the WRF and TSF, a layer of unconsolidated material from the North and South overburden stockpiles will be spread over the surface that will be overlain with an additional layer of growth media (topsoil and overburden). This material will be tested to ensure it is non-PAG.*

MIT 3

- The TSF should have an impermeable cover, not a permeable "engineered" soil cover. An impermeable cover would increase the likelihood that the seepage recovery pump and pipeline system conveying seepage to the pit lake could be decommissioned.
- Material must not leach contaminants, such as arsenic, in addition to being non-PAG.

**M24.** *The project design includes maintenance of sufficient freeboard at the mine pit lake…*

- The freeboard is a mitigation feature for hydrologic and water quality upset, but poses a risk to wildlife. Fencing should be considered to keep wildlife from falling into the pit.

**T3.** *The barge operations system was designed to avoid the need for river dredging.*

- It is difficult to see how this is true, considering the shallow areas that will need to be traversed and the intent to barge during the entire open water season (110 days).

**T6, T9.** *Donlin would implement barge guidelines for operating at certain river flow rates…*
*The project design includes a communication program in communities to keep local communities informed of the schedules and current status of barge traffic as well as minimize displacement of subsistence fishing by barges.*

- Barge guidelines should also include speed limits and periods of barging suspension to protect smelt and important subsistence fish and fishermen.

MIT 3

T8. *The project design includes special flasks and metric ton containers for mercury transport.*

- Air transport of the "special flask and metric ton containers" would eliminate risk to subsistence aquatic resources.

**Mitigation considered by the Corps (Table 5.5-1)**

Table 5.5-1, Mitigation considered by the Corps, contains many good proposals. All that are feasible and effective should be required. Possible additional thought should be applied to:

- Mit 7 – ponds and/or stream connections at borrow sites. Consider potential for pike to move into borrow ponds and displace other fish that had previously used the area.

MIT 4

- Mit 9 – Managing impacts on paleontological resources. Would it be feasible to have a cultural anthropologist on staff during construction?
- Mit 10 – potential for instability at the WRF due to ice rich soils. This is a serious concern and could require a great deal more excavation to bedrock and/or mitigation such as the installation of key trenches. If a much larger area needs to be excavated, how will this impact the costs and timeline of the mine? Will there be impacts on the routing of the rock drains to the pit lake?
- Mit 14 -- sediment barriers. Straw bales should not be used in erosion control due to the potential to harbor invasive species.

Those that are effective and feasible with practicability/cost considerations that should certainly move forward include:

- Mit 6 – seismic stability analysis using a higher level seismic event

MIT 4

- Mit 16, Mit 18 – vegetative mats or root masses to facilitate revegetation. This is listed as "practicable in limited situations where salvaged material can be stored nearby and re used in a timely manner". Conceptually it would seem that this measure could easily be employed, except in winter.

**Monitoring and Adaptive Management considered by the Corps (Table 5.7-1)**

MON 11

There are many good ideas in this table, and nearly all appear to be Effective and Feasible. Those with cost considerations appear to be minor costs. In general, Adaptive Management actions or concepts should have specific triggers that put them into place. Triggers should be quantitative (time period,

contaminant concentration, etc.) and clearly stated. If trigger points are reached, they need to be documented and any actions taken need to be documented, along with follow up monitoring.

- Mon1. Options to reduce potential breach between Crooked Creek floodplain and the pit. Potentially options could also work to reduce the risk of wildlife falling into the pit, and be considered closure mitigation for wildlife impacts.

- Mon16. Bank erosion mitigation. Consider willow cuttings as an erosion control method that would also provide habitat.

- Mon 20 – Monitor and evaluate the relationship between vessel speeds and wave heights. Studies of the impacts of the Yukon Queen II between Dawson City, Yukon and Eagle, AK showed that it *did* cause fish stranding due to wakes, and impacts were primarily related to speed and distance from shore. Speeds were higher (22 – 37 mph) than those anticipated by Donlin's tugs (3.5-10 mph), but the relationship at Donlin should be monitored nonetheless. (Yukon Environmental and Socio-Economic Assessment Board. 2008. Technical review of potential impacts of Yukon Queen II operations on Salmon. 50p.)[7]

MON 11

- Mon26 – Socioeconomic monitoring. A goal of having at least 50% of the employees from the Y-K region has been stated. This, or another figure, should be a quantifiable trigger. If the level of residents employed drops below the trigger, specific measures should be put in place. These may include – additional training opportunities, cultural respect training for all employees, counseling, health/money/time management workshops, elder – youth mentoring, establishment of local day cares, and so forth. Additionally, a trigger of having a certain percent of local residents in upper management and high-paying positions should be established. Outmigration (and the impacts on the Y-K economy) should be part of socio-economic monitoring. There may also be "spin offs" where employees leave to establish their own businesses (in or out of region), and this may be a long-term positive outcome.

Mitigations Not Considered

**Protection of water quality**

MIT 33

*Raincoats*

The use of raincoats is becoming common in the mining industry and should be considered for covering the South Overburden Stockpile or other areas expected to produce poor water, to reduce seepage.

*Reducing SRS pump failure risks*

PAA 9

Could Alternative 5A Option 1 (unlined Dry Stack) have an overdrain incorporated that could be pumped, reducing the number of years that an SRS pumping system would be required? It is currently estimated to

[7] No electronic link is available for the document, but it is attached along with this letter.

need 200 years until the rate of draindown of bad water entrained in tailings is slow enough that dilution
PAA 9 with groundwater will allow it to meet water quality criteria. The expected time for the wet slurry lined TSF or the dry stack lined TSF (assuming the same leakage rate in liners) is about 50 years.

*Mercury disposal*

There are risks inherent in processing mercury-containing ore. There are worker health risks that can be mitigated (but not entirely eliminated) by placing mercury gas monitors in areas where mercury emissions are collected in the plant. There are spill risks that can be mitigated (but not entirely eliminated) by designing a good storage and containment system including secondary containment and spill response equipment.

MIT 28 There is one risk that can be entirely eliminated – the risk of a mercury spill on the Kuskokwim River. Although the risk can be reduced, it cannot be eliminated if the material is barged out – and the results of a spill would be tremendous and permanent for subsistence. This risk CAN be entirely eliminated. One option would be to set up a secure storage area in a location that is not near a subsistence river – possibly near Anchorage or Fairbanks – and fly the material to that location. Mercury disposal containers (flasks, drums) could be flown out regularly on crew change flights, or annually on a dedicated flight. Potentially a permanent RCRA site could be set up – possibly near or on JBER or Eielson AFB – for permanent storage, similar to the way Barrick set up their own RCRA site in Nevada near their mercury-bearing gold mines. A second option could be to encase the material on site, possibly underground in a secure encasement, but this should be done in coordination with DEC and with DEC personnel on site.

**Revegetation**

*Increasing soil availability*

To increase the availability of soil for reclamation, composting could be instituted adjacent to the
MIT 16 cafeteria (in a fenced or enclosed area to prevent it from becoming an attractant). Similarly, sewage sludge and wood waste can be turned into viable soil for reclamation. Using food waste and human waste in this manner would also reduce the costs of disposal.

*Willow staking*

Stream crossing, barge landing, and other areas that are disturbed could stake willows as one way to reduce erosion and simultaneously provide habitat http://plants.alaska.gov/pdf/RevTraininNome.pdf) . This currently does not appear to be proposed as an erosion control measure:

MIT 20

> *"Indirect effects could result from erosion of the exposed soil and sedimentation. Drainage and erosion control measures, both temporary and permanent, would be implemented at the mine site, transportation facilities, and along the pipeline and at facilities such as camps, storage yards, material sites, and airstrips. Donlin would develop Erosion and Sediment Control Plans (ESCP) and Storm Water Pollution Prevention Plans (SWPPP) prior to construction. These plans would outline erosion control Best Management Practices (BMPs) to minimize soil erosion after soil*

MIT 20

*disturbance, such as the use of silt fences, bale check dams, swales, and trench and ditch reinforcement with geotextile fabric or rock gabions and sediment traps"* (DEIS p 3.10-42).

Alternatives Dismissed

**PAG backfill**

The suggestion to place some PAG material in the WRF, rather than in the pit at closure, should be reconsidered. It is expected to generate poor water, some of which will not show up for decades:

PAA 14

*However, piping of the combined WRF seepage to the pit lake may need to continue indefinitely because PAG 5 rock in the WRF is predicted to have the potential to generate ARD only after several decades* (Appendix H, Section 4.1)

This poses an unnecessary risk, which could be easily mitigated by stockpiling the PAG 5 material, preferably in a lined area and with a raincoat cover to reduce seepage during mine life, prior to backfill.

## Conclusions

The DEIS in its current form is insufficient to compare all alternatives adequately, nor does it fully consider alternatives and mitigation that could be implemented.

Thank you for the opportunity to comment on the mining permit. Please feel free to contact us with questions or for further information.

Regards,

Kendra Zamzow, PhD

Dave Chambers

WAQ 25

## Attachment – Water Quality Tables

**Table 1. Water quality at stages of water treatment.** Indicates the heavy reliance on the reverse osmosis (RO) system to meet discharge water quality objectives. From Hatch July 2015.

| | units | Effluent objective | Ferric Sulfate Influent | Expected HRC effluent | Expected Greensand effluent | Meets WQS? | Expected RO effluent | Expected in RO Brine |
|---|---|---|---|---|---|---|---|---|
| Aluminum | ug/L | 87 | 1,309 | 200 | still 200 | No | 6 | 6 |
| Ammonia | mg/L | 2.16 | 2.74 | still 2.7 | still 2.7 | No | 0.6 | 0.6 |
| Antimony | ug/L | 6 | 149 | 40 | still 40 | No | 4 | 4 |
| Arsenic | ug/L | 10 | 2,228 | 200 | 50 | No | 4 | 4 |
| Barium | mg/L | met | 1 | | | | 0.02 | |
| Cadmium | ug/L | 0.25 | 0.59 | still 0.59 | still 0.59 | No | 0.036 | 0.035 |
| Calcium | mg/L | met | 135 | | | | | <540 |
| Chloride | mg/L | met | 3.9 | | | | 0.12 | <15.6 |
| Chromium | ug/L | met | 5 | | | | 0.5 | |
| Cobalt | ug/L | met | 11 | | | | 0.3 | |
| Copper | ug/L | met (8.9) | 7 | | | | | |
| Fluoride | mg/L | met | 0.45 | | | | | |
| Iron | ug/L | 1000 | 5,400 | <1,000 | met at HRC | Yes | 5 | |
| Lead | ug/L | 3.2 | 12.8 | still 12.8 | still 12.8 | No | 0.4 | 0.4 |
| Lithium | ug/L | met | 34 | | | | | |
| Magnesium | mg/L | met | 122 | | | | | <490 |
| Manganese | ug/L | 50 | 1,100 | 550 | 50 | Yes | 2 | 2 |
| Mercury | ug/L | 0.012 | 0.75 | still 0.75 | still 0.75 | No | 0.011 | 0.011 |
| Molybdenum | ug/L | 10 | 52 | 50 | still 50 | No | | 5 |
| Nickel | ug/L | met (52) | 51 | | | | | |
| pH | | met | 8.3 | | | | | |
| Potassium | mg/L | met | 14.9 | | | | | |
| Selenium | ug/L | 5 | 38 | still 38 | still 38 | No | 4 | 4 |
| Sodium | mg/L | met | 147 | | | | | |
| Strontium | ug/L | met | 1,480 | | | | | |
| Sulphate | mg/L | 250 | 620 | still 620 | still 620 | No | 22 | 22 |
| TDS | mg/L | 500 | 1,166 | still 1,166 | still 1,166 | No | 38 | 38 |
| Thallium | ug/L | met | 0.70 | | | | | |
| TSS | mg/L | 20 | 30 | still 30 | still 30 | No | | |
| Vanadium | ug/L | met | 18.80 | | | | | |
| WAD CN | ug/L | 5.2 | 17 | still 17 | still 17 | No | 4.5 | 4.5 |
| Zinc | ug/L | met (119) | 83 | | | | 3 | |

WAQ 10 **Table 2**. **Calculations indicating WTP is undersized.** Maximum flows to the water treatment plant (WTP) upon which the AWT design was based are from the Hatch July 2015 report. Flow volumes if high conductivity material is encountered (high K) are from the BGC June 2015 report. Calculation of capacity needed at the WTP are my own.

| | Maximum Flows to WTP (m3/h) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Well flow (BGC base case)** | **SRS flow** | **Upper CWD flow** | **TSF flow** | **Total** | **Well flows (high K) (BGC June 2015)** | **Calculated WTP capacity needed for high K (m3/h)** |
| -2 | 334 | 161 | 250 | 0 | 745 | 866 | 1,277 |
| -1 | 329 | 161 | 250 | 12 | 752 | 808 | 1,231 |
| 1 | 269 | 161 | 250 | 50 | 730 | 725 | 1,186 |
| 2 | 316 | 161 | 250 | 50 | 777 | 836 | 1,297 |
| 3 | 412 | 235 | 250 | 50 | 947 | 1,174 | 1,709 |
| 4 | 355 | 235 | 250 | 50 | 890 | 1,099 | 1,634 |
| 5 | 343 | 235 | 250 | 71 | 899 | 1,086 | 1,642 |
| 6 | 323 | 235 | 250 | 71 | 879 | 1,064 | 1,620 |
| 7 | 315 | 235 | 250 | 71 | 871 | 1,056 | 1,612 |
| 8 | 392 | 235 | 250 | 71 | 948 | 1,245 | 1,801 |
| 9 | 369 | 235 | 250 | 71 | 925 | 1,193 | 1,749 |
| 10 | 364 | 200 | 250 | 71 | 885 | 1,192 | 1,713 |
| 11 | 360 | 200 | 250 | 71 | 881 | 1,183 | 1,704 |
| 12 | 540 | 200 | 250 | 71 | 1,061 | 1,583 | 2,104 |
| 13 | 467 | 200 | 250 | 71 | 988 | 1,382 | 1,903 |
| 14 | 419 | 200 | 250 | 71 | 940 | 1,338 | 1,859 |
| 15 | 396 | 169 | 250 | 71 | 886 | 1,321 | 1,811 |
| 16 | 419 | 169 | 250 | 71 | 909 | 1,356 | 1,846 |
| 17 | 397 | 169 | 250 | 71 | 887 | 1,339 | 1,829 |
| 18 | 400 | 169 | 250 | 71 | 890 | 1,349 | 1,839 |
| 19 | 394 | 169 | 250 | 71 | 884 | 1,347 | 1,837 |
| 20 | 212 | 153 | 250 | 71 | 686 | 673 | 1,147 |
| 21 | 239 | 153 | 250 | 71 | 713 | 776 | 1,250 |
| 22 | 253 | 153 | 250 | 71 | 727 | 863 | 1,337 |
| 23 | 261 | 153 | 250 | 71 | 735 | 893 | 1,367 |
| 24 | 265 | 153 | 250 | 71 | 739 | 902 | 1,376 |
| 25 | 28 | 134 | 250 | 71 | 483 | 118 | 573 |

WAQ 10 **Table 3: Groundwater dewatering rates.** Shown under base case, high conductivity, and low conductivity scenarios. From the BGC June 2015 report that informed Hatch July 2015 report

| | Base Case (m3/h) | | | High K (m3/h) | | | Low K (m3/h) | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Pit Perimeter | In-Pit | Total | Pit Perimeter | In-Pit | Total | Pit Perimeter | In-Pit | Total |
| -2 | 334 | 0 | 334 | 866 | 0 | 866 | 136 | 0 | 136 |
| -1 | 311 | 18 | 329 | 780 | 28 | 808 | 148 | 10 | 158 |
| 1 | 256 | 13 | 269 | 706 | 19 | 725 | 120 | 7 | 127 |
| 2 | 208 | 108 | 316 | 525 | 311 | 836 | 101 | 52 | 153 |
| 3 | 336 | 76 | 412 | 909 | 265 | 1174 | 158 | 32 | 190 |
| 4 | 288 | 67 | 355 | 849 | 250 | 1099 | 128 | 27 | 155 |
| 5 | 260 | 83 | 343 | 786 | 300 | 1086 | 112 | 36 | 148 |
| 6 | 246 | 77 | 323 | 771 | 293 | 1064 | 101 | 30 | 131 |
| 7 | 240 | 75 | 315 | 764 | 292 | 1056 | 96 | 28 | 124 |
| 8 | 223 | 169 | 392 | 642 | 603 | 1245 | 91 | 58 | 149 |
| 9 | 228 | 141 | 369 | 636 | 557 | 1193 | 94 | 46 | 140 |
| 10 | 212 | 152 | 364 | 609 | 583 | 1192 | 87 | 52 | 139 |
| 11 | 218 | 142 | 360 | 614 | 569 | 1183 | 93 | 46 | 139 |
| 12 | 197 | 343 | 540 | 484 | 1099 | 1583 | 85 | 118 | 203 |
| 13 | 201 | 266 | 467 | 452 | 930 | 1382 | 101 | 94 | 195 |
| 14 | 181 | 238 | 419 | 434 | 904 | 1338 | 90 | 83 | 173 |
| 15 | 171 | 225 | 396 | 428 | 893 | 1321 | 85 | 77 | 162 |
| 16 | 214 | 205 | 419 | 497 | 859 | 1356 | 111 | 63 | 174 |
| 17 | 196 | 201 | 397 | 483 | 856 | 1339 | 100 | 59 | 159 |
| 18 | 187 | 213 | 400 | 473 | 876 | 1349 | 94 | 65 | 159 |
| 19 | 181 | 213 | 394 | 465 | 882 | 1347 | 90 | 63 | 153 |
| 20 | 184 | 28 | 212 | 574 | 99 | 673 | 87 | 12 | 99 |
| 21 | 195 | 44 | 239 | 627 | 149 | 776 | 86 | 21 | 107 |
| 22 | 205 | 48 | 253 | 673 | 190 | 863 | 84 | 16 | 100 |
| 23 | 211 | 50 | 261 | 696 | 197 | 893 | 84 | 15 | 99 |
| 24 | 216 | 49 | 265 | 710 | 192 | 902 | 84 | 14 | 98 |
| 25 | 13 | 15 | 28 | 49 | 69 | 118 | 2 | 2 | 4 |

**From:** kzamzow@gmail.com on behalf of Kendra Zamzow
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold draft EIS, CSP2 public comment addendum
**Date:** Thursday, May 26, 2016 1:10:50 PM

Dear Keith:
Although CSP2 has already submitted our public comments, I would like to add this note as an addendum.

**Water Treatment Plant**
The proposed water treatment plant intends to use "Greensand" as a critical component of contaminant removal. The only greensand mine in the US is in New Jersey. I heard yesterday that the mine was closing.

WAQ 5

First, what evidence is there that Greensand can treat the Donlin mine wastewater in the intended manner? Has it been used at other mine sites or in other industrial applications at the same scale?

Second, please verify whether the New Jersey mine is closing. Please verify that there will be a source of material that will be able to supply the Donlin mine in the quantities required, particularly since the water treatment plant will need to operate in perpetuity. If Greensand is a resource that could be limited, this needs to be discussed in the EIS and alternative water treatment options (and costs) identified.

Thank you,

Kendra Zamzow, PhD
Center for Science in Public Participation
PO Box 1250 Chickaloon Alaska 99674
907.354.3886 cell

"What we observe is not nature itself, but nature exposed to our method of questioning." -- Werner Heisenberg

"Is there any knowledge in the world which is so certain that no reasonable man could doubt it?" -- Bertrand Russell, 1912

| | |
|---|---|
| **From:** | Natalia Paul-Brannon |
| **To:** | donlingoldeis, POA |
| **Cc:** | Dan Winkelman; Tiffany Zulkosky |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, April 26, 2016 11:40:34 AM |
| **Attachments:** | CYF Donlin Resolution 16.04.01.pdf |

To Whom It May Concern:

The Chefornak Traditional Council submit Native Village of Chefornak Resolution 16-04-01 (attached) in opposition to the Donlin Gold Mine Project for your review and as comment to the Draft Environmental Impact Statement (EIS).

Should you have any questions, or difficulty opening the attachment, please feel free to contact me via email or at the phone number below.

Thank you,

*Natalia Paul-Brannon for*

Tiffany Zulkosky
Vice President of Communications

YUKON KUSKOKWIM
HEALTH CORPORATION
ADMINISTRATION

Post Office Box 528, Bethel, Alaska 99559
(P) 907.543.6013
(F) 907.543.6006

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**CHEFORNAK TRADITIONAL COUNCIL**
P.O. BOX 110
CHEFORNAK, ALASKA 99561
PHONE: (907) 867-8850
FAX: (907) 867-8711

**FAX COVER SHEET**

| | |
|---|---|
| **Send To:** DAN | **From:** Chefornak Traditional Council |
| **Fax:** 907 543 6006 | **Date:** 4/26/16 |
| **Re:** | **Pages:** 3 with front page |

**__Urgent __ Reply __ Please Comment __ Please Review __ For your Information**

**Comments:**

Resolution No. 16-04-01

A Resolution of the Native Village of Chefornak in support of YKHC Resolution No. 16-04-04 Full Board of Directors in Opposition to the Donlin Gold Mine Project.

**Whereas:** The Chefornak Traditional Council (hereinafter CTC) is a federally Recognized Tribe and

**Whereas:** The CTC is the governing body of the Native Village of Chefornak and

**Whereas:** The CTC represents the wishes of its Tribal members and

*DAM 7*

**Whereas:** No one has constructed anything that will withstand the forces of nature and Time and

**Whereas:** No matter how well tailing ponds are constructed, they will eventually leak and

*SUB 15*

**Whereas:** Donlin Gold Mine Project is located in the HEADWATERS of major salmon Producing river, and other fish producing rivers and streams that people on that River or stream depend on and

**NOW THEREFORE BE IT RESOLVED:** That CTC along with its members are in Full support of YKHC's resolution no. 16-04-04 Full Board of Directors in Opposition to the Donlin Gold Mine Project.

**CERTIFICATION**

Adopted at a duly convened meeting of the CTC at which time a quorum was present on April 25, 2016 by a vote of 3 in favor, Ø opposed, Ø abstaining, and Ø absent.

Mary Tunuchuk- President

Charlene Erik-Secretary

YKHC FAX 907-543-6096
ATTN: DAN

SOL 8

Chefornak - April 25 2016

(1) EXPERIENCE IN PERMA FROST TO THE LAND - when the Land freezes in winter WE EXPERIENCE of the Ground CRACKING AS WELL AS the FROZEN ice.

(2) YKHC REPERSENT the the people of YKHC well biing and the Health of the people - ARE WE THE outside people Refuse to listen to the people of YKHC.

(3) Any Human beeing - cannot construct ANYthing that would NEVER be DAMAGED by NATure

TWL 2

(4) from memorial - our people have Survived WINTER AND SUMMER AND LIVED THROUGH even their is NO MONEY. AND THE DIRECTION is to PASS ON WAY of Life AND the VISION to the future of the Health and Survival of our people

(5) The Land that was destroyed - They will Leave it as it is -

(6) Mary - I have ancestors of Western people all my life living with my people - I have NEVER got RICH in living with my people - Our Health + Survival AND the VISION of our people - Health + Survival IN WINTER + SUMMER from the Land and Sea and Water.

Live in Sod houses - I'm very Rich IF in Surviving from Land + water

DAM 7

(7) On this earth there is no construction of things that will with stand by Mother earth

(8) Our forefathers have cautioned our people - to make wise decisions for the future of our people - which we may not Experience

(9) Anything that is constructed is no match for natures water and the wind - Damage that occured - we can never take back.

FSR 2

(10) distruction of Accidents - Denali is located in the high Mountain. it could Due to the Nat'n Rivers | Example of new Technology Sub Machines other Machinery - it is visible in oil + Gas Contaminants

9078678711 Chefornak Traditional Council 09:10:27 04-26-2016 2/3

**From:** Jeff Chen
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold comment
**Date:** Thursday, April 28, 2016 6:19:09 PM

---

Dear US Army Corps of Engineers,

SVE 2 I oppose the proposed Donlin Gold Mine because I believe it will have significant negative consequences to rural communities along and near the Kuskokwim River. I've seen the effects of mining in rural places -- including higher rates of drug use, water contamination, erosion, brain drain, loss of traditional cultures, impact on land and water, corporate greed -- and I don't want to see another rural Alaska village devastated by outside corporate interests. This is an especially sensitive area, considering the impact to subsistence and traditional ways of life. Further, Donlin Gold has effectively bought out the Iditarod Trail Committee by keeping musher mouths shut for a period of time.

We don't need another mega mine!

Jeff

# Alaska State Legislature

State Capitol, Room 208
Juneau, Alaska 99801-1182
Phone: 907-465-3779
Fax: 907-465-2833
Toll Free: 800-469-3779

145 Main St. Loop
Second Floor
Kenai, Alaska 99611
Phone: 907-283-7223
Fax: 907-283-7184

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REPRESENTATIVE MIKE CHENAULT
SPEAKER OF THE ALASKA STATE HOUSE

April 6, 2016

Keith Gordon
U.S. Army Corps of Engineers Alaska District
CEPOA-RD-Gordon
P.O. BOX 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

I am writing to express my support for the proposed Donlin Gold project located in the Yukon-Kuskokwim region, an area with some of the highest rates of unemployment in the United States. The Donlin Gold project is situated on lands selected under the Alaska Native Claims Settlement Act by the Calista Corporation expressly because of the known mineral potential of the area. Development of the project will enable Calista Corporation and The Kuskokwim Corporation, owner of the surface lands, to generate job and business opportunities for their shareholders. In addition to bringing economic activity to rural Alaska, it also will contribute to the diversification of the state's economy.

SER 2

During the exploration of the project, Donlin Gold demonstrated its commitment to local hire, at times exceeding 90% local employment. Equally important, staff turnover rate during the exploration phase was reduced from 300% to 5% through effective training and community engagement. During construction, the project anticipates hiring 3,000 workers and during the expected 27-year operating period up to 1,200 permanent workers will be needed. The project offers long-term, high wage employment to residents of the Yukon-Kuskokwim region and the State.

As Speaker of the Alaska State House, I am acutely aware that, as Alaska confronts the realities of declining oil production and tighter federal and state budgets, private investment is a critical source of economic development. In addition to the mine site facilities, Donlin Gold proposes to build a 315-mile long pipeline from Cook Inlet to site to deliver natural gas to fuel a power plant that will generate the electricity needed to operate the mine and process facilities. The proposed pipeline not only provides cleaner fuel to the power plant, but also reduces the number of annual barge trips up the Kuskokwim River to supply the mine. Transporting energy sources, whether oil or natural gas, via pipeline is demonstrably a safer, more efficient method of conveyance.

Rep.Mike.Chenault@akleg.gov

Donlin Gold will also be the first mine site in Alaska to place a synthetic liner underneath the entirety of its tailings impoundment. Consistent with best industry practices, the tailing storage facility will be built using a downstream construction design, the most stable of all dam types, and will be closed as a dry facility. Also, innovative and highly efficient control technologies will be used to capture or remove potentially harmful constituents from air and water at the site prior to release of the air or water to the environment. Specifically, naturally-occurring mercury in the ore will be captured in the process circuit and transported offsite for secure disposal.

Mining is an integral part of our state's culture and economy. The Donlin Gold project as proposed in Alternative 2 will continue a history of mining in the area that dates back over a century. Alaska was built and continues to grow through the responsible exploitation of its natural resources.

I encourage the U.S. Army Corps of Engineers, the Bureau of Land Management, and the Pipeline and Hazardous Materials Safety Administration to expeditiously complete their environmental review of the project and to issue the permits and approvals necessary to authorize development of the Donlin Gold project as proposed in Alternative 2.

Thank you for considering my comments and your consideration of issuing the permits and approvals necessary to move this project forward,

Sincerely,

Representative Mike Chenault
Speaker, Alaska State House

Alaska State Legislature
REPRESENTATIVE MIKE CHENAULT
SPEAKER OF THE ALASKA STATE HOUSE
Capitol Building, Room 208 • Juneau, Alaska 99801-1182
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Keith Gordon
U.S. Army Corps of Engineers Alaska District
CEPOA-RD-Gordon
P.O. BOX 6898
JBER, AK 99506-0898

**From:** Flora Chikigak
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Saturday, May 21, 2016 1:41:43 PM

---

SUB 15 I enjoy my dried fish, seal oil and my other native foods i was raised eating n to this day weather i live out there or not i could not jepordize my subsistance way of life by supporting this project. No matter how careful you are with the enviroment etc.. Accidents happen. You will be long gone but my people will be here forever so Yes i am OPPOSED to the project!!

Fchikigak

Chimegalrea, Sam

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May 31, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

I am a lifelong resident of the Yukon Kuskokwim region of Alaska and write today to support the Donlin Gold Mine project Draft EIS under your consideration.

SER 5 I support the project for the jobs it will bring to my region. Ours is one of the poorest regions of the state and desperately needs a project that will have a positive economic impact.

SVE 1 Like all the residents in the region, I have concerns about the potential impacts to our environment and our subsistence lifestyle. But I believe the company has taken steps towards safety.

I have appreciated the openness of the Donlin employees to work with our people and hear their concerns. I went on a tour of the Barrick's Golden Sunlight Mine to see first hand what the mining process was all about. It gave me a better understanding of what Donlin Gold is proposing. I can see that modern techniques will reduce the risks and trust the Donlin Gold Project will move forward while being responsible to protect the environment. For these reasons I am hopeful you will look favorably on the Draft EIS so the project can move forward.

Sincerely,

Sam Chimegalrea

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May 31, 2016

Vernon Chimegalrea
3102 West 32nd Avenue
Anchorage, AK 99517

Keith Gordon, Project Manager
US Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, PO Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon,

I support the development of the Donlin Gold mine and encourage alternative 2 as the option to proceed with the project.

I have been working at Donlin Gold for the past five years. Prior to accepting a position with the company I was initially hesitant because my mindset was focused on the past mining processes and the horror stories I had heard of throughout my life time. I accepted the position after having done my own research and realized the practices of the past were just that, practices of the past. Under today's regulations the protection of the environment is first and foremost.

Having been raised in the Kuskokwim river communities of Napakiak and Bethel, Alaska I have always known and realized that the area I grew up in, the Yukon Kuskokwim Delta, was the most poverty stricken area of the state, if not all of the United States.

SER 8

After graduating from the Bethel Regional High School it was always my goal to attain a college degree and come back to the region to work for my people, the Yup'ik people. As I was growing up I had heard from a number of the native leaders of the region that we the younger generation of the region should go on to college because, "you are the next generation of leaders that will be taking our positions of leadership". I still hear those words of encouragement being preached to today's youth yet those same leaders are still in those same positions today and only a few of today's college graduates are filling those positions which are mainly in the community of Bethel because the positions one can have in a small village are limited because there are no jobs in the 50-plus villages of southwest Alaska.

I am hopeful thatwith the development of the Donlin Gold we can employ the YK Delta's unemployed who have had to migrate out of the region to seek employment elsewhere. It will be a good opportunity for those of the region who like living a "subsistence lifestyle" and can practice that lifestyle on their off-time, working a convenient swing shift that the mine will have. The income that they earn at Donlin Gold will afford them to better practice that lifestyle by allowing them to purchase boats, snowmobiles, atv's, nets, guns and ammunition that is required of for today's subsistence hunters and gatherers.

SVE 1

I think an elder in the community of Nunapitchuk put it best when he stated, "the creator has provided us with the resources that are at Donlin Creek, if it wasn't for our benefit it would not have been placed there for our use. We just have to develop it in a responsible manner so it does not hurt the

SUB 18

environment." He went on to say that we hear a lot about subsistence and how the Donlin Gold mine might detrimentally affect our subsistence activities, yet today we need cash to practice subsistence. The mine will allow for better subsistence activities by providing them the jobs that are scarce in this region by providing the people with employment so they can purchase all the needed boats, motors, guns, etc. to go and subsist. "People now-a-days talk about subsistence, yet if they were given a kayak, a bow and arrow or set snares and subsisted like we used to do, and doing away with store purchased food; they will starve to death. Today's people need a cash economy and I think the Donlin Gold mine can provide for that needed cash."

Please consider Donlin Gold's alternative 2 in order for them to proceed with the project.

Quyana,

Vernon Chimegalrea

*Chuathbaluk Traditional Council*
#1 Teen Center Trail
Chuathbaluk, AK 99557
Phone (907) 467-4313
Fax (907) 467-4113

Richard L. Darden
Regulatory Division
U.S. Army Corps of Engineers
P.O. BOX 6898
JBER, AK 99506-0898

January 25, 2017

Subject: Follow up on Donlin Technical Working Group meetings, December 2016

Dear Mr. Darden;

The Chuathbaluk Traditional Council has read and approved the attached comments written by Kendra Zamzow, and David Chambers, on behalf of Chuathbaluk as a follow up to the Donlin Technical Working Group meetings in December 2016. We anticipate that these will be reviewed and incorporated into the Alternatives as appropriate.

If you have any questions or concerns regarding our request and data gap concerns, please feel free to contact the Chuathbaluk Traditional Council at (907) 467-4313 or via email at ctc.patriciayaska@gmail.com

Sincerely,

Patricia Yaska
Brownfield Tribal Response Program Coordinator

**CENTER for SCIENCE in PUBLIC PARTICIPATION**
224 North Church Avenue, Bozeman, MT 59715
Phone (406) 585-9854 / Fax (406) 585-2260 /web: www.csp2.org / e-mail: csp2@csp2.org
*"Technical Support for Grassroots Public Interest Groups"*

**MEMORANDUM** Date: December 23, 2016

From: David M. Chambers

To: Corps/AECOM

Re: Donlin Technical Meeting on Mine Water and Tailings Storage Facility

During the meeting on Tuesday, December 13, 2016, there was a short discussion on the potential use of blanket or other drain-designs to drain the tailings in the impoundment, as per the recommendations of the Mt Polley Expert Panel.

During that discussion a comment was made by either the Army Corps Subject Matter Expert, or a consultant (I am not able to identify the individual), that 'tailings always remain saturated.' The expert was then asked about tailings impoundments in arid areas like Arizona and New Mexico, and his response was that those impoundments are dewatered by 'suction created by surface evaporation.'

There is quite a bit of literature detailing the success of drains for controlling the phreatic level in tailings dams using toe drains of several designs, and of the success of dewatering the entire tailings mass itself – primarily for uranium tailings.

A search for references to evaporative dewatering of tailings impoundments did not turn up any definitive articles on dewatering an entire impoundment, only reference to dewatering rates due to evaporation in the upper meter of tailings, and references to using thin-layer deposition or the addition of flocculants to increase evaporation. None of these techniques are documented as being used in arid areas to dewater tailings impoundments. There is documentation of extensive sulfate plumes in groundwater downgradient of copper tailings impoundments in arid areas, proof that interstitial water is entering (i.e. draining) into groundwater in significant amounts.

Existing literature supports the concept that tailings can be drained by drain layers, especially since this concept is essential to controlling the phreatic zone for tailings dams.

The Army Corps should ask for references that support the statement that 'tailings always remain saturated' as purported in the December 13 discussion, since the failure to consider draining the tailings post-closure depends on this assumption/assertion.

I would be happy to have a discussion with the subject matter expert/consultant about the recommendations of the Mt Polley Panel, and their potential for implementation at the Donlin tailings impoundment.

Sincerely;

David M Chambers

David M Chambers, Ph.D., P. Geop.

DAM 10

**CENTER for SCIENCE in PUBLIC PARTICIPATION**
PO Box 1250 Chickaloon, AK 99674
Phone (907) 354-3886 / web: www.csp2.org / e-mail: kzamzow@csp2.org
"Technical Support for Grassroots Public Interest Groups"

CSP²

December 18, 2016

Chuathbaluk Tribal Administration
#1 Teen Center Trail
Chuathbaluk, AK 99557

Re: Follow up on Donlin Technical Working Group meetings, December 2016

Dear Patricia and Tracy:

I would like to recap here the key issues that appear to remain unresolved after the technical working group (TWG) meetings of December 12-16. I think it would be useful if you could combine these comments with comments of your own from the Barging TWGs and send to the Army Corps of Engineers as a follow up to the meetings. It might be helpful if our thoughts were laid out as

- Unresolved concerns that require additional field work or modeling. For these, we can request RFAIs (official "request for additional information")

- Unresolved concerns that require clarification in the next draft (or final) EIS

My key concerns revolve around

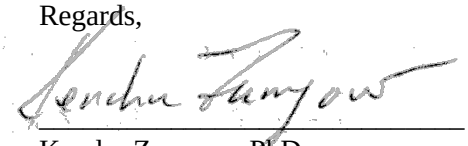
WILD 5 - The toxicity of pit lake surface water to wildlife, especially migratory waterfowl. This is affected by the volume of contaminated water from the WRF, the volume of clean surface and groundwater, and how they mix.

GRD 6 - The potential for pit lake water at depth to move out of the pit and transport contaminants.

Following is a list of RFAIs and requests for "clarification and context", followed by a more detailed discussion.

Please do share any of my memos with the traditional council. As you know, my goal is to ensure that all risks have been adequately identified and mitigated to the extent possible, and to ensure the Chuathbaluk Traditional Council has good information on which to base any future decisions or input they would like to provide in the process.

Regards,



Kendra Zamzow, PhD

**RFAIs**

This is a list of RFAIs we are requesting. The context for them follows in the bulk of the letter.

*Waste rock covers*

WAQ 31 RFAI: How would placing an impermeable cap over PAG cells compromise the integrity of the WRF? How would placing an impermeable cap over the entire WRF compromise it?

WAQ 31 RFAI: If an impermeable cap was placed on PAG cells in the WRF or on the entire WRF, would pit lake overturn occur sooner? Would pit lake water be "less bad" than with the designed colluvium cap? How would this affect water treatment plant design or capacity? Could it lead to decommissioning of the water treatment plant?

WAQ 31 RFAI: In an early closure scenario, could an impermeable cap on PAG cells or the entire WRF eventually eliminate the WRF seepage into the pit lake allow the pit lake water to "clean up" enough (through clean freshwater inputs) that the water treatment plant could be closed? If so, provide an estimate of the number of years until the plant could be closed if the mine ended operations after 5 years, 10 years, 15 years. Please compare the cost of an impermeable liner over the full WRF to the cost of water treatment over these time periods.

*Pit lake ecotoxicity*

WILD 5 RFAI: Determine the toxicity of overturn pit lake water to wildlife, including waterfowl.

*Groundwater hydrology*

GRD 11 RFAI: Provide information on the feasibility of utilizing deep exploratory holes to determine the existence or non-existence of regional groundwater flow.

RFAI: Provide suggestions on other methods of collecting solid data that would inform the question of and models of regional groundwater flow.

*Water treatment*

WAQ 5 RFAI: Please provide case studies of mines using xeolite to remove arsenic at similar scales.

WAQ 25 RFAI: Provide water quality for the DSTF operating pond, and apply that to a "water only" spill release scenario for Alternative 5A.

WAQ 25 RFAI: Please explain what the difficulties are, what technology exists, and limitations for treating DSTF operating pond and pit lake water, such as the volume that can be treated and discharged and placement of waste that cannot be discharged.

*Mercury*

WAQ 21 RFAI: Please ensure soil and sediment samples utilized to determine mercury methylation are proportionally representative of the landscape to ensure there has not been any sampling bias.

RFAI: Perform laboratory tests with sediment, applying future wastewater effluent simulations under a range of temperatures and dissolved organic carbon concentrations.

RFAI: Perform the same tests listed above with the simulated tailings.

RFAI: Determine the Hg(II) content of porewater in sediment.

AIQ 3 RFAI: Adjust the fugitive gas emissions model to account for the percent of time with high solar radiation.

GRD 1

**Clarification and context**

These are items that we do not believe need an RFAI, but which deserve clarification or better description of context in the FEIS.

Clarification: Should a range of hydraulic conductivities be applied to determine WRF seepage rates and volume?

GRD 11

Context: If regional groundwater flow is identified, discussions of pit lake stratification, pit lake ecotoxicology, and the water treatment plant will need to be updated.

GRD 6

Context: If it is determined that the pit will not maintain hydrologic conductivity, this may require a new management plan for waste rock intended for backfill.

WET 8

Context: If bedrock conductivity is higher than expected, will this have implications for desiccation of wetlands?

WAQ 10

Context: In the event that high flow is encountered at depth while mining, what would an extra 500 $m^3$/hr or 1,000 $m^3$/hr look like when added to the contact water pond or other storage areas?

Context: Post-closure scenarios for Alternatives 2 and 5A should include cost and design for waste from the water treatment plant that cannot be discharged.

**Introduction to concerns**

Three features will remain on the landscape forever: the tailings facility (with the permanent risk of tailings liquefaction if the dam fails at any time in the future), the waste rock facility (which will leach arsenic, selenium, and other contaminants forever, if rain and snow are allowed to infiltrate), and the pit lake (which will receive the contaminated waste rock seepage).

WAQ 20

While there is an alternative to assess for tailings options, there is no alternative that eliminates the pit lake. It is a certainty. The only permanent inputs into the pit lake are the waste rock facility (WRF) seepage and clean runoff water/precipitation (Figure 3.6-9). The tailings facility (TSF) is expected to stop contributing after the 30-60 year draindown period.[1] Groundwater may move into the pit in quantity (Fig. 3.5-28), but there is currently a lack of data supporting the conceptual model describing over 500 gpm groundwater flowing into the pit and no groundwater flowing out.

GRD 11

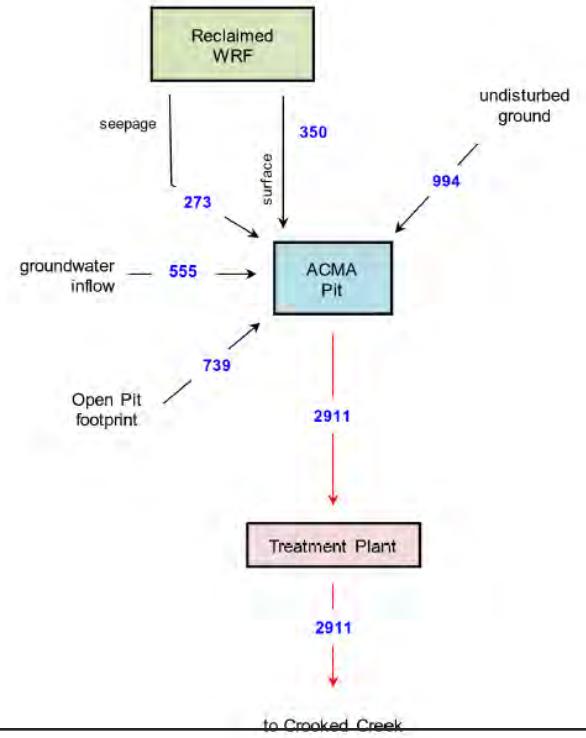



**Figure 3.5-28 of DEIS.** Flows (blue numbers) are in gallons per minute (gpm) expected in Years 52-200 of closure. Red arrows denote pumping routes; however, the route for "seepage" from the WRF will be a mix of gravity flow and pumping and perhaps should be marked with a red arrow.

GRD 14

WILD 5

The environmental risks that require analysis under NEPA are

- The toxicity of pit lake surface water to wildlife, especially migratory waterfowl. This is affected by the volume of contaminated water from the WRF, the volume of clean surface and groundwater, and how they mix.

GRD 6

- The potential for pit lake water at depth to move out of the pit and transport contaminants.

**Pit lake water quality**

WAQ 31

Waste rock seepage – very high in total dissolved solids, arsenic, and other contaminants, will enter a rock drain under the WRF and flow towards the pit. At the pit rim, it will be pumped to the bottom of the pit; presumably it will be pumped to the depth immediately above the waste rock backfill, rather than 1,800 feet down to the actual pit bottom. Freshwater inputs will float on this saline seepage water; this

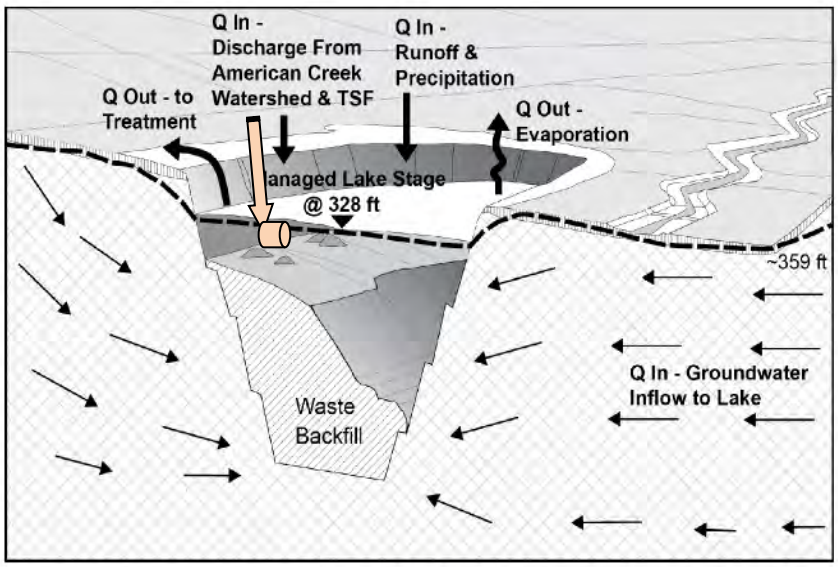
[1] There is expected to be about 400 gpm clean groundwater flow (Fig. 3.5-28 and p 3.6-38, DEIS) to dilute the 18 gpm allowed to seep through the TSF liner, and therefore any water that infiltrates and percolates through the TSF cover is not expected to be poor quality.

WAQ 31

WAQ 31 stratification is a key part of the mine "design for closure" and a key argument to why the WRF should not be lined or provided with an impermeable cover.

This "less bad" surface water is the water quality utilized to determine if the pit lake water would be toxic to wildlife, and to design the water treatment plant.

WAQ 31 This is insufficient. The bad water on the bottom of the pit lake *will* eventually mix throughout the lake. The effect of this mixture on wildlife, and inputs that contribute to mixed lake water quality need to be assessed. Cooperating agencies should not trivialize this issue simply because it may not occur for 100-200 years after closure. While the mining company will be long gone, the people and wildlife will remain and fewer mitigation options may be available.




After Pit Lake is Full

**Adapted from Fig. 3.6-9 DEIS.** The figure above shows the water inflows to the pit after closure. Added is a possible pumping discharge route for waste rock seepage (color). The tailings facility (TSF) is not expected to contribute water to the pit lake after the lake is full, and should be removed from the image. WAQ 31

*WRF cover and pit lake water quality*

WAQ 31 The type of cover on the WRF influences the volume of bad water seepage that enters the pit. It also influences the year at which the pit lake will turn over (mixing bad saline bottom water with upper freshwater). A less permeable cover will lead to less bad water to the pit and a faster time to turnover.

GRD 1 The cover for the waste rock facility is designed as 3 feet of "low conductivity" ($10^{-7}$ m/s) colluvium topped by vegetation. This will allow precipitation (rain, snowmelt) to enter into the waste rock. Water will be entrained in the waste rock facility before the cover is placed, and will continue to enter the facility, at a lower rate, after the cover is placed. Entrained and infiltrating water will percolate through the WRF into the underdrain and on to the pit. The permeable colluvium cap on the WRF ensures that water will percolate through the WRF in perpetuity and will seep into the pit lake in perpetuity.

Colluvium, which is uniformly given a hydraulic conductivity of $10^{-7}$ m/s in the DEIS, plays heavily into the WRF design. It was used to describe the conductivity of the 5-10 m of natural material under the WRF, the material that "encapsulates" PAG cells within the WRF, and the cover that will be placed on the WRF.

GRD 1

- Request for clarification: Even at depth, bedrock has a range of $10^{-6}$ m/s to $10^{-9}$ m/s. Shouldn't this range be applied to hydrology related to WRF covers? This could inform the seepage volume from the WRF, pit lake water quality, and the time to turnover.

WAQ 31

PAG cells are expected to provide the worst water quality in the seepage, but make up a relatively small part of the volume of the total WRF. Most waste rock will by NAG, some of which will leach arsenic and some of which will not. Placing an impermeable cap on the PAG cells within the WRF or over the full WRF would limit oxygen moving into the facility (which would reduce reactions converting PAG rock sulfides to sulfuric acid/acid drainage) and reduce or eliminate water entering the PAG cells or WRF. We are told this would compromise the strength of the facility.

- RFAI: How would placing an impermeable cap over PAG cells compromise the integrity of the WRF?

- RFAI: How would placing an impermeable cap over the entire WRF compromise it? Or is the decision to go with an impermeable cap one of budget rather than geophysics?

WAQ 31

The type of cap that covers the PAG cells and WRF affects pit lake water chemistry and potentially the point at which the water treatment plant needs to be redesigned to treat very bad water or the point at which a water treatment plant could be decommissioned entirely. It is critical to understand these points in order to balance long term cost and risk (water treatment) and short term cost (impermeable caps).

There is no reason to expect WRF seepage water chemistry to improve over time. When water levels flux with draindown and precipitation inputs, they create "wetting/drying" cycles that are particularly effective in causing metal leaching and mobilization.

WAQ 5

- Add to FEIS: There are implications for the cost and design of a water treatment plant that is able to fully treat overturn water. If this requires reverse osmosis units, these themselves have solid and brine waste products. Post closure, the brine cannot be sent through the processing plant. Disposal of these waste products needs to be part of the full post-closure scenarios considered for Alternative 2 and Alternative 5A.

WAQ 31

- RFAI: If an impermeable cap was placed on PAG cells,
  - Would overturn occur sooner? Would the chemistry of pit lake overturn water be "less bad" without PAG cell seepage? Would this make it easier for a water plant to treat?
  - Could a water treatment plant be fully decommissioned, and if so, at approximately what point in time (given inputs from fresh water, NAG WRF seepage, pit wall sloughing)?

- RFAI: If an impermeable cap was placed on the WRF,
  - Would overturn occur sooner (due to less TDS water entering the pit)? What are the implications for water treatment?
  - Is there a point at which the water treatment plant to be decommissioned entirely?

*WRF cover and ecotoxicity of pit lake water*

The models for potential toxicity of pit lake water only considered the scenario in which the fresher water was at the pit lake surface and the worst water was isolated below. We know that under the current design the bad water *will* eventually mix throughout the pit lake. The lack of an assessment of ecotoxicity after pit lake overturn is a serious data gap. The pit lake water at the point of overturn may not be the same as the Year 99 "complete mixing" scenario, as the pit lake may have a greater percentage of WRF seepage and less freshwater, resulting in potentially worse water than the Year 99 mix estimates.

WILD 5

- RFAI: Determine the toxicity of overturned pit lake water to waterfowl. For example, ecotoxicology was determined using arsenic at 114 ug/L (Lorax 2015 Table 3-1), but in an overturn scenario arsenic in pit lake surface water will be around 2.4 mg/L (Lori Filipek comment during TWG meeting).

WAQ 9

- Discuss the potential ecological, technical, and cost impacts of mitigation options (e.g. drawing water from the bottom of the pit for treatment, etc.)

WILD 5

- For mitigation: If an impermeable cap was placed on the PAG cells, how would this change ecotoxicity?

- For mitigation: If an impermeable cap were placed on the WRF, how would this change ecotoxicity?

*Early closure – cost of caps versus water treatment*

WAQ 31

We also need to keep in mind that water treatment will need to go forward, potentially in perpetuity, even if the mine only operates for a few years. Early closure, if permanent, is a particularly concerning scenario in that the water treatment plant will need to operate, possibly in perpetuity, but the mining company may have only paid into the fund for operations for a few years.

An early closure mitigation should consider an impermeable cap on any portion of PAG cells that have not already been covered by colluvium and non-acid generating (NAG) rock, and an impermeable cap on the full WRF. This would reduce the number of years that water flows out of the WRF into the pit lake.

WAQ 31

- RFAI: In an early closure scenario, would eventually eliminating the WRF seepage into the pit lake allow the pit lake water to "clean up" enough (through clean freshwater inputs) that the water treatment plant could be closed? If so, provide an estimate of the number of years until the plant could be closed if the mine ended operations after 5 years, 10 years, 15 years. Please compare the cost of an impermeable liner over the full WRF to the cost of water treatment over these time periods.

A less expensive option to an impermeable liner over the full WRF would be to place the planned colluvium liner as a WRF cap but encapsulate the PAG cells in impermeable material.

WAQ 31

- RFAI: In an early closure scenario, would eliminating seepage from the PAG cells alone be enough to allow the pit lake water to "clean up" eventually, or would arsenic leaching from NAG rocks continue to be so high that, along with contributions from the pit wall sloughing, freshwater inputs (clean runoff, precipitation, snowmelt) would not be enough to dilute the poor water and

WAQ 31

the pit lake would need water treatment in perpetuity? If decommissioning the water treatment plant is possible, provide an estimate of the number of years until the plant could be closed if the mine ended operations after 5 years, 10 years, 15 years. Please compare the cost of an impermeable liner over PAG cells to the cost of water treatment over these time periods.

**Hydrology and the pit lake**

GRD 11

There remain concerns as to whether a regional groundwater flow exists that could intersect the pit and whether bedrock groundwater will flow towards the pit at all depths after the pit has filled. These have implications for pit lake de-stratification, water quality, and transport of pit water contamination.

GRD 11

*Does regional groundwater flow exist that could intercept the pit?*

The concept that groundwater will flow towards the pit at closure, even when the pit is filled with water (leaving 33 feet of freeboard between the lake and the pit rim) is based on data collected almost entirely in the upper 400 feet of the geology. The model was developed without any hydrologic data from depth.

First, deep wells should have been drilled to collect this data. At the Pebble exploration site, over 20 wells between 1,000 and 5,700 feet deep were drilled for monitoring and study purposes.[2]

GRD 11

Is it possible to determine the presence or absence of regional flow without drilling new, very deep wells? There must be exploratory drill holes down to the suggested 1,800' depth of the pit, and probably somewhat deeper than that. Drill logs would show the type of geologic material at depth and potentially whether groundwater was encountered. These holes, if closed, would be expected to have cement in the alluvial material, to prevent a connection from groundwater to the surface; however, nearly all the depth (in bedrock) is probably not cemented. It could be relatively inexpensive to drill through the upper cement and conduct hydrologic testing.

- RFAI: Provide information on the feasibility of utilizing deep exploratory holes to determine the existence or non-existence of regional groundwater flow.

- RFAI: Provide suggestions on other methods of collecting solid data that would inform the question of and models of regional groundwater flow.

GRD 11

*Regional groundwater flow as a factor in pit lake water*

If groundwater does intersect and move in and out of the pit, this has serious implications for the assumption that pit lake water will remain stratified for at least 100 years. The assumption is based on models that feed high TDS waste rock facility drainage into the pit; if this high TDS water is intersected by fresh groundwater, stratification will be affected, with implications for the design of the wastewater treatment plant and the disposal of waste (for example, from the reverse osmosis waste). Additional groundwater inputs could also provide more dilution.

GRD 11

The following provide context to emphasize the importance of understanding groundwater hydrology.

GRD 11

[2] DNR 2016 PLP Borehole Status spreadsheet

GRD 11

- If regional groundwater flow is identified, the pit lake stratification modeling will need to be adjusted.
- If pit lake stratification modeling is adjusted, a complementary adjustment of pit lake ecotoxicology, particularly for waterfowl, needs to be conducted.
- If regional groundwater flow is identified, a discussion of the water treatment plant will need to be updated. This should be done for Alternative 2 (TSF option) and Alternative 5A (Dry Stack Tailings Facility option). It will need to discuss design features such as the type and volume of water to be treated, and disposal of water treatment waste that cannot be discharged to creeks.

GRD 6

*Pit lake water quality mitigation*

Whether or not there is regional flow, there is possibility that water will not remain in the pit at all depths. Determining the depth at which flow leaves the pit, if it leaves, and the freeboard required to maintain a hydrologic gradient towards the pit, may be important in understanding where backfill can be placed.

WRF seepage will contribute poor water, as discussed above, but backfill waste rock could contribute significantly to poor water quality if a water cover is not maintained over it.

Waste rock from the ACMA pit will go to the WRF, except PAG 7 material will be stockpiled and placed as backfill in the pit in Year 22. All waste rock from the Lewis pit will be backfilled into the ACMA pit. Backfill must be covered with a water cover if it contains PAG material. If the pit lake needs to be kept at, say 500 feet below the rim of the pit, instead of the currently planned 33 feet of freeboard, in order to maintain hydrologic containment, then potentially less Lewis or PAG 7 ACMA waste rock will be able to be placed in the pit.

This is a situation in which there is time to develop an adaptive management plan. Dewatering wells will provide the necessary hydrologic data during mining of the ACMA pit, in time to determine whether PAG 7 should be encapsulated in the WRF with the other PAG and/or whether Lewis pit waste rock needs to be stored on the surface.

I offer this not as an RFAI, but again as a point to illustrate how important it is to determine hydrologic containment at the pit. If a significant amount of waste rock cannot be backfilled into the pit, this will add quite a bit of expense at the latter end of mine life.

WET 8

**Rock conductivity and wetlands**

If conductivity is higher than expected, more dewatering would need to occur. Is it possible that this could cause more wetlands to dry up than currently expected? If so, are there implications for mitigation?

**Water treatment**

*Treatment during operations*

The water treatment plant is designed for a maximum of 1,500 $m^3$/hr inflow. It is assumed that if rock conductivity, which drives the volume of pit dewatering water, is higher than anticipated, operators will "know fairly quickly" and be able to adapt the water treatment plant. However, this assumes that conductivity declines with depth. This underscores the importance of Sue Braumiller's comments on understanding the conductivity at depth before operations begin.

WAQ 10

As noted in the meeting, the volume you can pump is one ceiling, the volume you can store is another.

- For impact analysis: In the event that high flow is encountered at depth, what does an extra 500 $m^3$/hr or 1,000 $m^3$/hr look like when added to the contact water pond or other storage areas? For how many days, weeks, months can this occur before there is no more storage, under high and low precipitation scenarios?

Per the water treatment plant design of using zeolites (synthetic greensand) as a key part of the process to remove arsenic and manganese,

WAQ 5

- RFAI: Please provide case studies of mines that use the technology for these elements at similar scales. This is necessary to ensure that current technology is being applied.

*Treatment post closure*

My impression is that the Dry Stack Tailings Facility operating pond will have TDS high enough that it will be difficult for it to be treated at the water treatment plant, and instead will be stored until the end of mine life and drained into the pit. However, at some point when the pit lake overturns, there will also be high TDS. This suggests that pit lake overturn water could be difficult to treat.

WAQ 25

- RFAI: Provide water quality for the DSTF operating pond, and apply that to a "water only" spill release scenario for Alternative 5A. This is necessary to compare Alternatives 2 and 5A.

- RFAI: Please explain what the difficulties are, what technology exists, and limitations for treating DSTF operating pond and pit lake water, such as the volume that can be treated and discharged and placement of waste that cannot be discharged.

**Mercury**

*Assumptions on solar radiation*

The majority of mercury in the gas phase will be released from the processing plant, but the second highest source will be the tailings facility, particularly in the later stages when the facility is large.

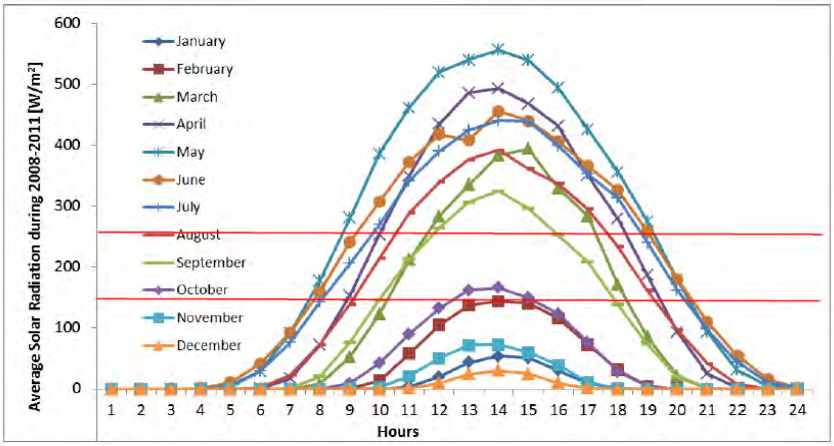
AIQ 11

> *"….gaseous Hg emissions from four fugitive source categories at Donlin (Tailings Storage Facility (TSF), waste rock facility, ore stockpile and open pit) were estimated using methods similar to the Eckley studies but accounting for Donlin-specific data where feasible to account for* ***differences in solar radiation****, air temperature and geochemistry/Hg content between Donlin and the Nevada mines."* (Environ 2014c) (emphasis added)

Solar radiation on site is expected to be low 72% of the time, middle range 8% of the time, and high 20% of the time (Environ 2014c, Figure 3-5 and pgs 20-21) (bars added to separate low, medium, and high solar radiation levels).

AIQ 11

Although the Donlin area receives a range of solar radiation, only "low" and "middle" radiation were used to calculate fugitive gas emissions.




**Adapted from Fig. 3-5, DEIS.** The figure shows the average solar radiation by month at the Donlin Camp site. The two red lines have been added to indicate the cut off for the designations of "low" and "middle" solar radiation. Data from above the second line was not included in equations for calculating fugitive mercury gas emissions from mine site facilities.

AIQ 3

> *"We estimated beach Hg fluxes by applying the linear regressions equations developed for the **low and middle solar regimes** to the Donlin solids Hg concentration as shown in Table 3-4. The equations developed are shown below, where f is the log(Hg flux) and c is log(Hg concentration)."* (Environ 2014c) (emphasis added)
>
> Low Solar: f = 0.604 c + 3.238 Mid Solar: f = 0.542 c + 4.36

**Table 3-4. Tailings beach mercury flux.**

| Beach Hg concentration (µg/g) | Log (Beach Hg concentration) | Log (Hg Flux in Low Solar Range) | Hg Flux in Low Solar Range ($ng/m^2$-day) | Log (Hg Flux in Middle Solar Range) | Hg Flux in Middle Solar Range ($ng/m^2$-day) |
|---|---|---|---|---|---|
| 0.7 | -0.15 | 3.14 | 1,396 | 4.28 | 18,902 |

* Values rounded off

**Table 3-5. Monthly tailings beach Hg fluxes**

| Month | Daily Mean Solar Radiation at American Ridge ($W/m^2$) | Solar Radiation Range | Tailings Beach Hg Flux ($ng/m^2$-day) |
|---|---|---|---|
| January | 8.9 | Low | 0 |
| February | 34.4 | Low | 0 |
| March | 111.8 | Low | 0 |
| April | 170.8 | Medium | 18,902 |
| May | 227.1 | Medium | 18,902 |
| June | 194.7 | Medium | 18,902 |
| July | 182.8 | Medium | 18,902 |
| August | 141.1 | Medium | 18,902 |
| September | 97.8 | Low | 1,396 |
| October | 41.1 | Low | 1,396 |
| November | 13.8 | Low | 0 |
| December | 4.3 | Low | 0 |

The difference between the fugitive gas emissions that could be released under low and high radiation for the tailings facility are striking (Environ 2014c, Table 3-4 above).

AIQ 11

- RFAI: Adjust the fugitive gas emissions model to account for the percent of time with high solar radiation.

*Potential for methylation*

There remain a number of concerns about the degree to which mercury will impact the environment. I disagree that it is a "conservative assumption" to assume 100% of 1% of total mercury will methylate. Specifically

WAQ 21

- Data does not support an assumption that the area will not support sulfate reducing bacteria (SRBs). The conclusion from the assumption is that only 1% of the total mercury will methylate.

- The Arcadis 2014 study did not appear to collect representative soil samples; there is a lack of samples from high sulfate areas (which would be more likely to support SRBs). This leads to potentially underestimating methylation rates.

- There is no consideration for how methylation rates could reasonably change in the future, due to exposure to fresh mercury particulates which methylate more easily than legacy cinnabar, or inputs that could stimulate SRB populations (additional sulfate release from the water treatment plant, lowered creek flow that could create anoxic and low flow areas, increased permafrost thaw that could provide fresh dissolved organic carbon).

MIT 28

If indeed more total mercury methylates, the impact analysis is inaccurate and further mitigations, such as reducing sulfate release from the wastewater treatment plant, may need to be discussed.

I would suggest collection of additional data that would provide better information for assessing impacts.

- RFAI: Please ensure soil and sediment samples utilized to determine mercury methylation are proportionally representative of the landscape to ensure there has not been any sampling bias. Soil should be collected from sites that are mineralized and unmineralized, high in sulfate and low in sulfate, high in organic material and low in organic material in proportions representative of the landscape. Sediment should be collected proportionally from areas of high and low oxygen (anoxic low flow/pool areas and higher flow oxygenated riffles, anoxic mucky bottoms and oxygenated gravel/cobble bottoms), as well as areas that are mineralized and unmineralized, high and low in sulfate, and high and low in organic material.

WAQ 21

- RFAI: Perform laboratory tests with sediment, applying future wastewater effluent simulations under a range of temperatures and dissolved organic carbon concentrations. This will provide information on methylation potential. For example, mercury can be methylated by sulfate reducers, iron reducers, or methanogens all of which will be stimulated or repressed under different conditions.

- RFAI: Perform the same tests listed above with the simulated tailings that have been made for humidity cell and other tests. This will provide information on how dust consisting of tailings could act on the landscape.

RFAI: Determine the Hg(II) content of porewater in sediment. This can be done through sequential extraction or through a tin reduction method developed by USGS, Menlo Park. Brooks Rand Laboratories should be familiar with the process.

*Chuathbaluk Traditional Council*
#1 Teen Center Trail
Chuathbaluk, AK 99557
Ph. 907-467-4313
Fax 907-467-4113
Email chuathtradcouncil@gmail.com

Patty McGrath
Donlin Gold Permit Manager

Tuesday, May 31, 2016

Dear Ms. McGrath,

The Chuathbaluk Traditional Council has read and approved the attached comments. If you have any questions, feel free to contact us at (907) 467-4313.

/s/
Patricia Yaska
Chuathbaluk Traditional Council

# Chuathbaluk DEIS Comments

**Comments by chapter**

| | Commenter | Section Number | Page | Original Language | Proposed Language or Comment | Initial Disposition | Comment Addressed Adequately for Draft EIS? | Disposition | Additional Review Comments |
|---|---|---|---|---|---|---|---|---|---|
| MIT 16 | Chuathbaluk/ CSP2 | Executive Summary | ES-13 | Solid waste would be reused…..or permanently disposed of in a designated section of the WRF | Solid waste should be taken off site, not placed in the WRF | | | | |
| GRD 7 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.6 | Table ES-13, page ES-60 to ES-61 | Alternative 2: Change in groundwater use impact intensity would be low, long-term in duration, local in extent, and common to important in context.<br><br>Alternative 5A: Pumping water from the SRS may be required for 200 years for unlined option, 10 to 50 years for lined option. | The Alternative 2 impact should note that pumping water from the SRS will be required for approximately 50 years – equal to or longer than the period for the lined Alternative 5A option. | | | | |
| NEP 7 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 | Table ES-13, page ES-62 to ES-63 | **Summary impacts would be moderate to major.** | All the Alternatives, including Alternative 2, have a summary impact of “Minor” except for Alternative 5A. This is unwarranted. See lines below. | | | | |
| GRD 7 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 | Table ES-13, page ES-62 to ES-63 | Treating water from the SRS may be required for 200 years for unlined option, 10 to 50 years for lined option. | It shouldn't matter how much water there is to treat -- it all goes through the water treatment plant and discharges to meet Alaska water quality standards. If the lined option is chosen, treatment will be required for LESS time at the SRS than for a traditional TSF. | | | | |
| GRD 7 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 | Table ES-13, page ES-62 to ES-63 | Lined option would minimize (but not prevent) impacts to groundwater quality. | This would be no different than the impact of the lined TSF to groundwater. | | | | |
| WAQ 25 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 | Table ES-13, page ES-62 to ES-63 | Higher risk of SRS pump failure for unlined option. | This is the only actual increased risk over other options, and it only applies to the unlined option. | | | | |
| WAQ 9 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 | Table ES-13, page ES-62 to ES-63 | Pit lake stratification would occur at an approximately 40 percent shallower depth, and metals in pit surface water would likely be higher. | No matter which Alternative is chosen, the pycnocline is going to migrate upwards and eventually the pit lake will overturn, with "bad" water throughout the lake. This is what the models show. Whether the water treatment plant has to deal with the overturn a few years or a few decades sooner should be irrelevant; it will have to deal with it at some point | | | | |

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| WAQ 26 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 And Chapter 4 | Table ES-13, page ES-62 to ES-63 | Increase in dry stack fugitive dust atmospheric deposition would lower sedimentation quality (BMPs applied). | It is ridiculous to say that sediment will be affected by fugitive dust when air quality and soil will not be affected by fugitive dust. In fact, in the Air Quality discussion in the summary impact table, ***they admit that the increase in fugitive dust off the stack will be offset by the decrease in fugitive dust from not having a tailings beach*** (which Alternative 2 will have)<br><br>In Chapter 4, Cumulative Impacts, it attributes the "moderate to major" summary impact as due to the increased fugitive dust. However, the impact from dust at Alternative 5A is listed as the same impact as for Alternative 2 with regards to impacts to soil and air quality. Therefore the summary impact table should be "minor", as it is with all the other alternatives.<br><br>Chapter 4, page 4-36 Impact of Alt 5A on **Air Quality:**<br>"The cumulative effects on air quality from all other action alternatives would be similar to Alternative 2, and therefore would be considered minor."<br><br>Chapter 4, page 4-18 Impact of Alt 5A on **Soil Quality:**<br>"More notable soil disturbance deviations from Alternative 2 would occur during the closure and reclamation phase of the operating pond. However, since disturbed soil acreages under this alternative are comparable to the proposed action, the **same level effects on soil** are anticipated....<br>....Alternative 5A would have minor to moderate direct and indirect impacts on soil disturbance and erosion"<br><br>Chapter 4, page 4-24 Impact of Alt 5A on **Soil Quality:**<br>Alternative 5A could generate 6.6% more fugitive dust than Alternative 2, but incremental effects would be minor, for an overall rating of "minor to moderate" cumulative impact. | | | | |

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| | | | | | Chapter 4, page 4-29 Impact of Alt 2: Impacts to **Water and Sediment quality**….. Impacts to surface water and sediment quality resulting from atmospheric deposition of mercury would be both low and high intensity. High intensity impacts would be likely to occur at some locations within the Crooked Creek and Donlin Creek watersheds, where the inputs of mercury deposition to water are expected to be the greatest. Water quality is likely to be within regulatory limits on average, but could exceed baseline conditions and EPA chronic criteria in some areas.<br>Impacts to sediment……would be **within the range of natural variation.**<br><br>**Chapter 4, page 4-32 Impact of Alt 5A on Water and sediment quality** …… "Under both options of Alternative 5A (unlined and lined dry stack), effects on downstream surface water and sediment quality in closure would be the same as Alternative 2..." | | | | |
| WAQ 26 | Chuathbaluk/ CSP2 | Section 4.3.1.7.2 (Relevant to ES section) | 4-32 | increased potential for high intensity impacts to surface water and sediment quality resulting from atmospheric deposition and terrestrial runoff of fugitive dust from the dry stack tailings facility. Impacts from increased deposition of mercury to sediments and the potential for **increased rates of mercury methylation** would result **from the increased levels of fugitive dust** under Alternative 5A. | This is the root sentence that eventually leads to the decision to rate Alternative 5A impacts to water quality as "moderate to major" instead of "minor.<br><br>There appears to be a clear bias against Alternative 5A. Please see lines below. These items follow from the lines above comparing summary impacts of Alternative 2 and 5A | | | | |
| WAQ 26 | | | | | --Mercury methylation rates should be the same for Alternatives 2 and 5A -- there is no reason they would "increase" under 5A. | | | | |
| WAQ 26 | | | | | --It is difficult to see how mercury deposition under Alternative 2 would "be within natural variation" with a max 2.5% increase in sediment, but a possible 6% more dust from the dry stack would shift the impact into being "moderate to major". | | | | |
| WAQ 26 | | | | | -- Does the 6% increase in dust at the Dry Stack take into account the fact that it won't have a tailings beach producing dust and that the DSTF can be progressively covered during operations? That was mentioned in the Executive Summary table but I didn't see it anywhere in Chapter 4 | | | | |
| WAQ 26 | | | | | --It would be virtually impossible for Alternative 5A to have a higher impact on sediment than Alternative 2 when the impacts to soil are the same. | | | | |

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| WAQ 25 | Chuathbaluk/ CSP2 | Executive Summary, impact tables on Chapter 3.7 And Chapter 4 | Table ES-13, page ES-62 to ES-63 | **Summary impacts would be moderate to major.** | The summary impact of Alternative 5A on water quality should be minor.<br><br>There seems to be no environmental downside to the lined DSTF option. The SRS system would be closed down sooner, there is less impact to groundwater, and the pit lake fills up sooner.<br><br>In fact, it seems that the possibility of the pit lake filling faster is a key reason the DEIS shows a bias against Alternative 5A. "A faster pit lake filling rate could require changes in water management/ treatment strategies in post-closure (page 4-25)", and "the pit would fill faster under Alternative 5A, and would likely have greater metals concentrations in surface water (page 4-32)".<br><br>However, this could be more of a benefit than detractant. The sooner the pit lake fills, the sooner operators will know what adjustments need to be made to the WTP, if any – if this could be accomplished 10 years post closure rather than 50 years post closure. | | | | |

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| EDIT 3 | Chuathbaluk/ CSP2 | 1.1 | Figure 1.1-1 | Native Village of Chuathbaluk assisted by Center for Science and Public Participation | Native Village of Chuathbaluk assisted by Center for Science *in* Public Participation | | | | |
| NEP 3 | Chuathbaluk/ CSP2 | 1.1, 1.3.3 | 1-2, 1-9 | A range of alternatives including the No Action Alternative…. by which to accomplish the purpose and need of the proposed project may reasonably be accomplished…. | How can the "purpose and need" of the project be accomplished through a No Action Alternative, when the NEPA purpose is to produce gold and the need is for economic benefits? Does this make the "No Action Alternative" infeasible by definition and therefore not a viable alternative? | | | | |
| NEP 3 | Chuathbaluk/ CSP2 | 1.3.4.1.2 | 1-10 | The overall purpose of the Donlin Gold Project as defined by the Corps, is to produce gold … while maximizing economic benefits for Donlin Gold, Calista, and TKC. | I thought the Corps did not need to consider maximizing economic benefits? | | | | |
| WET 1 | Chuathbaluk/ CSP2 | 1.3.4.1.1 | 1-10 | In general, the production of gold from these ore reserves is determined by the Corps not to be a water dependent activity,<br>i.e., the project does not require siting within a "special aquatic site" (such as wetlands) to fulfill its basic purpose.<br>…. there are wetlands that overlie the ore body, which are considered under regulation to be "special aquatic sites." | If wetlands overlie the ore body, how could the project possibly move forward without being required to be sited on wetlands? | | | | |

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| LAND 10 | Chuathbaluk/ CSP2 | 1.3.4.2.2 | 1-10 | In addition to the agency-specific guidance regarding purpose and need, the BLM must also evaluate the proposed project for conformance with two land use plans. | Will the BLM Bering Sea/Western Interior resource management plan also need to be considered once it is finalized?<br><br>The Land Management section notes the Southwest Area Management Plan, but that is an outdated plan that is being revised and in part replaced by the BSWI | | | | |
| EDIT 3 | Chuathbaluk/ CSP2 | 1.4.9 | | CENTER FOR SCIENCE AND PUBLIC PARTICIPATION | Center for Science *in* Public Participation | | | | |

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| PAA 19 | Chuathbaluk/ CSP2 | 2.3.2.1.12 | 2-40 | TSF reclamation | There is no mention of the type of cover that Alternative 2 prefers. Will it be impermeable or permeable? Will there be an overdrain above the tails as well as the underdrain under the tails? These affect cost, draindown time, and pit lake water quality. | | | | |
| PAA 14 | Chuathbaluk/ CSP2 | 2.3.2.1.12 | 2-40 to 2-41 | WRF reclamation: ….placing a cover designed to minimize infiltration and support vegetation growth. The cover would consist of a 12-inch layer of colluvium or terrace gravel and a top layer of 14 inches of peat and loess. | Infiltration will be best minimized by placing an impermeable cover on the WRF. Without an impermeable cover, it seems it would be questionable whether the pit lake would ever have water quality good enough to allow the water treatment plant to be decommissioned. | | | | |
| PAA 31 | Chuathbaluk/ CSP2 | 2.3.2.1.12 | 2-41 | Building, Electrical power, mobile equipment reclamation | All of these mention the potential to bury material – mill, crusher, fuel, generators, and vehicles. It seems like all material should be offered for sale to communities or removed from the site. | | | | |
| CLA 30 | Chuathbaluk/ CSP2 | 2.3.6.1 | 2-159 | The main dam would have a maximum height of 367 feet and would contain the operating pond. | The DSTF option requires an operating pond. Will the downstream dam for the operating pond be built all at once, or in stages (the way the TSF dam in Alternative 2 would be built in stages). | | | | |

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| CLA 31 | Chuathbaluk/ CSP2 | 3.1.2.1.1 | Figure 3.1-1 | Upper Matanuska Valley label on map | The physiographic area on the figure labeled "Upper Matanuska Valley" is geographically what we refer to as the Susitna Valley, not the Matanuska Valley. Does USGS 2012 refer to it as the Upper Matanuska? | | | | |
| GEO 8 | Chuathbaluk/ CSP2 | 3.1.2.1.2 | 3.1-8 | Similar mineralization has been well documented throughout Southwest Alaska (Frost 1990; Frost and Box 1991; Gray et al. 1990; Gray and Sanzolone 1996; Zamzow 2012). | Please remove my reference from this sentence (and from Chapter 9, References if this is the only place the material was cited). The presentation that I gave re-iterated material from Marti Miller, 2008 publication and an AMEC 2012 Technical Report for Donlin Gold. It did not contain original material. | | | | |

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| HYD 1 | Chuathbaluk/ CSP2 | 3.5.3.6.1 | 3.5-142 | Years 1 to 5 – Closure of TSF facility, all TSF water pumped to the open pit, infiltration water collected in the overdrain system (above the LLPDE) would be pumped…. | Replace all "TSF" with "DSTF". Clarify that it is not "TSF water" that will be pumped to the pit, but rather the water in the operating pond in front of the tailings. | | | | |

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| WAQ 1 | Chuathbaluk/ CSP2 | 3.7.2.1.1 | 3.7-13, Table 3.7-2, Table 3.7-10 | Why was there no testing for uranium in surface water (DEIS Table 3.7-2)?<br>Why was there no analysis for uranium in groundwater (DEIS Table 3.7-10)? | Provide a reason for not including uranium in the suite of analytes.<br>If uranium is detected in water, it should be added to the list of fish tissue (whole body grind) analytes for slimy sculpin, in baseline and in monitoring during operations. | | | | |

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| WAQ 1 | Chuathbaluk/ CSP2 | | 3.7-32 | Due to higher concentrations of mercury and higher flow rates, the mercury load in Crooked Creek increases during spring flow and storm flow conditions relative to base flow<br>(Tetra Tech 2013). Higher stream discharge is usually associated with higher flow velocity, which entrains particulate material from the substrate (Tetra Tech 2013). Thus ***the data suggest*** that a substantial fraction of the total mercury load in the Crooked Creek watershed (measured as total mercury in the water) is associated with particles entrained from the substrate during high flow events. | It would be exceptionally easy to determine whether the higher mercury at freshet is due to particles/TSS. Analyze the total and dissolved concentrations of mercury, and the concentrations of TSS. I thought Donlin had agreed to measure dissolved and total mercury together in at least some locations? | | | | |
| WAQ 1 | Chuathbaluk/ CSP2 | 3.7.2.3.1 | 3.7-59 and 3.7-60 | sediment samples were collected and analyzed to establish baseline concentrations of metals in sediment from the Crooked Creek watershed | Sediment needs to be collected in areas where wind is expected to deposit dust, such as Bell Creek, and areas rich in fish such as Getmuna Creek. | | | | |
| WAQ 25 | Chuathbaluk/ CSP2 | | 3.7-157, 3.7-193 | As the TSF is drained, it would be reclaimed with an engineered cover overlain by a peat/mineral growth media mix. The engineered cover would promote runoff and reduce the potential for runoff or precipitation to contact the consolidated tailings.<br><br>And for the DSTF:<br>At mine site closure, an LLDPE geomembrane liner would be incorporated into a soil cover for each of the options described above. | BGC 2015d seems to suggest that the "engineered cover" for the TSF would be a permeable soil cover, but they assessed draindown time for the DSTF using an impermeable cover.<br><br>The DEIS should be clear on what type of cover is proposed – and if there is a difference in the cover proposed for the TSF and DSTF, explain why.<br><br>Both covers should include overdrains to promote drainage of infiltration *before* it reaches the tailings below.<br><br>Without an overdrain (for both either tailings option and for the WRF), infiltration could create poor quality discharge water. | | | | |
| WAQ 20 | Chuathbaluk/ CSP2 | | 3.7-158 | It is assumed that by approximately Year 52 post-closure, the flow would be essentially all infiltrated precipitation, and SRS water quality would be consistent with natural conditions and suitable for discharge (BGC 2014b). | This sentence in BGC 2014b provides no basis for the conclusion, but cites the 2012 Water Resources Management Plan. I presume this is the July 2012 WRMP that was part of the initial Donlin mining proposal.<br><br>When I reviewed the 2012 WRMP, I did not see any work that went in to determining how long it would take for water infiltrating the TSF to become clean enough to dismantle the SRS pumps.<br><br>For something as important as an "assumption" that water from the TSF will be "clean" within 10 years post closure – without details on the TSF cover – it is very important to provide the document the assumption is based on and the work that went into the determination. | | | | |

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| WAQ 25 | Chuathbaluk/ CSP2 | 3.7.3.6.1 | 3.7-192 | While detailed water quality modeling has not been conducted for Alternative 5A, it is anticipated that metals and TDS concentrations in dry stack porewater would be the same or higher than those of tailings porewater under Alternative 2 (BGC 2014a), likely due to less leaching and dilution by recirculated process water. | Detailed water quality modeling should be done using the methods described by SRK (April 15 2015: Revised process water pond predictions – draft) – using final tailings filtrate, determine how often water would be recycled and what ions would reach saturation state. The step of "determining pond water chemistry with tailings under sub-oxic conditions resulting from consumption of oxygen by DOC" due to "deep burial in tailings" could be eliminated.<br><br>Why should this be conducted? The assumption that DSTF operating pond water will look like TSF pore water does not seem entirely logical, given that pond water will not be in contact with tails. Specific comments are on individual lines below. | | | | |
| WAQ 25 | | | | | First, spill risk. The operating pond chemistry may be different and indicate different risk if the pond walls were to fail (compared to TSF "water only" spill). For example, if reducing conditions are less strong in the DSTF pond, less arsenic may be mobilized from iron. Also, there will be a greater volume of water than in the TSF pond – could this mean parameters would be more dilute? | | | | |
| WAQ 26 | | | | | Second – fugitive emissions. If there is less dissolved mercury, resulting in less mercury volatilizing off the pond during mine life. | | | | |
| WAQ 25 | | | | | Third – pit lake water quality. Without modeling operational pond water quality, it doesn't seem that the statement with regards to the pit lake that "surface water concentrations of metals would likely be higher than for Alternative 2" is a conclusion that can be made. (DEIS page 3.7-193) | | | | |
| WAQ 9 | | | | | Fourth – pit lake stratification. Stratification in the pit lake depends on sulfate salinity. Both the TSF and DSTF ponds will be pumped to the pit lake at the end of mine life and provide stratification. The extent to which initial stratification is different, and whether this is important decades later when waste rock seepage dominates the inputs, should be identified. | | | | |

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| MIT 19 | Chuathbaluk/ CSP2 | 3.7.3.5 | 3.7-189 | NAG rock would not be used to construct the BTC Road. Impacts to surface water quality could result from leaching of arsenic, selenium, antimony and possibly other constituents of concern from the material used for road construction. The potential for such impacts would be controlled by testing materials from borrow sites for metal leaching potential prior to use for construction.<br>Materials that could act as sources of contaminants of concern would not be used and alternative material sites would be identified. | What work has been done to determine the probability of having enough non-toxic material to build the BTC road?<br><br>If Alternative 4 is chosen and reconnaissance work shows there is not enough NAG material, what happens? Would material be shipped in, or would a different route need to be identified?<br><br>There are 40 streams that would need to be crossed – it is critical that contaminants not leach into them, particularly selenium, which can cause deformities in fish and birds. | | | | |
| HYD 4 | Chuathbaluk/ CSP2 | BGC 2015d, as cited in 3.7.3.6.2 | BGC 2015d p9 | The deterministic WBM is based on a synthetic precipitation dataset developed for the period 1940-2010. Within the dataset the synthetic average precipitation is represented by data from 1940-1970, as described in BGC (2014a) and BGC (2011a). | Why was the older precipitation data set (1940-1970) used to determine the average precipitation? Given rapid climate changes, would it not be better to use a more recent subset of the 1940-2010 dataset? What was the variability from 1940-2010, and was there a change in the trend line if data was assessed in 10 year increments? | | | | |
| WAQ 5 | Chuathbaluk/ CSP2 | 3.7.3.6.2 | 3.7-194 | The water would be treated to meet applicable standards prior to discharge to Crooked Creek using a High Density Sludge (HDS) Water Treatment Plant, as described in Section 3.7.3.2.1 (SGS 2012). | Is an HDS plant expected to be built? Would it just be for the construction period? SGS 2012 is not a reference in 3.7.3.2.1, and the section discusses an AWT, not an HDS | | | | |
| WAQ 25 | Chuathbaluk/ CSP2 | 3.7.3.6 | 3.7-197 | Thus, the main difference between Alternative 5A-Option 1, Alternative 5A-Option 2, and Alternative 2 with respect to surface water quality is the time it takes for the SRS water to clean<br>up to the point that it can be discharged to Anaconda Creek, that is, roughly 200 years under Option 1, and about 10 to 50 years under Option 2 and Alternative 2. | This section is confusing and does not provide a good picture of why the options have different draindown times.<br><br>This information seems to be based on a BGC document March 29, 2015 Dry Stack Tailings Alternative Seepage Assessment.<br><br>This assessment compares different dry stack scenarios with NO cover or with an impermeable LLDPE to determine a possible range. However, it does NOT compare what the seepage rates would be for a DSTF with an engineered soil cover (possibly 3’ of NAG rock with 1’ of gravel then 1’ of soil on top) and a DSTF with an impermeable LLDPE cover. | | | | |

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| INV 3 | Chuathbaluk/ CSP2 | 3.10.3.2.1 | 3.10-44 | "will develop…Invasive Species Management Plan" | Given the cluster of invasives at the Donlin airport and one road, it would seem that there has been no interest in controlling invasive plants at least to this point in time.<br><br>Why is there not a plan already in place? If there is one, it appears to be failing. | | | | |

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| INV 3 | Chuathbaluk/ CSP2 | Table 3.12-7, Section 3.12.3.2.2 and 3.10.3.2.1 | 3.12-29 to 33, 3.10-44 to -48 | Impacts from invasive species (plants, rats) will be temporary, local, and minor at the mine site and for transportation facilities; for the pipeline medium impact for plants and low for rats | There is no analysis to support the conclusion that impacts from invasive species – particularly aquatic invasives and rats – would be temporary or minor.<br><br>For prevention, monitoring and control, the text references the Invasive Species Management Plan in Chapter 3.10 (Vegetation). In that section, it says the ISMP "will be developed" and tosses out a bunch of ideas that could be included, but which are not required. There is virtually no mention of prevention for aquatic invasives or rats, other than inspecting docks.<br><br>Chapter 3.12 essentially bases their conclusion that rats will not become a problem on the fact that they have not been a problem to date. However, the Donlin camp will be bigger than most of the villages currently on the river and this project will triple the barge traffic, expand one port, and build an entirely new port. The mine and ports will have food and garbage that could be attractants not previously found in abundance – possibly even an increase despite garbage control measures that could be put in place.<br><br>Rats are known to devastate populations of ground dwelling birds. How have rats previously reached and spread in other areas? In areas where rats have impacted ground dwelling birds, what has been done to reduce their numbers or their impact?<br><br>There are problems with rats in Dutch Harbor. Why would rats not travel from Dutch to Bethel by barge? | | | | |

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| INV 3 | Chuathbaluk/ CSP2 | Table 3.12-7, Section 3.12.3.2.2 and 3.10.3.2.1 | 3.12-29 to 33, 3.10-44 to -48 | Impacts from invasive species (plants, rats) will be temporary, local, and minor at the mine site and for transportation facilities; for the pipeline medium impact for plants and low for rats | Float planes have brought the invasive aquatic plant Elodea to lakes throughout Alaska. Donlin will not be able to control the spread of Elodea or other invasives brought by float planes if people who work at the mine decide to fly back to the area to hunt or fish on off-days. | | | | |

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| FISH 11 | Chuathbaluk/ CSP2 | 3.13.2.2.1 | 3.13-36 | | No studies have been done on fish in the BTC road area, although it will apparently cross 40 streams – 8 of them wide enough to require bridges. It will also cross the Owhat, an important fishing river for people in the central Kuskokwim.<br><br>Studies HAVE been done on vegetation (3.10.2.4, Figure 3.10-4).<br><br>**Studies need to be done on fish in the streams along the BTC corridor in order to understand the potential impacts if Alternative 4 is chosen.** | | | | |
| IFHS 11 | Chuathbaluk/ CSP2 | 3.13.3.2.5 | 3.13-166 | Table 3.30 The terms low and high "K scenario" are not explained anywhere in this chapter, but they create a difference in impacts. | Explain in detail what high and low K factors are, and how they affect the uncertainty around potential impacts. | | | | |
| FISH 7 | Chu/ CSP2 | 3.13 | 3.13-173 | A single-season 12-mile ice road would be developed during construction from Crooked Creek<br>Village to the mine site vicinity along Crooked Creek valley as a temporary late-winter access to material borrow sites for road construction. | This sentence is under the description of Alternative 4. Is it in the right place? Would borrow material for the BTC road be accessed along Crooked Creek road? | | | | |

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| SER 13 | Chuathbaluk/ CSP2 | 3.18 | 3.18-39 | From DEIS: The agreement with TKC included initial plans for regional training, including a potential training facility in Aniak (Dischner 2014).<br><br>From Dischner citation: TKC will use some of the signing agreement payment for a training facility, but many of those details must still be worked out. The training program will try to target recent graduates of Kuskokwim-area schools, as well as older members of the workforce who may already have some training, and the generation that will eventually join the workforce. | Residents are balancing the potential positive benefits of jobs with a variety of potential negative impacts. To obtain good, career jobs, residents will need to have the appropriate skills and will need to enter a welcoming environment.<br><br>How much training has actually been put in place? The fact that a 2014 Journal of Commerce article is the citation for "training" makes it seem as if no effort has actually moved forward.<br><br>Has Donlin worked with the local college to develop classwork relevant to jobs that will open up, including those that could translate to other employers (electrical engineering, nursing etc)?<br><br>In the Yukon, mining companies (including those very early in the permitting process without developed assets) are working closely with the Yukon college campuses to ensure a local workforce will have the skills needed.<br><br>http://www.emr.gov.yk.ca/mining/pdf/from_the_trenches_vol5_spring_2013.pdf<br><br>https://www.yukoncollege.yk.ca/research/project/developing_protocols_and_capacity_for_northern_restoration_with_local_nativ<br><br>https://yukoncollege.yk.ca/research/post/restoring_mine_sites_with_local_native_plants | | | | |

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| SER 13 | Chuathbaluk/ CSP2 | 3.19 | 3.19-25 | Assistance to develop project related training programs for local residents to enhance local hire potential during construction, and operations and maintenance phases; | See comment for page 3.18-39 | | | | |

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| PHL 12 | Chuathbaluk/ CSP2 | 3.19 | 3.19-27 | Communication between Donlin Gold and subsistence users to ensure dissemination of factual information concerning actual ecological risks and potential exposure of waterfowl to contamination is important to address concerns and perceptions about contamination. This may include monitoring and testing of bird carcasses, if appropriate. | Communication without data is propaganda.<br><br>Waterfowl tissue testing should be integrated as part of normal wildlife monitoring, as should fish tissue testing. | | | | |
| PHL 11 | Chuathbaluk/ CSP2 | 3.19 | 3.19-27 | Mitigation | Additional mitigations for Environmental Justice: Require cultural sensitivity training for all workers coming in from out of the area. Local workers should feel respected at and outside the workplace.<br>Require training in what sexual harassment is, and institute a zero tolerance policy<br>Ensure health and psych counselors are available at local clinics, at a minimum in Aniak<br>Work with local communities to establish (funding, training) large scale gardening that could be sustained in villages after the mine is closed.<br>Set up courses in financial management and provide workers and their families with the time to take the course<br>Promote respect for cultural activities, such as language, arts, drumming | | | | |

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| SUB 17 | Chuathbaluk/ CSP2 | 3.21 | Table 3.21-12 | Per capita harvest on the Lower Kuskokwim | Why are no marine mammals listed? Marine mammals in Kuskokwim Bay are potentially at risk if there is a fuel spill. | | | | |
| SUB 17 | Chuathbaluk/ CSP2 | 3.21 | 3.21-128 | Based on the calculations and discussion of exposure in the ERA, no birds would be expected to be at risk from ingestion of water during the filling stage of the pit lake or from ingestion of surface water, sediment, or food from the mature pit lake. | This trivializes the actual findings, which concluded there is some – if low – risk to mallards (or similar waterfowl) due to aluminum and arsenic, and low risk due to arsenic and antimony for the American dipper. Both the 2013 Arcadis assessment and the 2015 ERM assessment categorized the risk as “low”, not as “no risk”.<br><br>More appropriately the wording should reflect what was in the ERM 2015 Ecological Risk Assessment report, with additions shown in bold:<br><br>“The potential risk to ~~wildlife~~ **waterfowl** from exposure to aluminum, **arsenic, and antimony** concentrations in the proposed pit lake is regarded as low **even if waterfowl spend all their time at the pit lake**.” | | | | |

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| SUB 17 | Chuathbaluk/ CSP2 | 3.21 | 3.21-128 | Based on the calculations and discussion of exposure in the ERA, no birds would be expected to be at risk from ingestion of water during the filling stage of the pit lake or from ingestion of surface water, sediment, or food from the mature pit lake. | The 1993 EPA "Wildlife Exposures Handbook", which was the basis of the risk assessment, says (p1-3): "**I**f estimated doses fall far below the toxicity values associated with adverse effects, especially from chronic exposures, further assessment may be unnecessary…..When a screening-level exposure assessment indicates that adverse effects are likely, additional confirmatory data may be needed in the decision-making process…..For wildlife, confirmatory data may be obtained from chemical analyses of tissue samples from potentially exposed wildlife or their prey and from observed incidence of disease, reproductive failure, or death in exposed wildlife."<br><br>The assessed risk was not "likely", but neither did it "fall far below the toxicity values", therefore mitigation should include monitoring at the mine site through collection of "confirmatory data" to determine the levels of arsenic, antimony, aluminum, selenium and copper, which were all determined to have some potential risk (above NOAEL hazard quotient, below LOAEL hazard quotient).<br><br>Although the ecological risk assessment made some conservative assumptions, there are also significant uncertainties associated with predicting into the future (as listed in Arcadis 2013 and in Lorax and SRK source documents), therefore monitoring wildlife health is warranted in order to determine whether additional measures need to be taken (during and post operations) to prevent wildlife exposure.<br><br>This would require baseline monitoring of wildlife (including birds) to determine contaminant levels prior to the mine opening and at some points during mining (which would capture potential effects from dust as well as water sources, particularly important if the Dry Stack Tailings option is chosen), as well as post closure when the pit lake becomes a potential source.<br><br>More appropriately the wording:<br><br>"The potential risk to wildlife, **including birds,** from exposure to aluminum, **arsenic, antimony**, **copper, and selenium** concentrations in the proposed pit lake is regarded as low **even if waterfowl spend all their time at the pit lake**. **Wildlife, including birds, identified to be at risk will be monitored before the mine opens, during mining, and post mining for these analytes."** | | | | |
| SUB 17 | Chuathbaluk/ CSP2 | 3.21 | 3.21-139 | As noted in Section 3.12.5.2.2, Wildlife, in the subsection addressing Birds, the standing waterbodies would have varying levels of contamination (inorganic constituents), with the TSF likely to have higher concentrations of antimony, arsenic, and selenium than the pit lake. | The TSF will also have higher cyanide. | | | | |

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| EDIT 5 | Chuathbaluk/ CSP2 | 3.22.2 | 3.22-5 | The majority of the information presented for the scoping and baseline assessment of health is drawn from the two sources listed below:<br>· NewFields 2015. Draft Health Impact Assessment, Baseline Community Health Data Assessment, Donlin Gold Project. Prepared for ADHSS Health Impact Assessment<br>Program. | This document does not appear to be available on the AECOM document site | | | | |
| PHL 5 | Chuathbaluk/ CSP2 | 3.22 | 3.22-39 | Increases in economic opportunities could result in an increase in the number of individuals in the potentially affected communities investing in their education, resulting in positive behavioral changes that could improve health. | Is there any evidence to support this? If not, remove. | | | | |
| PHL 7 | Chuathbaluk/ CSP2 | 3.22 | 3.22-39 | Benefits may be noticeable in terms of being able to afford increased and **faster access** to and utilization of healthcare | How would there be faster access to healthcare? | | | | |
| PHL 14 | Chuathbaluk/ CSP2 | 3.22.4.2.3 | 3.22-53 | Overall, the health concerns are related to how hazardous constituents would be stored, handled, and used at the mine site, how emissions and releases would be controlled and managed, and how accidental spills and releases related to the transportation and pipeline components would be minimized so that there are no unacceptable exposures to on-site workers or off-site communities. | The wording on this is awkward, and seems to suggest that there will be no unacceptable exposure, when in fact it says the health concerns were related to whether there would be unacceptable exposure. | | | | |
| PHL 16 | Chuathbaluk/ CSP2 | 3.22.3.4.4 | Figure 3.22-4 | Exposure route: dust and vapor inhalation | The model indicates that only wind-born gas and particulates contribute to the risk of exposure to mercury from inhalation. This is incorrect. There is also a risk of inhalation at the processing plant. No mitigation – such as mercury monitors at mercury emission collection sites – is discussed or proposed. This risk was mentioned in scoping (DEIS p 3.22-53) | | | | |
| PHL 11 | Chuathbaluk/ CSP2 | 3.22.4.2. 11 | 3.22-97 | Design features most important for reducing impacts to human health include:<br>· Donlin Gold would develop and implement a drug and alcohol abuse prevention<br>program for employees; | Donlin Gold should also implement a mandatory cultural awareness program and hire a mediator/ombudsman who can manage cultural harassment issues. | | | | |
| PHL 9 | Chuathbaluk/ CSP2 | 3.22.4.6 | 3.22-102 | For the mine site, the probability for exposure to potentially hazardous materials (HEC 3) would be reduced, but the summary impact rating would be medium, the same as Alternative 2. | Would there be a higher risk of respiratory problems for employees due to increased dust for Alternative 5A? | | | | |

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| DAM 9 | Chuathbaluk/ CSP2 | 3.24 | 3.24-61 | Based on historical Crooked Creek discharge measurements in closest proximity to the confluence with Anaconda Creek (upstream of Crevice Creek), long-term average daily discharges seasonally range from approximately 100 cfs to 250 cfs. A maximum average daily discharge of 880 cfs was recorded in late August of 2006. The 2-year and 5-year flood magnitude for the Crooked Creek water shed is 783 cfs, and 1,284 cfs, respectively. With the exception of brief peak flood events, total discharge under this release scenario would likely be well within the range of historical flow conditions. | From BGC 2015n (August 12, 2015 memo), they note that the average monthly flow at the confluence of Crooked Creek and Anaconda is 0.6 to 4.6 cfs, depending on the month. This is much different than the 100-250 cfs quoted in the DEIS.<br><br>The modeled flow of a water only or a tailings + water spill estimated flow rates of 600 cfs (again, restricted by pushing the material through a 33' diameter pipe).<br><br>A more thorough analysis of the impact of scour and sediment deposition, particularly impact on changing the geomorphology of Anaconda and Crooked Creeks, impacts to gravel and the streambed, and impacts to aquatic resources is required in a thoughtful, quantitative manner rather than the generally qualitative discussions provided in the DEIS.<br><br>Please see the Bristol Bay Watershed Assessment section 9.4 for an example of a thorough analysis of scour and deposition. This document also provides an example of a better way to inform the reader of potential impacts to several resources from a single possible event – together in one section rather than distributed out by "impact to soil, impact to surface water hydrology, impact to groundwater hydrology" etc – which makes it extremely difficult to follow the full impact of an event.<br><br>I continue to emphasize the need to develop a scenario with a larger, more realistic release of material – and a thorough analysis of the impact. | | | | |
| HYD 8 | Chuathbaluk/ CSP2 | 3.24.6.13.1 | 3.24-152 | (re a Water Release only scenario): The maximum flow rates of water would be approximately 4.0 percent of flow rates of the Kuskokwim River in the winter months (November to April), | Flow rates at Crooked Creek are closer to 1 cfs and a 600 cfs tailings water flow would be a much more significant impact on Anaconda Creek and Crooked Creek than has been discussed. No real analysis of stream bank incision and erosion/instability or scour of stream bed has been provided.<br><br>Provide an analysis of scour of stream beds and banks for the Anaconda and Crooked Creeks, including lasting damage such as changes in stream geomorphology or bank instability and changes in stream bed make up (% gravel, % cobble, etc). | | | | |

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| FISH 10 | Chuathbaluk/ CSP2 | 3.24.6.13.1 | 3.24-152 to 156 | | Discussion of impacts is qualitative. The discussion should tie directly back to baseline data on fish species and abundance in stream reaches (rather than "suggests few spawning redds", data on stream beds and banks (actual habitat used for spawning, rearing, and migration). | | | | |
| FISH 10 | Chuathbaluk/ CSP2 | 3.24.6.13.1 | 3.24-156 | Depending on the physical and chemical nature of water quality effects from such releases, the intensity of impacts to overall fish production in Crooked Creek could range from medium to high, **would be local**, and could persist over several years. | A water only release, and water from the tails + water scenario, would move out of the mine footprint area. This means the geographical extent is **regional**. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9 | Table 3.24-10 | Duration of spill | How does changing the duration of the spill release affect the environmental impact? How were the 5 hr (water and tailings) and >48 hour (water only) time periods chosen? | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9 | Figure 3.24-2 and 3.24-3 | Tailings and water spill | How is it that water from a 50% slurry would not continue to move down Crooked Creek even as tails settle at the confluence of Crooked and Anaconda? It does not make sense that the Inundation area (which would include water) would be exactly the same as the extent of the tailings deposition area.<br><br>Rather, it seems that there would be a flood wave that would travel with and ahead of the tails, and continue downstream along Crooked Creek after the tails settled at the confluence. Related questions and comments are on individual lines below. | | | | |
| DAM 5 | | | | | If there is no justification for ignoring the flood wave, then the speed of the wave and time/depth at Crooked Creek need to be provided | | | | |
| DAM 5 | | | | | The environmental impacts of a flood wave need to be modeled, including stream scour and associated impacts to aquatic life. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9 | | Piping erosion scenario | Please confirm that the piping erosion failure occurred at the toe of the dam, which would have the highest head (most force) compared to a piping failure at mid-elevation or near the top of the dam (BGC 2015n and EPA Region 10, 2014, BBWA Box 9-4). | | | | |
| DAM 4 | Chuathbaluk/ CSP2 | 3.24.5.9.1 | 3.24-49 | Should the release occur in the winter, the cone-shaped deposit of tailings could be excavated and transported back to the tailings facility, thereby limiting the impact…….. The tailings would be excavated and transported back to the TSF or other designated temporary storage area. | This is one of many aspects of a TSF dam failure that could be very different if the size of the tailings release is greater than the 0.5% modeled.<br><br>If something like 10 million m3 of tailings is released, instead of 2 million m3 there could be an issue of where to put the excavated tails. They might not all be able to be returned to the TSF and remain below the dam break. "Other designated temporary storage area" is vague.<br><br>A series of questions related to this comment are provided on separate lines below: | | | | |

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| DAM 4 | | | | | This continues to indicate the need to examine different sized TSF spills, perhaps at different stages of mine life (dam height/tailings volume). And the need to consider mitigation and remediation for a larger spill – what locations could be available to store the material? | | | | |
| | | | | | How long would it take to get enough liner material from warehouses to location and get it installed in order to place tailings on a lined pad? Could liners be welded in winter, if the spill occurred in winter and lined storage was needed to place excavated tails? | | | | |
| DAM 5 | | | | | If millions of cubic meters of material needed to be temporarily stored on a pad, would it be necessary to bring in non-reactive, non-leaching rock to create berms around the area, and would there be enough non-leaching waste rock to provide this, considering that rock would also need to be supplied to fix the dam breach and possibly also be placed on the dam slope to make it thicker (less steep slope). | | | | |
| DAM 4 | | | | | Should the release be greater than the 2 million m3 modeled, tailings would flow down Crooked Creek. This could require a road to be built to reach the material to excavate it. The road itself would create additional environmental impacts. | | | | |
| DAM 5 | | | | | Should the release be greater than 2 million m3, the duration of time during which tailings and/or water are released will be longer than the 5 hrs or 48 hrs modeled – how would this impact the environmental effects? | | | | |
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| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9.1 | 3.24-49 | Should the release occur in the winter, the cone-shaped deposit of tailings could be excavated and transported back to the tailings facility, thereby limiting the impact…….. The tailings would be excavated and transported back to the TSF or other designated temporary storage area. | There is no discussion of how a spill would be addressed in spring or summer. Some questions related to this comment are provided on separate lines below: | | | | |
| DAM 5 | | | | | What would be the impacts of disturbing Anaconda and Crooked Creek to remove tailings in spring or summer? | | | | |
| DAM 5 | | | | | Would stream beds be permanently damaged by excavation equipment? | | | | |
| DAM 5 | | | | | How would turbidity below excavation activity be reduced? | | | | |
| DAM 5 | | | | | Where would excavated material be placed? | | | | |
| DAM 4 | | | | | Where would excavated material be placed if 10 million m3 or 20 million m3 of material was released, instead of the 2 million m3 modeled? | | | | |
| DAM 5 | | | | | How long would it take for liners to be positioned on site and welded before tailings could be placed on a lined, temporary facility? | | | | |
| DAM 5 | | | | | If the temporary storage facility is not going to be lined, what are the expected impacts to surface water and groundwater as the uncovered material leaches? | | | | |

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| DAM 5 | | | | | Simply digging ditches around temporary storage areas may not be sufficient containment – would there be enough non-leaching rock to provide berms/ small dams? | | | | |
| DAM 5 | | | | | Would monitoring wells be placed hydrologically downgradient of temporary storage facilities? | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | Table 3.24-10 | 3.24-49 | 0.6 hrs for spill to reach confluence of Anaconda and Crooked Creeks (1.6 miles) | What is the assumed speed of a water and tailings slurry release? 1.6 miles/0.6 hrs appears to be 2.7 mph. Please provide a justification.<br><br>The spill in Stava Italy traveled at 37 mph, and this is the speed assumed in the EPA Region 10 Bristol Bay Watershed Assessment analysis of a potential dam failure. (BBWA, Chapter 9.1.1)<br><br>The original reference for the Stave spill was ICOLD 2001: ICOLD (International Commission on Large Dams). 2001. *Tailings Dams, Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences*. United Nations Environmental Programme, Bulletin 121. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | Table 3.24-10 | 3.24-49 | Water and tailings spill, time to reach Crooked Creek/Kusko confluence | Although the model indicates that tailings (if 2 million m3 released) would stop at the confluence of Anaconda and Crooked Creeks, water would continue to flow to the Kusko. Please provide the estimated time of arrival, the speed water would be traveling (in mph, not cfs) and justification for the estimated speed. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | Table 3.24-10 | 3.24-49 | 25 hours for water from a spill to move 13 miles to Crooked Creek | Please provide the assumed speed (as mph, not cfs) and the justification for it. If water actually moves at anything like 37 mph (ICOLD 2001), it would reach Crooked in less than half an hour.<br><br>ICOLD (International Commission on Large Dams). 2001. *Tailings Dams, Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences*. United Nations Environmental Programme, Bulletin 121. | | | | |
| DAM 3 | Chuathbaluk/ CSP2 | 3.24.5.9 | | Size of TSF spill scenario | In 2014, Fort Knox developed a dam breach scenario and inundation map to examine what they would need for emergency response and evacuation. They considered a "dam break scenario coincident with the probable maximum flood" as a worst case scenario to understand the potential for inundation. This should be done at Donlin. Although the "worst case scenario" is not required in the EIS, it is required by the state of Alaska. (Kinross. 2014. Walter Creek Valley Fill Heap Leach Pad operations and maintenance manual, revision 5. Last 2 pages) | | | | |

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| FISH 10 | Chuathbaluk/ CSP2 | 3.27.1 | 3.27-1 | Unavoidable impacts.<br>Water quality: Atmospheric deposition of mercury could create high intensity impacts to surface water quality depending on watershed location.<br><br>Fish: changes in habitat (including effects of wetland removal), direct habitat removal, stream flow and temperature changes, and sedimentation. | How is it possible to have high intensity impacts from mercury to surface water without impacting fish? There is no mention of mercury or chemical contamination as an unavoidable impact on fish. | | | | |
| INV 3 | Chuathbaluk/ CSP2 | 3.27.1 | 3.27-1 | Water quality | There is no mention of the unavoidable impacts of introduction of aquatic invasive plant and animal species – which will be extremely difficult to prevent | | | | |
| CUL 3 | Chuathbaluk/ CSP2 | 3.27.1 | 3.27-1 | Cultural resources -- changes to cultural landscape of INHT at a scale that would not reduce the scenic quality rating class, impact to sites not eligible for the NRHP, and loss of integrity or destruction of sites eligible for the NHRP. | This sentence makes no sense. What are the unavoidable impacts to cultural resources? State this plainly. | | | | |
| SUB 19 | Chuathbaluk/ CSP2 | 3.27.1 | 3.27-1 | Subsistence -- disturbance and displacement from subsistence use areas, potential for increased competition for resources, disturbance to subsistence fishing in narrow reaches of the Kuskokwim River, and potential or perceived contamination of waterfowl due to the tailings pond and pit lake. | …… ~~potential for~~ increased competition for resources, disturbance to subsistence fishing in narrow reaches of the Kuskokwim River, and potential or perceived contamination of waterfowl due to the tailings pond, **contact water ponds,** and pit lake. | | | | |
| HZM 2 | Chuathbaluk/ CSP2 | 3.27.1 | 3.27-1 | The probability of spills of a magnitude that could adversely affect resources is low. | The probability of spills of a magnitude that could adversely affect resources is low **but the impact of a spill that size would be high and potentially permanent, depending on the material spilled and location.** Resources that could be adversely affected by spills include vegetation, fish, wildlife, water resources, subsistence harvest and uses, recreation, cultural resources, and the economy. | | | | |
| SER 1 | Chuathbaluk/ CSP2 | 3.27.3 | 3.27-2 | Annual revenues and taxes resulting from the mining activity would cease upon the conclusion of project operations. The loss of these economic benefits could have long-term impacts to the local and regional economy if they are not replaced with other resource development revenues. | If a mine does not go in, the economy will remain unchanged, it will not be a loss relative to what is present today.<br><br>Resource development may not be the only option for revenue for local economies.<br><br>The development of additional lands to further resource development after the closure of the mine could have long term environmental, social and cultural impacts and would not guarantee economic benefits. | | | | |

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| CLA 33 | Chuathbaluk/ CSP2 | Appendix C | Table C-9 | Per MS-53 option: Air transport of mercury is limited to 77 pounds per shipment and 76 pound containers are commercially available for elemental mercury. Donlin Gold estimates the mine would remove approximately 22,000 pounds per year of mercury from the gaseous waste streams. At 76 pounds per shipment, it would require 290 individual containers (packages) to transport this amount of mercury. This number of air shipments is not practical. | I called the National Hazmat Information Center (202-366-0386) and spoke with Eamon. You can reach them from 9-5 Eastern Time. They said there are federal regulations on the quantity of mercury PER PACKAGE to 35 kg, but that there is NO limit to the number of packages per airplane. The only limits would be those placed by the specific air carrier, not by federal regulations.<br><br>The only other difference in shipping by air or "other" (vessel, rail, highway) is in the packaging requirements. Air requires the most robust packaging (49 CFR Section 173.164 Paragraph A), called "Packing Group 1". Transporting by "other means" requires less robust packing, Packing Group 3 (49 CFR Section 173.164 Paragraph D)<br><br>The PHMSA Hazardous Materials Table, which outlines the quantity limits is at http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=d84ddf479bd7d110VgnVCM1000009ed07898RCRD&vgnextchannel=4f347fd9b896b110VgnVCM1000009ed07898RCRD | | | | |
| WAQ 12 | Chuathbaluk/ CSP2 | Appendix C | Table C-10 | MS-71. Secondary dam, downstream of TSF as a means of capturing spilled material……..Eliminated because it would create a larger footprint and greater environmental impact, and collect more precipitation. | Viewing Figure 2.3-1, it appears that there could be room to place a secondary dam in the Anaconda Valley below the main TSF if the overburden stockpile was moved. If such a facility were built to hold something the size of the modeled 2 million m3 tailings release (argued to be improbable by Donlin and too small by some agencies), a 100' dam less than 950' on each side would be sufficient.<br><br>It could be designed with a spillway and other methods to allow captured water to be released. Such an area could also serve as another way to diversify water management and as emergency storage for TSF pond water if needed.<br><br>What is not clear from the Figure 2.3-1 is whether the topography would be amenable to building a secondary dam.<br><br>It could be worthwhile to cost out this option and then keep or eliminate it after reviewing the cost.<br><br>Although the TSF dam is to be built with a good design, there is always the potential for human error in the future, or the need for cost cutting measures that would result in later dam lifts being less robust than planned. A secondary dam would provide some measure of environmental security against future cost cutting measures. | | | | |

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| | Chuathbaluk/ CSP2 | Appendix H | Table H-5 | Pore water quality for NAG and PAG portions of WRF during operations | The source for this table is SRK 2007, presumably based on HCT data. This table should reflect updated HCT information from 2011 (SRK 2011 ML and ARD update report Feb 2011) or 2015 (DEIS Appendix S notes that data is available from SRK as recently as a February 2015 report) | | | | |
| WAQ 12 | Chuathbaluk/ CSP2 | Appendix H | Table H-5 | | The DEIS Appendix H (Geochemistry) uses the SRK 2007 data to describe the WRF drainage (Table H-5 Operations) rather than the updated 2012 or 2015 data. This may mis-represent WRF seepage water quality during operations. | | | | |
| WAQ 12 | Chuathbaluk/ CSP2 | Appendix H | Table H-11 | Reference for the table is Lorax 2015 Table 2-1 | In Lorax 2015, table 2-1 references source documents SRK Feb 4 2015, SRK April 2015 and Hatch May 2015. Please make SRK Feb 4 2015 report of HCT data available. | | | | |
| WAQ 12 | Chuathbaluk/ CSP2 | Appendix H | Table H-11 | Reference for the table is Lorax 2015 Table 2-1 | With regards to pit lake water quality (Appendix H, Table H-11), the citation for the table is Lorax 2015 but it is not clear whether the information is derived from HCTs (a February 4 2015 SRK document cited in Lorax 2015 but not found in the DEIS references) or from field barrel tests (SRK 2015c). The Lorax 2015 Table 2-1 and DEIS Table H-11 are the same table and both say NAG and PAG seepage are from humidity cell tests (HCT), but the reference is a field barrel report.<br><br>If field barrel tests were used to develop the table, we do not know how those results compare to HCTs; if the updated HCT data was used, we don't know if they are the same columns that were continued into 2015, as no data after 2013 is provided.<br><br>**Clarify whether humidity cell tests or field barrel tests were used as input terms for waste rock seepage to the pit lake, and provide the reason** why. | | | | |

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| WAQ 11 | Chuathbaluk/ CSP2 | Appendix H | | | The source terms for "major inflows" to the pit lake were the 75$^{th}$ percentile of well mixed NAG in year 2036 and 75$^{th}$ percentile of poorly mixed PAG in year 2050. It is not clear what this represents. If the mine starts in year 2020 and goes for 27 years before closure, 2036 is actually during operations and 2050 is just a few years into starting to fill the lake – TSF will only be 2-3 years into an estimated 52 years of draindown. If we assume year 2024 (PAG) or 2027 (NAG) is meant to represent Year 0 of filling the pit, therefore 2036 would be 9 years in and 2050 would be 26 years in.<br><br>The water quality summaries for Year 0 ("initial pit lake"), Year 2- 52 ("filling"), Year 53 ("full"), and Year 99 are provided in Arcadis 2013 but not in the Lorax 2015 or ERM 2015 documents. This is a better way to represent water quality.<br>**Provide pit lake source terms in a clear manner based on "pit lake year"** | | | | |

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| CWA 1 | Chuathbaluk/ CSP2 | Appendix J | 4 | Looking ahead to 2016, Donlin Gold will reduce the study area of the 2014 PJD to the proposed project described in the final permit application, and update the wetlands data within this study area to reflect the 2007 ARS. Additional field work will be required to complete this task, which will result in the submission of an updated PJD towards the 4th quarter of 2016. Subsequently, Donlin Gold **will update the permit application to a final permit application.** | How can environmental impacts be described or adequately commented on without the final information? The public must be provided with an opportunity to comment on wetland delineation methods, wetland impacts and mitigation. **The DEIS may be incomplete without the full 404 analysis.** | | | | |
| CWA 1 | Chuathbaluk/ CSP2 | Appendix J | 6 | Tables 22.1A, 22.1B "expected material site impacts for FSA and PSA" **will be updated with final permit application.** | How can environmental impacts be described or adequately commented on without the final information? The public must be provided with an opportunity to comment on wetland delineation methods, wetland impacts and mitigation. | | | | |
| CWA 1 | Chuathbaluk/ CSP2 | Appendix J | 7 | Tables 22.3, 22.5, 22.6 "are no longer accurate…..revised summary tables **will be developed following revision of the Functional Assessment"** | How can environmental impacts be described or adequately commented on without the final information? The public must be provided with an opportunity to comment on wetland delineation methods, wetland impacts and mitigation. **The DEIS may be incomplete without the full 404 analysis.** | | | | |

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| MIT 7 | Chuathbaluk/ CSP2 | Appendix M | Ii | A final compensatory Mitigation Plan will be developed as the 404 evaluation and permitting process progresses. | How can environmental impacts be described or adequately commented on without the final information? The public must be provided with an opportunity to comment on wetland wetland impacts and mitigation. **The DEIS may be incomplete without the final Mitigation Plan.** | | | | |

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| WILD 5 | Chuathbaluk/ CSP2 | Appendix S – Memo "Addendum to ERA…" | 1 | This scenario is referred as Advanced Water Treatment (AWT). As a consequence of the AWT, the surface water quality predictions were revised (Lorax 2015). The updated surface water quality predictions for year 99 shows that two additional constituents, aluminum and copper, are predicted to occur in concentrations above ecological water quality criteria. | The 6 page memo is not sufficient for us to determine whether the ERA was conducted in an adequate manner, and the Lorax 2015 paper upon which the pit lake water quality was based is unavailable. We are unable to see how the analysis in 2015 differed from the 2012 analysis of ecological risk. | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | Appendix S | 2013 ERA Ex Sum, no page number | Predicted concentrations of mercury were less than this screening level and were therefore not evaluated further for purposes of this ERA. A more detailed, comprehensive evaluation of mercury effects associated with the proposed project, however**, is being completed separately.** | Is this "comprehensive evaluation" included in the DEIS or in other public documents? The public needs access to the detailed evaluation to ensure all sources (tailings pond draindown, tailings pore water draindown, pit wall sloughing, waste rock leachate, etc) are included in the model, and that an appropriate timeline(s) has (have) been selected.<br><br>There are different timelines of interest in pit lake evolution. 1) During or just after tailings facility draindown when TSF water may make up a significant part of the water quality 2) After pit lake has reached its maximum height but before pit lake overturn and 3) Since the pit lake water is expected to worsen as the pycnocline gets shallower, ecological risk assessments should be conducted after a pit lake overturn. | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | Appendix S | Table 4-3 | Reference for antimony TRV is actually a study on lead, and also does not use ducks as the receptor: Damron, B.L. and H.R. Wilson. 1975. Lead toxicity of Bobwhite Quail. Bulletin of Environmental Contamination and Toxicology 14:489-496/ | Recommend using a study on effects of antimony on waterfowl | | | | |
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**Topic specific comments**

**Ecological risk from dust deposition – 3.12 (wildlife), 3.2 (soils), 3.10 (vegetation).**

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| VEG 4 | Chuathbaluk/ CSP2 | 3.10.3.2.1<br><br>And<br><br>3.2.3.2.4 | 3.10-50<br><br>And Table 3.2-13 | Impacts of dust on vegetation (related to Section 3.2 Impacts of dust accumulation on soil) | Arsenic is toxic to plants and can cause seeds, leaves, and roots to die. (Eisler 2004. Arsenic hazards to humans, plants, and animals from gold mining. Rev Env Contam Toxicol 180: 133-165)<br><br>Although the amount of arsenic in the upper layer of soil is only expected to increase about 5% during mine life, how will potential impacts to vegetation be monitored and assessed? Will there be monitoring of changes in plant communities? | | | | |
| WILD 3 | Chuathbaluk/ CSP2 | 3.12.2.2 | Table 3.12-4 | The selected LOECs are the lowest of LOECs protective of plants, soil, invertebrates, birds, and mammals. | Not enough information is provided here, and the link in the citation (LANL 2014) in the References chapter does not work.<br><br>The table suggests that flora and fauna in the region are not sensitive to arsenic and mercury – given that baseline soil is already much higher than LOEC. However, the baseline is provided as a mean and without regard to how soil chemistry changes at different parts of the mine site.<br><br>The timing of high concentrations is likely more important than the mean. | | | | |

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| WILD 3 | Chuathbaluk/ CSP2 | 3.12.2.2<br><br>And<br>3.2.3.2.4 | Table 3.12-4<br><br>And Figure 3.2-12 | Mean concentrations in baseline soil also are compared to LOECs. | Although the mean is predicted to only increase incrementally, some areas may experience significant changes while others experience very few or no change.<br><br>The mean is less important than the change in specific areas. A map of baseline soil arsenic and the expected increase in soil arsenic – similar to Figure 3.2-12 for mercury – should be provided in the soils chapter and referred to in section 3.12.2.2.<br><br>We should be provided with information on the range and mean of arsenic and antimony in soils of specific areas, and then the expected increase due to dust in those areas. An addition of 10 mg/kg of arsenic in dust in an area that has 170 mg/kg in soil already may not have much effect, but if applied to an area that is only 10 mg/kg baseline, it could push soil from safe to phytotoxic (Eisler 2000. Arsenic. In Handbook of Chemical Risk Assessment, vol 3 pp 1501-1566). | | | | |

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| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.2 , 3.12.3.2.2, and Appendix S | Table 3.12-4, App S Table 4-3 | Choice of receptors for pit lake – and potential toxicity due to dust | Several mammals were chosen as potential receptors to examine ecological risk of the pit lake (including water and sediment) – but none were potential analogs for moose or caribou. As moose and caribou are unlikely to spend time at the pit lake, this is reasonable.<br><br>However, they could be exposed to arsenic and antimony in dust. Tables in Eisler 2004 suggest animals like horse and cow (analogs for moose/ caribou?) may be more sensitive to arsenic than dogs (analog for wolf?). (Eisler 2004. Arsenic hazards to humans, plants, and animals from gold mining. Rev Env Contam Toxicol 180: 133-165). This brings into question **whether the best receptors were chosen to look at ecological risk** (App S Table 4-3).<br><br>The chapter on wildlife (Section 3.12.3.2.2) states there is no risk to wildlife from dust, referencing section 3.12.2.2. However, while Appendix S (Arcadis 2013) specifically lays out what receptors they chose, the LOAEL and NOAEL for those receptors with references, and a clear method – none of this is provided for the potential risk of dust (Table 3.12-4, section 3.12.2.2).<br><br>**The risk of ecological toxicity from arsenic and antimony in dust needs to be clearly provided, including receptors, toxicity values with references, and method.** Basing a conclusion that there is no ecological risk because the average soil concentrations over the entire area will increase minimally is not sufficient. Particularly when the baseline soil is provided as 169 mg/kg (As) and 11 mg/kg (Sb) (Table 3.12-4)– much higher than the baselines provided when assessing pit lake ecotoxicology risk. | | | | |
| WILD 3 | Chuathbaluk/ CSP2 | 3.12.2.2 and Appendix S | Table 3.12-4, App S Table 4-3 | Greater than NOAEL-HQ of 1 for arsenic and antimony for voles and mallards | Given the potential risk to wildlife and birds, a program to monitor hair and feathers – where arsenic can concentrate – should be a required part of mitigation.<br><br>There appears to be little to no data on arsenic toxicity to moose/caribou, therefore they should be included in hair monitoring. | | | | |

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| WILD 5 | Chuathbaluk/ CSP2 | Appendix S and Chapter 3.2.34.2.4 | Appendix S Table 5-3 and Chapter 3.2 Table 3.2-13 | Arsenic in soil (baseline) = 10.35 mg/kg<br><br>Arsenic in soil (baseline) = mean of 78.8 mg/kg and 95% UCL of 169 mg/kg | When evaluating the ecological risk of the pit lake (sediment/littoral zone) to wildlife, a soil concentration of 10.35 mg/kg was used for arsenic, 1.09 for antimony. (Appendix S table 5.-3, no page number)<br><br>When the potential for dust to impact wildlife was considered, much higher levels (79 to 169 mg/kg as means for arsenic, 5 to 11 mg/kg as means for antimony) were given as the baseline – which led to the conclusion that the increase in arsenic and antimony in soil, from dust settling, would be a small increase (<1% to 5%) and therefore not an ecological risk.<br><br>The baseline concentrations of arsenic and antimony in soil need to be reconciled, and these two areas of potential risk – from fugitive dust and from sediment in the pit lake – need to be reconsidered. | | | | |

WILD 5

**Pit lake ecotoxicology – risk to birds.** DEIS Section 3.12.2.1.1., Appendix S (=Arcadis 2013 ERA) [did they accurately evaluate the chemical ecotox risks? Are birds at more risk than shown in DEIS? I could not independently confirm the NOAEL, LOAEL, or "time to chronic or acute exposure". After going through Wildlife Tox and EPA docs, it looks as if they correctly assessed that the pit lake (if looking at individual trace element harm based on lab studies) will not be toxic. Also, the

What was not done – did not look at tox of CN at TSF pond (relevant to an early closure scenario); did not look at overturned (well mixed) pit lake – which WILL occur (find the section of Appendix H where this is stated)

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| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-6 | The ARCADIS ERA (2013b) focused only on the risk of exposure from the pit lake after closure. An addendum prepared in August 2015 assessed the potential risk of exposure to mine-related water sources (Tailings Storage Facility [TSF], Contact Water Dam [CWD] Ponds) available during operations ERM 2015). | The ERM 2015 document, only 6 pages long, focuses on the pit lake under an AWT scenario– not on the TSF pond or CWD pond during operations. From the ERM 2015 introduction: "The purpose of this memorandum is to provide an addendum to the 2013 ERA with an<br><br>analysis of the potential risk to wildlife from exposure to aluminum and copper constituents in the proposed pit lake at year 99."<br><br>All references to ERM 2015 as a document that assesses risks to birds from the TSF pond and contact water ponds need to be removed.<br><br>**There is no assessment of the elevated cyanide in the tailings pond.**<br><br>**There is no discussion of potential impacts at the TSF or CWD if there is temporary closure.** | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-10 | The mallard is not at risk in the TSF | The "streamlined ERA" has no background report. It states that the formula used for the pit lake was applied to the TSF pond (for mallards) for Al, Sb, As, Cu, and Se.<br><br>The upper layers of the pit lake are expected to have worse water than the TSF pond, with the exception of sulfate and cyanide. We do not know what the concentration of CN will be at the pit lake. We do know the expected concentrations at the TSF pond.<br><br>**The TSF pond risk for toxicity due to cyanide needs to be assessed. Particularly in the context of risks if there is a temporary closure.** | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-10 | The mallard is not at risk in the TSF | If there is a temporary closure, could mallards, voles, and other wildlife be at risk from the tailings beach? Could a littoral zone or vegetation develop near the beach and pond water as an attractant? Would ingestion of beach sediment be a risk? | | | | |

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| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-10 | The mallard is not at risk in the TSF | If there is a temporary closure, could mallards, voles, and other wildlife be at risk from the tailings beach? Would ingestion of beach sediment be a risk? | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-5 to 3.12-13 | Data gap in the Wildlife "Attraction to mine site open areas" section: The pit lake water accumulation was defined in two stages after closure: filling stage (Year 2-52) and mature stage, after the lake was filled to capacity (Year 53 and beyond). | Source document Lorax 2015 notes "However, because the pit lake is predicted to be stratified, the poorest quality waters remain largely isolated from surface waters. "<br><br>However, the pit lake **will turn over** (DEIS Appendix H) bringing the worst quality water to the surface. There is no assessment of the risks of the pit lake under an overturn scenario.<br><br>**An ecological risk assessment should be done for a turnover state**. The DEIS pit lake ecotox risk section should include a discussion of the conditions that could cause the pit lake to remain mixed or re-stratify and the range of length of time poor water could be at the surface. | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-5 to 3.12-13 | Data gap in the Wildlife "Attraction to mine site open areas" section | There is no assessment of the risks of the pit lake under any scenario (operating, pit filling, mature pit, pit lake 100 years post closure) if the Dry Stack Tailings scenario is chosen. | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-5 to 3.12-13 | Data gap in the Wildlife "Attraction to mine site open areas" section | There is no assessment of the risks of the pit lake if the WRF is poorly mixed, which would result in significantly worse water quality.<br><br>How will mixing be monitored to determine whether waste rock is well mixed? If it is poorly mixed in the first 2-5 years of mine life, how long would it take for the decline in water quality to show up in monitoring wells or the contact water ponds? How would that be mitigated to reduce the ecological risks due to pit lake water quality becoming worse than predicted? | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1 | 3.12-5 to 3.12-13 | Data gap in the Wildlife "Attraction to mine site open areas" section | If poor mixing occurred only in the last 2-5 years of mine life, would the decline in water quality show up before mine closure? How would it be mitigated, if poor mixing occurred only in the later years of mine life, to reduce the ecological risks of the pit lake? | | | | |

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| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1.1 | 3.12-8 | Several conservative exposure assumptions were used including: use of maximum estimated COPC concentrations in surface water and sediment; 100 percent bioavailability of metals in the ingested water, sediment, and food; and that wildlife are exposed exclusively, year-round (i.e.,100 percent of the time), to water in the pit lake. | The pit lake water quality geochem models by Lorax included source terms for snow/ice on the surface of the pit lake. This would make the pit lake inaccessible to wildlife for virtually all of the months that migratory birds would be out of the area.<br><br>Explain how the ecological risk assessment assumed wildlife presence 100% of the year when the pit lake model assumed the lake was covered for several months out of the year?<br><br>Did the model only look at snow/ice as an input of freshwater – and not as a barrier to exposure? | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1.3 | 3.12-11 | Estimated concentrations of metals (milligrams per liter [mg/L], dissolved) in the TSF used in the risk calculations were taken from Table H-6 for the Lower CWD Pond and H-7 for the Upper CWD Pond (See Appendix H). | The Lower CWD water quality is very much influenced by how well waste rock is mixed. Table H-6 shows potentially very different water quality at different years based on different mixing. Table H-7 also varies.<br><br>Specifically which concentrations of Al, Sb, As, Cu, and Se were used? | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1.3 | 3.12-10 to -11 | HQs for the CWD ponds were estimated for the five metals (aluminum, antimony, arsenic, copper, and selenium) that were identified as COPCs in the first ERA | The first ERA (Arcadis 2013) only looked at COPCs for the pit lake; it did not identify ones for the CWD.<br><br>The lower CWD is also expected to exceed AWQC for Cd, Pb, Mn, Mo, Zn, and Hg. If we assume that the authors of the "streamlined ERA" used the 50$^{th}$ or 95$^{th}$ percentiles of the "Water Treatment Design basis" (Appendix H, Table H-6), mercury is expected to be significantly higher in the Lower CWD than in the pit lake (130-150 ng/L vs 35 ng/L in pit lake) | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | 3.12.2.1.3 | 3.12-10 to -11 | Method for assessing risk at Lower Contact Water pond | Presumably this method uses the 50$^{th}$ or 95$^{th}$ percentile of the "water treatment design basis". While determining the 50$^{th}$ and 95$^{th}$ percentiles would be appropriate for designing a water treatment plant, an ecological risk assessment should provide a range of risks that would include poorly mixed PAG (Table H-6 Appendix H), which has significantly worse water quality.<br><br>The Lower Contact Water pond could represent a significant ecological risk if there is a temporary closure; with low activity on site, the pond could be a greater attractant. | | | | |

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| WILD 5 | Chuathbaluk/ CSP2 | 3.12.5.2 | 3.12-145 | Based on the calculations and discussion of exposure in the ERA, no birds would be expected to<br><br>be at risk from ingestion of water during the filling stage of the pit lake or from ingestion of surface water, sediment, or food from the mature pit lake. | This is not accurate | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | Appendix S | Table 1 | BAF: sediment to aquatic invertebrate or sediment to aquatic plant | Why is there no BAF listed for water to bird or insect to bird? | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | Appendix S | 15 | Non-nutritive chemicals were compared to State of Alaska aquatic life chronic criteria for freshwater organisms (ADEC 2008c)…… Sources of screening levels were consulted in the following order: 1) USEPA chronic criteria for freshwater aquatic life, | The pit lake will have around 3,800 mg/L of sulfate as it is initially filling. This makes it essentially saltwater. Water quality criteria for marine life should be used instead of freshwater for the pit filling stage. This is particularly important for arsenic, which is toxic at much lower levels in saltwater than in fresh. Water may be less toxic for other contaminants at this stage. The "marine" conditions will also likely apply during pit lake turnover. | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | Appendix S | 22 | This included screening the toxicity databases for studies that assessed chronic exposure of physiologically similar species and measured endpoints consistent with the objectives and goals of this ERA, which are to protect reproduction, growth and development in wildlife. | Why was cancer not used as a toxicological endpoint? | | | | |
| WILD 5 | Chuathbaluk/ CSP2 | Appendix S | 23, 25 | Acute studies were excluded from the database since these studies do not assess long-term effects on animals……Acute studies were not<br><br>considered appropriate for TRV derivation. | If contaminant concentrations are in the range that could cause acute toxicity, this should be included in the analysis. Why were they not included? | | | | |

**Tailings facility risks.** Our goal in providing comments on this topic are to ensure that the wet slurry (Alternative 2) and dry stack (Alternative 5) options are evenly compared, and that the environmental and social risks of a tailings facility failure are adequately described. In these comments, we do not advocate for a specific alternative.

DAM 4

A meeting, without cooperating agencies, was held in January 2015 to discuss "Failure Mode Effects Analysis" (FMEA, different ways a tailings facility could fail). At this meeting, 49 different failure scenarios were listed, and 13 that were "Possible" or "unlikely" (but not "very unlikely") and had consequences that were "Moderate", "Major", or "Critical" were moved forward for analysis. Two of these scenarios were provided in the DEIS. In general, it was a thoughtful process, however we believe some issues were ignored or underplayed including – the risk for dam failure due to slope instability (listed in the FMEA but not pursued for risk analysis), no analysis of an actual breach in the dam, no analysis of a "flood wave" preceding tailings, the choice of a very small volume of tailings released, and the speed with which tailings and water traveled. The analysis of the impacts on fish and aquatic life are descriptive but qualitative. There is no discussion that pulls in the data on streambed composition or riverbank vegetation to discuss how that is likely to change (specifically, eg xx% gravel suitable for spawning will be buried under tailings or fines are expected to move xx miles downstream if tailings spill occurs in the summer, based on xx cfs flows, accompanied by maps of fish habitat and spawning areas).

A key aspect of the TSF spill scenarios is the arbitrarily chosen size of the spill. This size results in tailings reaching, but not moving more than ½ mile up/downstream of, Crooked Creek at the confluence with Anaconda Creek. If a larger spill were modeled, many impacts not discussed would be relevant: incision of the Crooked Creek channel and resulting bank instability and stream geomorphology changes, impacts of fines in spawning gravel, physical barriers to other tributaries (e.g. Bell, Getmuna, Crevice, etc), and more. We feel this is important enough that the FEIS must include an analysis of a larger spill.

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| | Chuathbaluk/ CSP2 | | | Tailings facility risks | | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 2.3.2.1.8 and 3.24.3.5.2 | 2-30 and 3.24-31 | [TSF dam size]<br><br>Constructed in phases, the height of the tailings dam at completion would be 464 feet.<br><br>Downstream tailings dams like that proposed for this project are less likely to fail compared to centerline or upstream designs (Chambers and Higman 2011). Based on International<br><br>Commission on Large Dams (ICOLD) statistical data for dam failure, HydroCoop (2013) noted<br><br>that far fewer failures have occurred worldwide for rockfill dams as compared to earthfill dams.<br><br>In a benchmarking study of B.C. tailings dam failure frequency, IEEIRP (2015) noted that there<br><br>were no failures of rockfill dams out of 525 dam-years of active operation for U.S. water dams. | The highest part of the TSF dam is proposed to be 464' high, making it one of the highest TSF dams in the world. How many tailings dams, in particular rock-filled tailings dams, are currently this high?<br><br>**The dam design should be vetted by an independent tailings dam review board, which should continue to track the progress of the dam lifts constructions through the life of the mine.**<br><br>BGC, which is designing the Donlin dam, had this statement in a review of the Casino project in the Yukon:<br>"Conventional design procedures and assumptions based on empirical knowledge cannot be<br><br>relied upon with the same degree of confidence as is normally used in smaller dams that are<br><br>within the state of the practice." (BGC Engineering. 2014. Report to Little Salmon Carmacks First Nation on Casino Project, Geotechnical and Hydrological Review of Tailing Management Facility and Heap Leach Facility Design, 36p) | | | | |

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| DAM 5 | Chuathbaluk/ CSP2 | 2.3.6.1 | 2-161` | There is no precedent in current mining operations for using the dry stack tailings method at this production rate. | I would like to note that there is ALSO little to no precedent for a 464' high rock filled tailings dam.<br><br>Although both may be unprecedented, there seems to be a rosy assumption that the dam will be fine and alternatively that the DSTF is an "unprecedented risk".<br><br>There should be a better write up that notes that no matter which tailings facility is chosen, TSF or DSTF, it will have unprecedented components that introduce risk. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9, FMEA source documents | | TSF dam failure scenarios chosen for analysis | In the April 2015 FMEA Tailings spill meeting, Scenario 48 "Degradation of rockfill leads to slope failure of the dam face" was categorized as "Very Unlikely" with major consequences and moderate risk. What justification is there for the "Very Unlikely" categorization of likelihood? Slope instability is the highest causes of failures (EPA Region 10, 2014, Bristol Bay Watershed Assessment, Chapter 9, Table 9-1).<br><br>How could a slope failure have different impacts or remediation compared with the two scenarios provided in the DSEIS?<br><br>What mitigation is provided to ensure slope failure does not occur? | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9, FMEA source documents | | TSF dam failure scenarios chosen for analysis | "overtopping" is listed as the second biggest cause of tailings facility failures (EPA Region 10, 2014, Bristol Bay Watershed Assessment, Chapter 9, Table 9-1), and the FMEA considered several overtopping scenarios, but did not move them forward to analysis in the DEIS. Was it assumed that the results (environmental and social impacts) would be the same as the "water only" release scenario that was provided in the DEIS? | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | 3.24.5.9, BGC 2015n | | Tailings dam failure model | In the reference BGC 2015n, the document explains that the model used was the FLO-2D FEMA 2D hydrologic model "developed for muddy flows over complex terrain." The Bristol Bay Watershed Assessment used the Army Corps of Engineers HEC-RAS (hydrologic engineering center's river analysis system) to model a possible spill at the proposed Pebble mine. What are the advantages and disadvantages of FLO-2D compared to HEC-RAS? | | | | |

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| DAM 1 | Chuathbaluk/ CSP2 | BGC 2011 relevant to 2.3.2.1.8 and 3.7.3.6.1 | 3.7-192 | Ice rich soils will be excavated so that the dam foundation will be on bedrock.<br><br>And<br><br>The dry stack tailings would be placed on existing overburden material following removal of ice-rich or saturated overburden. | Provide details of storage of frozen material unsuitable for use in construction. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | BGC 2015 relevant to 3.24.5.9 | | Source information for the Tailings spill analysis includes BGC June 12 2015, 20 page memo from BGC to Donlin Gold (RFAI 62), in which an assumption was made that the "progression of the partial breach from a piping failure was omitted". | Why was this omitted, and how would it impact the volume spilled and environmental impacts if a breach occurred?<br><br>It should be noted that "slope instability", which would cause a breach, is one of the biggest reasons for tailings dam failures. | | | | |
| DAM 5 | Chuathbaluk/ CSP2 | BGC 2015 relevant to 3.24.5.9 | | Source information for the Tailings spill analysis includes BGC June 12 2015, 20 page memo from BGC to Donlin Gold (RFAI 62), in which an assumption was made that "rock fill material in the underdrain is eroded at the exit of the underdrain due to high hydraulic pressure" | How would erosion in this part of the dam affect dam slope stability? | | | | |
| DAM 4 | Chuathbaluk/ CSP2 | BGC 2015 relevant to 3.24.5.9 | Choice of volume of tailings spill | Source information for the Tailings spill analysis includes BGC 2015n (Aug 12 2015 memo), which notes that: "The maximum pipe size (33' diameter) was estimated based on the released volume requested by AECOM…" (memo section 5.1)<br><br>And<br><br>"A volume of 1,620 acre-ft of tailings and process-affected water released in the spill scenarios requested by AECOM was chosen by the participants of the early stage FMEA. There is no<br><br>technical basis for this volume, rather it was considered as representative of a significant release consistent with that described in the FMEA." (memo section 1) | The pipe diameter is the critical component controlling rate of water and tailings + water release and apparently also controls the volume released.<br><br>There was no discussion in the memo or in the FMEA that justified the choice of volume and pipe diameter, and there are several references that suggest a release of 20% of tailings is a more realistic failure volume.<br><br>Convince me that scenario authors did not choose a size of tailings that would only reach just to Crooked Creek and "walk it back" to see what size of spill that would be.<br><br>Authors need to include a 20% tailings spill release analysis, or provide much better justification for the current 2 million m3 volume (0.5% of the end of mine life volume of 412 million m3 tails) | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SOL 9 | Chuathbaluk/ CSP2 | 3.24.6.2.1 | 3.24-58 | would cause significant<br><br>impacts to undisturbed soils located downstream of the TSF dam toe, | The analysis of the impact of a spill on soils does not expand much more than this statement.<br><br>Authors need to provide much greater detail.<br><br>Will Anaconda and/or Crooked Creek experience deep incision and subsequent bank instability? Will their geomorphology change?<br><br>What is the make up of the stream beds (% silt, % sand, % gravel, % cobble) and how will that be changed after a spill? Will the original stream bed be flushed out and replaced with tails? Will interstitial gravel be clogged with fines? Assuming tails are removed as best as possible, what will the final stream bed make up look like?<br><br>The State of Alaska requires that accumulation of fines be "less than 5% above natural background, with a maximum of 30% in waters used by fish for spawning" (ADEC 2011. Water Quality Standards. Report 18–AAC–70.) There is no discussion of this, and in particular whether the entire stream bottom would need to be removed and replaced to prevent a substantial amount of tailings fines to remain. | | | | |

Chugach
ALASKA CORPORATION

April 13, 2016

Mr. Keith Gordon
U.S. Army Corps of Engineers
Regulatory Division CEPOA-RD
P.O. Box 6898
JBER, Alaska 99506-0898

Dear Mr. Gordon,

Chugach Alaska Corporation (Chugach) is an Alaska Native Regional Corporation established pursuant to the Alaska Native Claims Settlement Act (ANCSA) of 1971, as amended, 43 U.S.C. § 1601, *et seq*. As an Alaska Native Corporation we understand the unique challenges associated with development of ANCSA lands, which must be done responsibly in order to maintain cultural values and protect subsistence rights, while also providing economic benefits to the people of the region.

I am writing to express our support for Alternative 2 in the Draft EIS for the Donlin Gold Mine Project. The Donlin Gold project will provide hundreds of good paying jobs and other economic benefits for the people of the Calista region, where opportunities are significantly limited. In addition, the infrastructure development from the project will lower the costs of essential goods and services, which is greatly needed in a region that is one of the most expensive in the state to live.

SER 18

Calista holds the mineral rights for the Donlin gold property, and TKC holds the surface estate. These land selections were made during ANCSA specifically so that shareholders could benefit from development of a mine within their region. Donlin Gold has been working proactively with the shareholders and has diligently advanced the project in an environmentally responsible manner to ensure the safety and sustainability of the region.

We appreciate the opportunity to submit these comments of support for the Donlin Gold project.

Sincerely,

Gabriel Kompkoff
Chief Executive Officer

Chugach
ALASKA CORPORATION

3800 Centerpoint Drive, Suite 1200
Anchorage, AK 99503

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ZIP 99503
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Mr. Keith Gordon
US Army Corps of Engineers CEPOA-RD
P.O. Box 6898
JBER, Alaska 99506-0898

99506\0898

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica |
| **Subject:** | FW: [EXTERNAL] City of Bethel Request for Extension |
| **Date:** | Tuesday, March 08, 2016 1:39:55 PM |
| **Attachments:** | Res. 16-05 Review Extention For Donlin EIS.pdf |

---

Bill Craig
Environmental Department Manager
D 1-907-261-6703 C 1-907-441-7207
bill.m.craig@aecom.com

AECOM
700 G Street, Anchorage, Alaska 99501
T 1-907-562-3366 F 1-907-562-1297
www.aecom.com

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Tuesday, March 08, 2016 1:33 PM
To: Craig, Bill
Subject: FW: [EXTERNAL] City of Bethel Request for Extension

-----Original Message-----
From: Lori Strickler [mailto:lstrickler@cityofbethel.net]
Sent: Friday, February 19, 2016 3:44 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Cc: Ann Capela <acapela@cityofbethel.net>
Subject: [EXTERNAL] City of Bethel Request for Extension

Hello Keith,

Please find the attached Resolution approved by the Bethel City Council requesting additional time for review of the Donlin Gold EIS.

If you have questions regarding this request, please let me know.

Thank you,

--

Lori Strickler
City Clerk
City of Bethel
lstrickler@cityofbethel.net <mailto:lstrickler@cityofbethel.net>
907-543-1384
fax: 907-543-3817

Introduced by: Council Member Fansler
Date: February 9, 2016
Action: Passed
Vote: 6-1

# *CITY OF BETHEL, ALASKA*

## Resolution # 16-05

### A RESOLUTION FORMALLY REQUESTING AT LEAST A SIX (6) MONTH EXTENSION OF THE OFFICIAL COMMENT PERIOD FOR THE ARMY CORPS OF ENGINEER'S ENVIRONMENTAL IMPACT STUDY ON THE DONLIN GOLD PROJECT

**WHEREAS**, Donlin Gold LLC has applied for permits to develop an open pit, hardrock mine about 10 miles north of the community of Crooked Creek, in southwest Alaska;

**WHEREAS**, Donlin Gold's proposed mine is located approximately 277 miles west of Anchorage and 145 miles northeast of Bethel;

**WHEREAS**, in addition to the mine site, the project has two other major components: transportation infrastructure and pipeline infrastructure;

**WHEREAS**, the transportation infrastructure includes barges that will dock in the City of Bethel and transportation barges will utilize the waterways of the Kuskokwim River for transportation of supplies, equipment and materials for the project that will impact the citizens of Bethel;

**WHEREAS**, the construction of and planned lifetime of the mine lasts for the next 30 plus years;

**WHEREAS**, monitoring of the tailings and the area around the mine will be required for perpetuity;

**WHEREAS**, the project will undoubtedly affect the citizens of Bethel and the surrounding villages and areas along the Kuskokwim river for decades and possibly centuries to come;

**WHEREAS**, the Army Corps of Engineers Environmental Impact Study (EIS) was released on November 27, 2015;

**WHEREAS**, the EIS itself totals over 5,300 pages;

Introduced by: Council Member Fansler
Date: February 9, 2016
Action: Passed
Vote: 6-1

**WHEREAS,** in addition to the sheer volume of the EIS, the report itself includes numerous technical and engineering terms that require additional research and investigation by the average reader;

**WHEREAS,** currently the comment period for the EIS is essentially five months and is slated to end on April 30, 2016;

**WHEREAS,** the magnitude of the proposed project and its impacts on subsistence activities, the environment, economic development, job creation and other such concerns make it extremely important that the comment period be open for as long as necessary to allow a thorough understanding and thoughtful comment time period that is not rushed;

**WHEREAS,** it is essential that all citizens, tribal entities, governmental bodies, and agencies have an adequate amount of time to read, review, digest and form thoughtful comments regarding the EIS report on this project.

NEP 1

**NOW, THEREFORE, BE IT RESOLVED,** the Bethel City Council does hereby formally request an extension of at least six (6) months and at least one more public comment meeting in Bethel, with for the public to offer comment on the Army Corps of Engineers' Donlin Gold Environmental Impact Study.

**ENACTED THIS 9 DAY OF FEBRUARY, BY A VOTE OF 6 IN FAVOR AND 1 OPPOSED**

Richard Robb, Mayor

ATTEST:

Lori Strickler, City Clerk

**From:** Bellion, Tara
**To:** Evans, Jessica
**Subject:** FW: [EXTERNAL] say it aint" so
**Date:** Thursday, May 26, 2016 5:01:15 PM

---

We will use as comment per Keith (second email to follow)

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Thursday, May 26, 2016 4:40 PM
To: Isaacs, Jon; Bellion, Tara
Cc: Newman, Sheila M POA; Brewer, Jason D POA
Subject: FW: [EXTERNAL] say it aint' so

Jon,

Per A. Capela's request the Cities comments in this and the other letters I will forward are comments on the DEIS. As those other emails may discuss a broader range of comments I will leave it to Ann to clarify/refine any comments in those emails. AECOM may also seek clarification via Shelia or Jason but that clarification (as you know) must be documented in writing (Ann's email clarification would be sufficient documentation).

-----Original Message-----
From: Ann Capela [mailto:acapela@cityofbethel.net]
Sent: Monday, May 23, 2016 8:52 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] say it aint' so

Keith

I heard today that you were leaving the Corps.

Just from the times we discussed the issues of Donlin Gold project - you were such an asset to the Corps and the local communities.

I hope your replacement has a solid grasp on these YK area communities and villages.

PHL 14

But before you go, can you confirm that the City of Bethel concerns regarding Emergency Management Plan of managing Donlin Gold mine transportation and storage facilities, while outsources to Lynden Transportation, is and should be evaluated as part of this DRAFT EIS?
That the emergency preparedness of this project is not limited to the end of the public comment period but will be considered as an integral agency dialogue.

I met with Donlin Gold and their parent Barrick Gold last month and brought the same issues regarding the Emergency Management of the transportation route and they passed it on to "it is outsourced" and is not part of this EIS.

The second argument Donlin Gold stated that "Lynden Cargo" and the company they lease the property for the Bethel dock facility is not their facility and not related to Donlin Gold project.

I say it is given the old "but for" Donlin Gold project - Knik yard in Bethel would not be planning a massive expansion.

MIT 27

While Donlin Gold states that the Coast Guard is in charge of the inland waters - and Lynden Cargo works with the Coast Guard all the time - to me - this does not negate the need for a emergency response plan as part of this EIS process. I have not seen any specific plans on how many men that are trained to spill response of cyanide , mercury and high explosives in the Bethel dock area (which you

MIT 27

visited) will be 24/7/365 in Bethel.

Neither Donlin Gold or Lynden Cargo or Knik properties have any plans on securing fencing for the facility, road for Bethel emergency crews to get there, etc.

Keith, the City of Bethel has no plausible way of responding to any emergency of spills of these highly dangerous toxic chemicals on the ground or in the water. The high explosives and the storage of these worry me a great deal.

I made the Donlin Gold executive aware that the City of Bethel does not have water pressure in the proposed dock yard or for vessels travelling on the river. The City has no piped water system.

I informed the Donlin Gold executives that the City is currently planning a main pipe water and sewer along the State Highway in Bethel and advised them to build a water and sewer line off of the main line to create the necessary water pressure and sewer for discharge of the vessels.

My concerns were not taken seriously by Donlin Gold representatives.

I don't see this as a priority for Donlin Gold unless the company is compelled to do so by the permitting agency.

I would request that at least my emails previously to this and this one be considered as a response to the EIS for Donlin Gold Mine proposed project.

When Donlin Gold and Barrick Gold President and CEO were here in Bethel - I asked the top executives (including their PR representative) if they wanted to be hauled in front of a Congressional inquiry of major spills or disasters of explosives and be asked "what did you know and when did you know about these dangers?" - no one wanted this type of scenario - but I don't see Donlin Gold or Barrick Gold doing anything out of the "goodness of their corporate heart" given corporations don't have hearts and spend large amounts of money that need to be justified to their investors because they corporation is compelled by law to do so.

FSR 5

The City of Bethel draws its potable water from the same area as the Kuskokwim River basin.
I do not know how far the water table in this region spreads.

Donlin Gold and Barrick Gold executives stated to me that the company would have trained men stationed in Bethel to deal with any spills in the River or on land. They would also provide training to Bethel Emergency response team. That to me was very vague "promise" with no real teeth to this.

Since this EIS is the first line of "defense" for residents of Bethel - I, as the official "incident commander" need to make the authorizing agency to be aware of the shortcomings in the Donlin Gold Mine DRAFT EIS Plan regarding their emergency management response plan to spills in the river and on land and for the remediation of the river and the land contained within the City of Bethel City Limits.

MIT 27

As the City Manager and the Incident Commander of Emergency Preparedness as mandated by US Homeland Security administered by the State of Alaska - I am requesting that the Donlin Gold mine proposal be required to submit and gain approval of the local City government that is responsible for the safety of the local residents (over 6,000 people that live in Bethel) with no way out of the area except by a airplane if a catastrophic explosion or spill takes place in and around city of Bethel. Moreover, that the local governments, Village governments, along the Kuskokwim River do not have the governance capacity to deal with scale of such emergencies and that the "project" in question is compelled to prepare an Emergency Preparedness Plan with partnership of the City of Bethel.

Thank you for a wonderful job you did while at the CORPS.

Ann

Ann K. Capela, City Manager
P.O. Box 1388
Bethel, AK 99559
(907) 545-0143

| | |
|---|---|
| **From:** | Bellion, Tara |
| **To:** | Evans, Jessica |
| **Subject:** | FW: [EXTERNAL] Donlin Gold Mine Draft EIS |
| **Date:** | Thursday, May 26, 2016 5:01:37 PM |

---

Second email as comment per Keith.

-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Thursday, May 26, 2016 4:50 PM
To: Isaacs, Jon; Bellion, Tara; Ann Capela
Cc: Newman, Sheila M POA; Brewer, Jason D POA
Subject: FW: [EXTERNAL] Donlin Gold Mine Draft EIS

Ann,

As you requested I am forwarding the below email to AECOM as a Donlin DEIS comment.

If there is any clarification re the comments below you want considered on the ADonlin DEIS please send them to Jon via Jason Brewer.

Thanks

-----Original Message-----
From: Gordon, Keith POA
Sent: Monday, March 14, 2016 10:22 AM
To: 'Ann Capela' <acapela@cityofbethel.net>
Subject: RE: [EXTERNAL] Donlin Gold Mine Draft EIS

Ann,

907-753-2777

-----Original Message-----
From: Ann Capela [mailto:acapela@cityofbethel.net]
Sent: Friday, March 11, 2016 9:30 AM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>; Bill Howell <bhowell@cityofbethel.net>; Andre Achee <aachee@cityofbethel.net>; Peter Williams <pwilliams@cityofbethel.net>; Ted Meyer <tmeyer@cityofbethel.net>
Subject: Re: [EXTERNAL] Donlin Gold Mine Draft EIS

of course...March 14th is great.

We will keep the time flexible in case of delays.

Ann

Ann K. Capela, City Manager
P.O. Box 1388
Bethel, AK 99559
(907) 545-0143

On Fri, Mar 11, 2016 at 9:25 AM, Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil> > wrote:

Ann,

Our travel office was not able to get me onto either of the early flights Monday into Bethel nor the Sunday night flight as they are all sold out.

Therefore, I will be arriving at 1130.

Can you re-schedule the meeting to start at 11:45?

Thanks

-----Original Message-----
From: Ann Capella [mailto:acapela@cityofbethel.net <mailto:acapela@cityofbethel.net> ]
Sent: Monday, February 29, 2016 7:08 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil> >
Cc: Winn, Ryan H POA <Ryan.H.Winn@usace.army.mil <mailto:Ryan.H.Winn@usace.army.mil> >; Bill Howell <bhowell@cityofbethel.net <mailto:bhowell@cityofbethel.net> >; Andre Achee <aachee@cityofbethel.net <mailto:aachee@cityofbethel.net> >; Peter <pwilliams@cityofbethel.net <mailto:pwilliams@cityofbethel.net> >; Ted Meyer <tmeyer@cityofbethel.net <mailto:tmeyer@cityofbethel.net> >
Subject: Re: [EXTERNAL] Donlin Gold Mine Draft EIS

Please save the date for 14th of March 11;00 am

Fire dept training room if available

Sent from my iPhone

> On Feb 29, 2016, at 5:10 PM, Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil> > wrote:
>
> Ann,
>
> Mr. Ryan Winn, North Section Chief, is the PM for the Bethel Yard Dock application.
>
> Please send us both an Outlook meeting invite for the meeting and a call-in # so Ryan can call into the meeting.
>
> Thanks
>
> -----Original Message-----
> From: Gordon, Keith POA
> Sent: Monday, February 29, 2016 1:04 PM
> To: 'Ann Capela' <acapela@cityofbethel.net <mailto:acapela@cityofbethel.net> >
> Subject: RE: [EXTERNAL] Donlin Gold Mine Draft EIS
>
> Ann,
>
> I will be in Bethel early AM March 14th.
>
> Please let me know what time you would like to meet.
>
> I have a 3PM meeting with the USFWS. Otherwise the day is open.
>
> Thanks
>
> -----Original Message-----
> From: Ann Capela [mailto:acapela@cityofbethel.net <mailto:acapela@cityofbethel.net> ]
> Sent: Tuesday, February 16, 2016 8:55 PM
> To: Denver, Claude (MVA) <claude.denver@alaska.gov <mailto:claude.denver@alaska.gov> >; Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil <mailto:Keith.Q.Gordon@usace.army.mil> >

> Cc: Bill Howell <bhowell@cityofbethel.net <mailto:bhowell@cityofbethel.net> >; Andre Achee <aachee@cityofbethel.net <mailto:aachee@cityofbethel.net> >; Peter Williams <pwilliams@cityofbethel.net <mailto:pwilliams@cityofbethel.net> >; Ted Meyer <tmeyer@cityofbethel.net <mailto:tmeyer@cityofbethel.net> >; Brian_Hughes@energy.senate.gov <mailto:Brian_Hughes@energy.senate.gov>
> Subject: [EXTERNAL] Donlin Gold Mine Draft EIS
>

FSR 5

> Claude,
>
> I realize it has been a while since we spoke.
>
> I provided your name as a contact to US Army Corps of Eng. Keith Gordon, project manager, for Donlin Gold EIS regarding Bethel concerns for Emergency Management.
>
> This can be expanded to the total Donlin Gold Mine project regarding Emergency Management along the natural gas pipeline, the gold mine site and for Bethel the travel route and storage of cyanide, mercury and explosives.
>
> The plan currently calls for transporting by a sea barge to Bethel and unloading the sea barge and loading or storage of the material - in Bethel - and then placing it on two smaller river barges and transporting the explosives up to Crooked Creek and then unloading it and storing it on site.
>
> I do realize that mining operations are done all over the world and while I do not expect an "ISIS" attack but accidents happen all the time and it is the local government that has to provide the first responder services.
>
> As first responder for fire, acts of violence, spills and other mishaps the City of Bethel will need to be prepared to deal with chemicals, security, access and explosives.
>
> Lynden Cargo has secured a dock yard in Bethel for storage of fuel, and storage of various chemicals and other "stuff" in Bethel.
>
> It is the City of Bethel's Emergency Management team that Homeland Security should have an opportunity as an inter-agency commentator for the DRAFT EIS for the Donlin Gold mine project.
>
> I leave some of the higher level analysis to professionals as you - but at the end when emergencies occur (remember the Valdez), local government as well as small remote villages will not be able to respond to such emergencies.
>
> While the US Coastguard regulates the safety of transport for navigable waters - the nearest Coastguard to Bethel, AK s in Kodiak, AK - days away from Bethel.
>
> When an accident in the proposed Bethel port takes place like the Kilbuck School fire, I will be calling you for help!
>
> Ann
>
>
>
> Ann K. Capela, City Manager
> P.O. Box 1388
> Bethel, AK 99559
> (907) 545-0143 <tel:%28907%29%20545-0143>

| | |
|---|---|
| **From:** | Ann Capela |
| **To:** | Gordon, Keith POA; Newman, Sheila M POA; Brewer, Jason D POA |
| **Cc:** | Council@cityofbethel.net; Andre Achee; Bill Howell; Peter Williams; Ted Meyer; Muzaffar Lakhani; Hansel Mathlaw |
| **Subject:** | [EXTERNAL] Donlin Gold Mine Project Comments |
| **Date:** | Monday, May 30, 2016 9:51:27 PM |
| **Attachments:** | DonlinGoldMineEISCommentsSubmissionAKC05.30.2016.pdf |

Keith

Attached are official comments on the Proposed EIS for Donlin Gold Mine Project.

This is in substitution to any previous comments that were previously made.

Please note that the attached comments were reviewed and approved by Bethel City Council

These comments are not in support or opposition of this project.

Ann

Ann K. Capela, City Manager
P.O. Box 1388
Bethel, AK 99559
(907) 545-0143

# CITY OF BETHEL

P.O. Box 1388 ● Bethel, Alaska 99559-1388
Phone (907) 543-2087 ● Fax (907) 543-4171
www.cityofbethel.org


May 26, 2016

U.S. Army Corps of Engineers
Keith Gordon, Project Manager
Regulatory Division
P.O. Box 6898
JEBER, AK 99506-0898

Email: Keith.Q.Gordon@usace.army.mil
Phone: (907) 753-5674

**RE: Public Comment for Donlin Gold Project EIS**

Mr. Gordon, while this letter does not cite specific section of the EIS, this letter does address the overriding concerns for the City of Bethel that the "Donlin Gold Project" EIS does not include

NEP 9 consultation or input from the Department of Homeland Security. DHS oversees and administers emergency management services and thus should have been identified by the lead agency, US Army Corps of Engineers, as one of the essential agencies to be consulted. Moreover, this EIS lacks any input

MIT 27 from the State of Alaska or any local emergency service management providers on how the "project" would address catastrophic events which will affect residents along the water transportation routes and land based routes. Specifically, in the City of Bethel where Donlin Gold has partnered with Lynden Cargo Transport and Knik properties for the transport and storage of cyanide, mercury and high caliber explosives.

By this letter, the City of Bethel does not indicate support or opposition for this project, however as the City Manager and the City's designated Civil Defense Incident Commander with full support of Bethel City Council; I have the following comments and observations on the Donlin Gold Mine project:

**Sec. I**

HZM 4 **The premise of "de-coupling" the transportation and storage of cyanide, mercury and high explosives**

While it is the position of Donlin Gold Project that the Bethel operation has been subcontracted to a separate operator, the US Army Corps of Engineers should apply the standard of measurement that

HZM 4

"but for the Donlin Gold Projects" Lynden Cargo Transportation and Knik properties would not operate a massive storage yard in City of Bethel and barge highly toxic chemicals and explosives on the Kuskokwim River.

(a) Transportation and storage of toxic chemicals necessary for the operation of this project must be part of the EIS.

NEP 9 (b) Department of Homeland Security should be an official federal/state agency to comment on any and all emergency management plans for the safety or evacuation of residents along the Kuskokwim River and the entire "Project's" natural gas pipeline route.

**Sec. II**

MIT 27 **The security of the proposed dock and storage yards in Bethel should be a required component of this project**

Proposed Bethel storage yard adjacent to the Bethel dockyard does not include any security measures for the safety of Bethel residents or the safety of the employees at the storage yard. This project needs to include basic security fencing around the perimeter of the proposed storage yard and an emergency access route to the dock and the storage yard. This EIS is not specify if the chemical shipments of cyanide, mercury and high explosives will be off-loaded from the sea barge directly to the river barges or will this material be off-loaded from the sea barge to the dock and stored in the yard and then loaded on to the smaller river vessels.

For this reason alone, the proposed project must obtain mandatory comments from Homeland Security and the Local Emergency Planning Committee/City of Bethel Emergency Incident Commander. The City of Bethel first responder teams for safety, security and medical treatment of injuries to human beings and wildlife must be provided with the resources and training to handle any environmental spills, and injuries from cyanide, mercury and high explosives.

(a) Safety and emergency response plan at the Bethel storage and dock yard must be included as approved by Department of Homeland Security and City of Bethel first responder agencies.

(b) Donlin Gold Project must provide the necessary resources including but not limited to financial security bonds for the development of emergency response plan at the Bethel dock and storage yard.

(c) This emergency response plan must address the location and security of the proposed storage and the dock yard, that currently plans to store high explosives within several hundred yards of the largest regional fuel storage containers.

(d) Storage of these high explosives next to the storage of fuel tanks is a disaster awaiting the residents of Bethel.

**Sec. III**

**Piped water is not currently available for fire suppression for the dock yard or the storage yard located next to the fuel tanks**

City of Bethel does not have sufficient water and sewer infrastructure to provide the necessary water pressure for fire suppression, waste water and toxic solid waste disposal. The issue of water pressure availability for fire suppression is significant for the protection of life and property in the proposed Bethel dock and storage yard.

City of Bethel has trucked water. The ability to draw water from the river, in the event of a chemical spill, an explosion on a sea barge, or during winter months when the river is frozen is impossible and/or would pose an enormous risk to all first responders. Accordingly, the City of Bethel lacks a viable means to adequately fight a fire in this area.

(a) Bethel dock and storage yard facility must build an extension from the planned water and sewer pipeline main institutional corridor to the Donlin Gold Project associated storage and dock yard facilities.

(b) Bethel dock and storage yard must provide a plan for disposition of its waste water and solid waste including but not limited to used oil and associated toxic chemical products.

**Sec. IV**

**Geographic isolation of the area**

City of Bethel and the villages that dot the landscape along the Kuskokwim River are located on what is commonly referred to as "off the road transportation system". There are no traditional "roads" leading to and from Bethel or planned project's geographical region. There is no "mutual aid" from anywhere in the United States that can arrive to assist Bethel's first responders for at least the first 6 hours of a catastrophic event. The nearest US Coast Guard is located in Kodiak, AK. Bethel dock and storage yard operating as a subcontractor for Donlin Gold Project must provide sufficient physical and financial emergency transportation resources to the City of Bethel and the region's villages along Kuskokwim River.

(a) Bethel dock and storage yard must provide initial resources and create a 5-year plan to assist local area emergency first responders with evacuation and transportation of area residents.

(b) Provide for emergency housing facilities if village residents along the "Project's" planned transportation routes must be evacuated.

**Sec. V**

**Local governance capacity along the Kuskokwim River and the "Donlin Gold Project" region**

The City of Bethel has the largest developed local governance capacity along the Kuskokwim River at the present time. However, Donlin Gold Project will affect all the small villages along with a large swath of land related to this project. Small villages have very few resources or governance capacity to organize and address environmental or human disasters. Such emergencies would have to be addressed by the State of Alaska with assistance from first responders in Bethel.

Issue of governance capacity is somewhat loosely referred to in the current EIS study. However, this study fails to address or recommend a remediation plan on how the lack governance capacity will affect the isolated population. How will these small village and tribal governments recognize, communicate and articulate their concerns on the matters of safety and security of their communities?

(a) Donlin Gold Projects and the permitting Agency must address the issue of governance capacity by set aside of financial resources to aid the affected communities to build governance organization(s). These organization will then enable affected communities to develop a common voice and a financial instruments that will compensate the affected communities in their ability to develop a "metropolitan planning organization-like" governance structures which will address the ongoing environmental and human impacts to this area for the 30 years of proposed operation of the mine and the 100-year life cycle of the mining operation's impact on this region.

With Bethel City Council,

Respectfully,

Ann K. Capela
City Manager

cc: Bethel City Council
Alaska Governor, Bill Walker
Claude Denver, State of Alaska Office of Homeland Security

**From:** karen clautice
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold EIS comment
**Date:** Monday, May 30, 2016 7:29:28 PM

I am writing in support of Alternative 2, Donlin Gold's proposed project with a short personal account.

This area has a long history of mining and these lands were specifically selected under the Alaska Native Claims Settlement Act (ANCSA) for their mineral development potential. Donlin Gold is proposing to develop this land in partnership with The Kuskokwim Corporation (surface estate owner) and the Calista Corporation (subsurface estate owner). Royalties paid to the Calista Corporation will in part be redistributed to other regional and village corporations as provided by ANCSA, thus benefiting many in the State during a downturning Alaska economy.

A few years back I was a geologist on a drilling project at Donlin. The driller was from a company in Anchorage and the rest of the drilling crew was locally hired. I was impressed with management's commitment to train employees technically over and above the tasks expected and to provide leadership opportunities. The driller I worked with trained the young men on our crew so well that they were able to apply what he taught them, add it to their extensive knowledge gained from working on their snow machines and recognize a serious mechanical problem with our drill before he did. In conversations over breaks, it was obvious the young men enjoyed living, working and learning on teams with their friends and many cousins and were extremely proud to be able to provide for their families and children back home. There were good opportunities for women as well as men in all facets of the exploration camp from the kitchen/cafeteria to exploration offices, transportation, health and safety, supply, and work crews. The employees I spoke with seemed happy with their work schedule that included breaks at home (longer than I've witnessed anywhere else) provided by a management willing to work with local needs and customs.

SER 5

I believe the development of the Donlin mine would be an economic, educational, and training benefit many times greater than I witnessed while it was an exploration camp. Its development with associated infrastructure would help one of the poorest areas of our State long beyond the expected 27.5 year life of the mine.

Sincerely,

Karen H Clautice, P.O. Box 83628, Fairbanks, AK 99708

**From:** Chad Hutchison
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Support Comment from Senator Coghill"s Office - Donlin Gold Project
**Date:** Tuesday, May 24, 2016 10:45:49 AM

---

This is Chad Hutchison from State Senator John Coghill's office. This office supports the Donlin Gold project.

In Interior Alaska, the first-hand benefits to successful mining activities are clear. Look no further than Fort Knox and Pogo. People have good, well-paying jobs. Families are supported. Prosperity ensues.

SER 5

Many believe that Donlin will provide similar benefits/opportunities to those in Western Alaska. An estimated 3,000 jobs will be created during the approximate four-year construction phase. During the estimated mine life of 27.5 years, there will likely be between 600 to 1,200 jobs at Donlin. These jobs will have a significant, positive impact on the Yukon-Kuskokwim region and the state.

Please take the necessary steps to move this project forward.

Chad Hutchison – On behalf of Senator Coghill's Office.

This electronic message transmission contains information belonging to the office of Senator John Coghill that is solely for the recipient named above and which may be confidential or privileged. THE OFFICE OF SENATOR JOHN COGHILL EXPRESSLY PRESERVES AND ASSERTS ALL PRIVILEGES AND IMMUNITIES APPLICABLE TO THIS TRANSMISSION. If you are not the intended recipient, be aware that any disclosure, copying, distribution, or use of the contents of this communication is STRICTLY PROHIBITED. If you have received this electronic transmission in error, please notify this office by telephone (907-465-6858 during session, and 907-451-2941 during interim) or by electronic mail (chad.hutchison@akleg.gov).

**From:** Vivian Coleman
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Tuesday, May 31, 2016 4:13:52 PM

---

To whom it may concern,

SVE 2 It is unfortunate that there is a need to create such environmental impacts in this area of Alaska. The damage that may be caused outweighs the benefit. This mine upsets the natural balance in this pristine area. And disrupts native people and wildlife.

I work with and know many now in Alaska and have travelled there each year for the past four to visit.

I urge the US Army Corps of Engineers to not permit this mine.

Please do not disrupt this natural habitat in the name of corporate profit.

Vivian Coleman
Charlotte, NC

USACE
RECEIVED
MAY 0 3 2016
AK REGULATORY

**COLUMBIA HELICOPTERS, INC.**

April 21, 2016

US Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Donlin Gold Draft Environmental Impact Statement

To Whom It May Concern:

Columbia Helicopters, Inc. is a privately owned and operated heavy lift helicopter company who has been involved in logging, construction and stream restoration projects in Alaska, primarily in the southeast region, for many years. We support **Alternative 2, Donlin Gold's proposed project**, believing it to solidly benefit and further develop and enhance the health of the economy of southwest Alaska for generations to follow.

SER 18 Highlighted benefits of approval of this project will be improved transportation and communications infrastructure to support the mine, port and pipeline facilities, better services and lower cost of energy, goods, and services to local residents and businesses.

Over the last 10 years, more than $480 million have been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel and other supplies. Job skills and training received from this project will generate a stronger and broader workforce pool for generations to come, reaching beyond the life of this mining project. Over the 27 ½ estimated life of the project, 3,000 construction jobs for four of those years and between 600 to 1,200 jobs will have a significant and positive impact on the economy of the southwest region as well as the rippling effect throughout the state.

Additionally, employment opportunities, both directly and indirectly in areas such as logistics, transportation, training education and health care are anticipated.

Please consider approval of this well researched, environmentally and responsibly engineered draft proposal.

Sincerely,

COLUMBIA HELICOPTERS, INC.
P.O. Box 3500
Portland, OR 97208

**From:** Kissee, Dale
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Project
**Date:** Tuesday, May 24, 2016 10:07:24 AM
**Attachments:** image001.png

---

To whom it my concern,

I am sending this email to voice my support for the development of the Donlin Gold Project. The following bullets have been distributed to Alaska Industry Support Alliance members as talking points of why the Donlin Gold Project should come to fruition. I agree with every point listed below and the Project has my support. The State of Alaska needs resource development such as this for a stronger economy and revenue to support our Government.

SER 4

- The Donlin Gold project could produce gold for 27.5 years, while providing HIGH paying jobs in a region where few other opportunities exist.
- The State of Alaska Department of Natural Resources enforces stringent regulations overseeing mining activities statewide that effectively protect the environment, wildlife, and human health.
- New mining operations in the area, should they come to fruition, can be of great economic benefit to Alaska and local communities, as well as Alaska Native corporations and shareholders.
- This project will provide responsible economic prospects for this region and for Alaska, while protecting the subsistence resources.
- The proposed pipeline in Alternative 2 is designed to minimize impacts on the Iditarod National Historic Trail. There would be insignificant impacts to the trail and no impacts to the Iditarod Sled Dog race.
- Construction of the gas pipeline would be sensitive to the timing of the Iditarod and Iron Dog races as well as hunting season.
- The EIS process gives Alaskans and other stakeholders adequate time to fully review the project documents, and to provide input on the plans.
- The project will offer long-term opportunities for rural Alaskans to develop skills and to enable them to continue living in rural Alaska and to prosper.
- An estimated 3,000 jobs will be created during the approximate four-year construction phase, and between 600 to 1,200 jobs for the estimated mine life of 27.5 years. These jobs will have a significant and positive impact on the economy of the region and the state.
- Donlin Gold's project description demonstrates an understanding of environmental concerns, and features vigorous environmental management principles.
- Alaska's existing mines are operating to the highest standards and in harmony with our renewable resources.
- Potential for lower cost energy options to the region exist, such as the proposed natural gas pipeline which will have excess capacity.
- Job opportunities which will likely lead to reduced out-migration, helping to maintain rural schools and culture, including traditional ways of life.

Dale D. Kissee
President

301 W. Northern Lights Blvd., Suite 300
Anchorage, Alaska 99503
Phone: 907-278-6600 Fax: 907-278-4401
dkissee@conamco.com

| | |
|---|---|
| **From:** | Liz Cornejo |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Monday, May 30, 2016 3:04:47 PM |
| **Attachments:** | Constantine Comment Letter on Donlin Draft EIS.pdf |

Hello,

Please accept the attached comments.

Respectfully,

**Liz Cornejo, M.Sc.**
Manager, Exploration & Community

**Constantine Metal Resources Ltd.**
800 West Pender Street, Suite 320
Vancouver, British Columbia V6C 2V6 CANADA

Tel 604-629-2348
Cell 778-886-3173
Fax 604-608-3878
Email: liz@constantinemetals.com
Website: Blockedwww.constantinemetals.com

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***Constantine Metal Resources Ltd.***
*800 West Pender Street, Suite 320*
*Vancouver, British Columbia*
*V6C 2V6 Canada*

May 30, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

SENT BY EMAIL

To U.S Army Corps of Engineers

Re: Donlin Gold Draft Environmental Impact Statement

Please accept this letter on behalf of Constantine Metal Resources. As a member of the Alaskan mining community we would like to provide comment and support for Donlin Gold's Alternative 2 - proposed project. We believe their proposed design is a notable example of best practices in modern mining. They have demonstrated technical competence and ample consideration for safeguarding the environment while maximizing economic benefit to the region.

We are very aware of the importance of doing things right and recognize Donlin is setting a high standard for modern resource development projects. They have ensured extensive and thoughtful design planning in their project. This has been complemented by the all-encompassing and thorough analysis by you at the Army Corps of Engineers.

Donlin have demonstrated that they are committed to developing a safe and environmentally responsible project that will provide much-needed economic benefit to the Yukon Kuskokwim region and the State.

They have also shown a commitment to comprehensive community engagement and made great efforts to be transparent as the project has moved forward. Their Economic Opportunity and Workplace Development video series is a great illustration of their efforts to work with and provide benefit to the local community

**Examples of their Environmentally Responsible Development include:**

- Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project.

SVE 1
- The Donlin Gold project was designed to reduce the overall footprint of the mine and allow for safe management of the water over the mine life and post closure.

PAA 4
- The natural gas pipeline proposal is a result of conversations with the region about reducing the amount of diesel barges on the Kuskokwim River. The use of natural gas for power generation, instead of diesel, will also reduce air emissions.

MIT 9
- Donlin Gold will be the first large mine in Alaska to use a synthetic liner underneath it's entire tailings impoundment. Additionally, dry closure of the tailings storage facility at the end of the mine's life is a "best practice" proposed by Donlin Gold to ensure an environmentally responsible mining project.

NSB 1
- The tailings dam will be constructed of engineered rock fill and use a downstream construction method that is the most stable of all tailings dam types, designed for water storage and to withstand earthquakes.

AIQ 1
- Donlin Gold will employ state of the art mercury emissions controls to ensure mercury emissions are well below air quality standards.
- Donlin Gold will construct an active water treatment plant to ensure water that is discharged from the site is treated to meet water quality standards.

**Economic Benefits to the Region include:**

SER 18
- Improved transportation and communications infrastructure to support the mine, including port and pipeline facilities, can provide better services and lower costs of energy, goods, and services to local residents.

SER 13
- The job skills and training received while working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine.

SER 5
- 3,000 construction jobs for four years and between 600 to 1,200 jobs for the 27.5-year estimated life of mine will have a significant and positive impact on the economy of the region and the state.

SER 11
- The jobs and economic benefits provided by Donlin Gold would help sustain communities in the Yukon-Kuskokwim region and fund traditional subsistence activities.

These initiatives, among many others included in Donlin Gold's Environmental Impact Statement, highlight their commitment to environmentally and socially responsible operations and we re-iterate our support for this project.

In closing, we are in support of responsible mineral development projects and request the Army Corps of Engineers approve Donlin Gold's Alternative 2.

Respectfully Submitted,

Darwin Green,
Vice President, Exploration

| | |
|---|---|
| **From:** | Jason Brune |
| **To:** | Gordon, Keith POA; m1spence@blm.gov; donlingoldeis, POA |
| **Subject:** | [EXTERNAL] CIRI Comments on Donlin EIS |
| **Date:** | Saturday, May 28, 2016 9:29:59 AM |
| **Attachments:** | CIRI Donlin EIS Comments.pdf |

Dear Mr. Gordon and Mr. Spencer,

ANIL 16 Please find CIRI's comments on the Donlin EIS attached, submitted both to the COE for the EIS and the BLM for the 810 analysis. Thank you for the opportunity to submit comments.

Jason Brune
Sr. Director, Land and Resources
**Cook Inlet Region, Inc.** CIRI
PO Box 93330, Anchorage, Alaska 99509
direct (907) 263-5104
mobile (907) 382-4353

The information contained in this CIRI email message may be privileged, confidential and protected from disclosure. If you are not an intended recipient, please notify the sender by reply email and delete the message and any attachments immediately. The use, disclosure, dissemination, distribution or reproduction of this CIRI message or the information in it or attached to it by any unintended recipient is unauthorized, strictly prohibited by the sender, and may be unlawful. Thank you.

CIRI

May 28, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
COPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

Cook Inlet Region Inc. (CIRI) appreciates the opportunity to provide comments in support of Donlin Gold's (Donlin) proposed project as outlined in Alternative 2. CIRI is an Alaska Native Regional Corporation formed under the Alaska Native Claims Settlement Act (ANCSA) and one of the largest private landowners in Southcentral Alaska, with more than 1.3 million acres of subsurface estate and similar surface estate split between CIRI and its 7 village corporations.

The proposed 315-mile long, 14-inch diameter pipeline will cross CIRI lands for approximately 7 miles. Donlin worked closely with CIRI to identify potential options and we support the route selected. We do not feel there will be any conflicts with subsistence users in the region arising from the pipeline's construction or use of the Farewell airstrip. SUB 8

Along with a stable source of energy for the Donlin project, CIRI supports the potential this pipeline has to provide energy for local communities and other development opportunities along the pipeline corridor in the future. GAS 1

In addition, Donlin will provide a market for Cook Inlet natural gas which will help lure more exploration investment, including to CIRI land. GAS 5

While we are supportive of a natural gas pipeline to energize this project, we have concerns with the alternative that suggests building a diesel pipeline. PAA 4

We also have concerns that many of the non-project proponent alternatives, if adopted, are not only technologically impossible, but they do not consider the financial implications and may lead to the project not being constructed. The agencies should give special care to make sure proposed alternatives are actually realistic. PAA 56

When approved, the Donlin gold mine will provide thousands of well-paying jobs in a region that possesses some of the highest unemployment rates in the state. These economic opportunities can help revive rural communities and ultimately preserve cultures. The economic benefits of Donlin will not be limited to Southwest Alaska. In fact, Donlin's effects will be felt statewide. Located on Calista land, Donlin will ultimately benefit not only Calista and its shareholders, but all of the other ANCSA regional and village corporations and their shareholders as well, including CIRI, through 7i/7j distributions. SER 2

This type of project is ultimately what ANCSA envisioned and CIRI recognizes both Calista's and the Kuskokwim Corporation's support for the project as the land owners. We appreciate that Donlin has worked with them, and us, to ensure subsistence resources and the subsistence way of life along the proposed project footprint are not only considered, but likely enhanced. Subsistence is not free. We recognize that by providing economic opportunities and jobs for shareholders and residents of the region, subsistence opportunities will be maintained and Alaska Native cultures will ultimately be preserved. To that end, the no build alternative that is envisioned in this EIS will have a major effect on the region, leading to fewer jobs in the area, out-migration of people, and ultimately Alaska Native cultures that could disappear. This alternative is unacceptable. SUB 18

CIRI

In conclusion, CIRI enthusiastically supports Donlin's plans outlined in Alternative 2 and we urge the Corps of Engineers and the coordinating agencies to expeditiously approve this project. In addition to our comments, we would like to endorse the comments submitted by the ANCSA Resource Managers group as well as the ANCSA Regional Association. Thank you for the opportunity to submit comments.

Sincerely,
COOK INLET REGION, INC.

Jason W. Brune
Senior Director, Land & Resources

cc: Mark Spencer, BLM, ANILCA Section 810 Subsistence Impact Analysis Coordinator

| | |
|---|---|
| **From:** | Bob Shavelson |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin EIS Comments |
| **Date:** | Tuesday, May 31, 2016 1:13:46 PM |
| **Attachments:** | Inletkeeper - Donlin EIS Comments 20160531.pdf |

---

Please confirm receipt of the attached comments on the Donlin EIS.

Thank you -

Bob Shavelson

Cook Inletkeeper
P.O. Box 3269
3734 Ben Walters Lane
Homer, AK 99603
p. 907.235.4068 x22
f. 907.235.4069
c.907.299.3277
skype: inletkeeper
bob@inletkeeper.org

Love Cook Inlet? Make an extra gift to Cook Inletkeeper when you PICK.CLICK.GIVE. Or donate online. Together we can protect Alaska's Cook Inlet watershed.

Cook Inletkeeper
3734 Ben Walters Lane
Homer, Alaska 99603

p. 907.235.4068
f. 907.235.4069
www.inletkeeper.org

VIA EMAIL ONLY
(poa.donlingoldeis@usace.army.mil)

May 31, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898

RE: Comments on the Donlin Gold Project, Draft Environmental Impact Statement

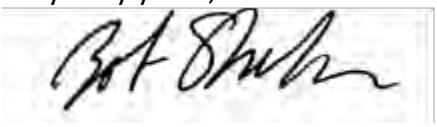
Dear Mr. Gordon:

Cook Inletkeeper is a community-based Alaska nonprofit organization working since 1995 to protect clean water and healthy, wild salmon. Please accept the following comments on the Donlin Gold Project's Draft Environmental Impact Statement on behalf of our more than 2,500 members and supporters who live, work, and recreate in south-central and western Alaska.

The Kuskokwim River Basin is one of the most remote and unspoiled places in Alaska. The proposed Donlin mine, however, will destroy important wetlands and streams in the headwaters of the Kuskokwim River, and threaten the region's fisheries and the many families and communities who rely on them.

As a result, the Army Corps should select the No Action alternative on the grounds that the project's risks and likely effects to the environment, communities, and subsistence users are too great.

Very truly yours,



Bob Shavelson
Inletkeeper

Enc. a/s

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## I. INTRODUCTION

NEP 6

The draft environmental impact statement (DEIS) prepared by the Army Corps for the Donlin Gold Project does not comply with the mandates of the National Environmental Policy Act (NEPA). For example, the Army Corps failed to analyze reasonable alternatives that would minimize many of the project's negative environmental effects. Furthermore, the Army Corps failed to consider a number of the project's important direct, indirect, and cumulative effects on the natural and social environment. Consequently, the Army Corps should select the No Action Alternative because the project's social and ecological risks are too high, and the unknowns are too numerous.

## II. PROJECT OVERVIEW

The Donlin Gold Project will consist of three main components: a large-scale open pit gold mine in the headwaters of the Kuskokwim River, the transportation infrastructure bringing resources to and from the mine site, and a 315-mile natural gas pipeline from Cook Inlet to the mine site.[1] The project is expected to require 3 to 4 years of construction, followed by 27.5 years of gold production.[2]

### A. The Mine Site

The project's main focus consists of two massive open pit mines, which will eventually be merged into a single, 2.2-mile-long by 1-mile-wide open pit.[3] The mine will be located 277 miles west of Anchorage and 145 miles northeast of Bethel, in the remote center of western Alaska, 10 miles north of the village of Crooked Creek.[4] The mine site will require worker housing, considerable road construction and site development, and a 227 MW natural-gas fired power plant.[5] Donlin estimates that it will recover 33 million ounces of gold over the 27.5 years of mine operations.[6]

HZM 5

The open pit mining will generate enormous volumes of waste rock – resulting from exploding and excavating the pits – and toxic waste from the leaching process separating gold from the ore.[7] Donlin plans to store over 3 billion tons of rock in a waste rock facility (WRF), which will destroy salmon habitat.[8] In fact, the WRF is actually the American Creek drainage – a salmon spawning stream – which Donlin plans to destroy with a 2,240-acre heap of acid-contaminated rock. The mine plans to contain the waste rock by placing a dam on American Creek upstream from the WRF and diverting water before it comes into

[1] Draft Environmental Impact Statement (DEIS) Executive Summary at ES-2.
[2] DEIS Executive Summary at ES-3.
[3] DEIS Executive Summary at ES-9.
[4] DEIS Executive Summary at ES-2–3.
[5] DEIS Executive Summary at ES-2–3.
[6] DEIS Executive Summary at ES-2.
[7] *See* DEIS Chapter 2 (describing in detail proposed mining activities).
[8] DEIS at 2-30.

HZM 5

contact with the waste rock.[9] The most highly toxic waste rock will be placed in moderate grades upstream to limit leaching into the American Creek drainage. But modeling and analysis shows that it will be impossible to eliminate all toxic leakage from the WRF, and downstream concentrations of arsenic, lead, and mercury will exceed applicable water quality standards.[10]

Donlin also plans to build a tailings storage facility (TSF) to store 568 million tons of contaminated mine tailings and chemical waste (see Figure 1). The TSF would consist of a 464-foot earth dam placed in Anaconda Creek near the mine site. Anaconda Creek is important habitat for Coho salmon rearing. The TSF would completely destroy 4.1 miles of that habitat and occupy 2,351 acres within the creek's watershed.

WAQ 20

To minimize leakage from the TSF, the entire area will be dug out to bedrock and lined with a 0.06-inch plastic liner. Surface water and runoff would be diverted into a plastic-lined pond on top of the tailings heap, where that water will be tested and treated to meet water quality standards. Despite this attempt at using best available technology to contain the contamination, the TSF will be rated as a "Hazard Class I" installation, meaning that the danger to public health is high. Leakage of highly toxic heavy metals will likely occur. Seepage through the plastic liner is expected to occur at rates between 1.4 and 17.6 gallons per minute, and downstream water quality will exceed acceptable standards for cyanide, arsenic, mercury, and other toxic heavy metals.[11]

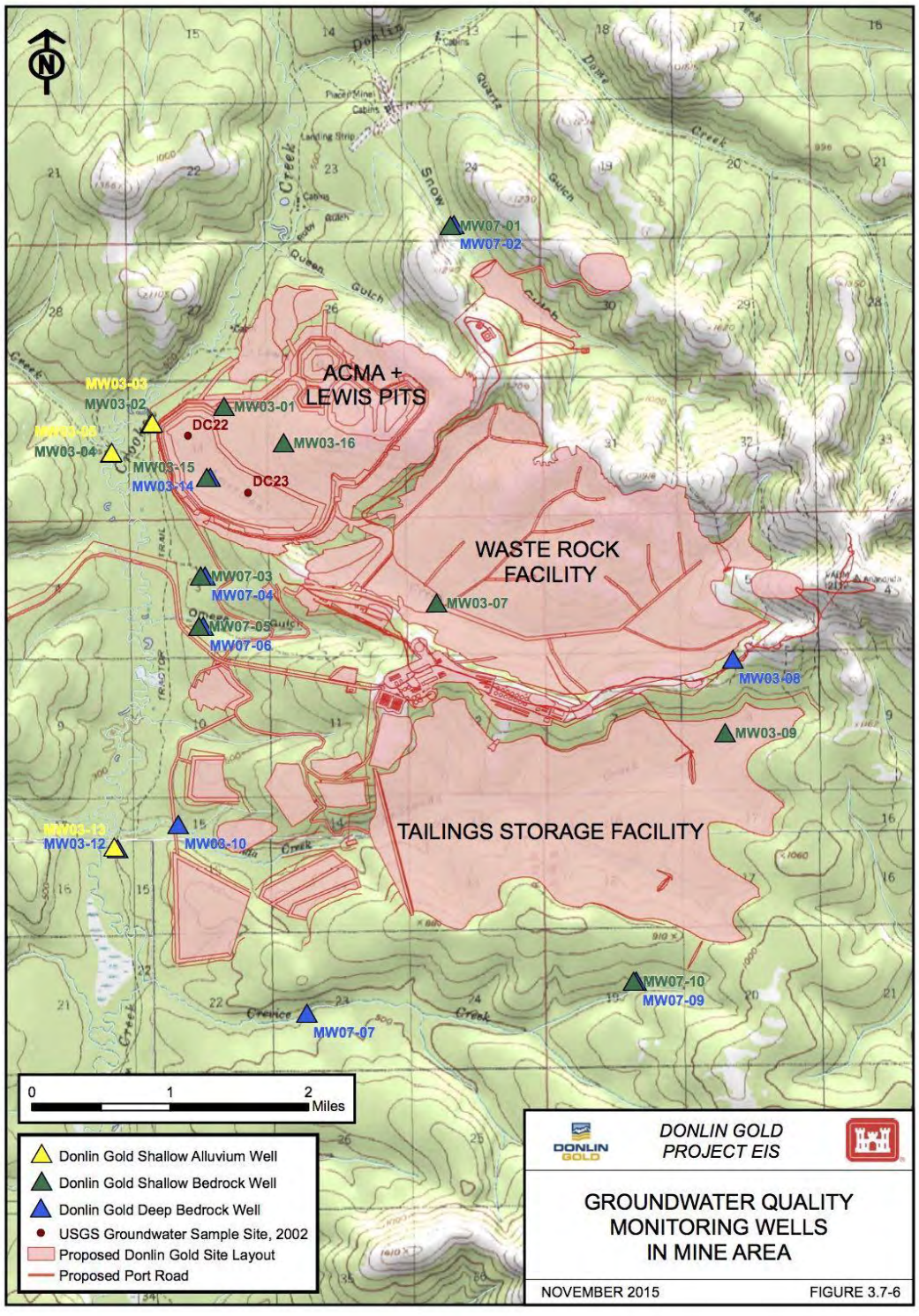
HZM 5

[9] DEIS at 2-30.

[10] DEIS Appendix H at H-23.

WAQ 20

[11] DEIS Appendix H at H-29.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MW07-03
MW07-04
MW03-07
MW07-05
MW07-06
MW03-08
MW03-09
MW03-13
MW03-12
MW03-10
MW07-10
MW07-09
MW07-07
0
1
2
Miles
Donlin Gold Shallow Alluvium Well
Donlin Gold Shallow Bedrock Well
Donlin Gold Deep Bedrock Well
USGS Groundwater Sample Site, 2002
Proposed Donlin Gold Site Layout
Proposed Port Road
DONLIN GOLD
DONLIN GOLD
PROJECT EIS
GROUNDWATER QUALITY
MONITORING WELLS
IN MINE AREA
NOVEMBER 2015
FIGURE 3.7-6

**Figure 1**

### B. Transportation and Infrastructure

The Donlin mine will be supplied primarily by barges hauling equipment and resources 145 miles up the Kuskokwim River from Bethel and beyond.[12] The project would use 150-foot long barges, operated 24 hours per day and 7 days per week during the shipping season on the Kuskokwim.[13] The 110-day season would allow Donlin to make 122 round trips, representing a 180 percent increase in the river's barge traffic.[14]

Much of the barge traffic will be dedicated to hauling diesel fuel for equipment at the mine site. Donlin will use four specially-built fuel barges with a total capacity of 1.29 million gallons per trip.[15] Barging diesel will require construction of massive new fuel storage terminals in Bethel and near the mine site at Angyaruaq (Jungjuk). Mooring and intensive river use associated with the barges during low water conditions will lead to bank erosion, particularly permafrost degradation, caused by wakes and river access.[16]

Donlin also proposes to build a new 5,000-foot airstrip at the mine site and a 30-mile access road from Crooked Creek to the mine site.[17]

### C. The Natural Gas Pipeline

Donlin plans to construct a 315-mile natural gas pipeline from Cook Inlet to the mine site to supply the mine's 227 MW natural gas power plant.[18] The 14-inch diameter buried pipeline will transport more than 73 million cubic feet of natural gas per day to the mine site.

The pipeline route begins at Cook Inlet near Beluga – within the Susitna Flats State Game Refuge. An above-ground compressor station, powered by an above-ground transmission line from Beluga, will feed natural gas into the pipeline, where the route continues for 5.1 miles within the Refuge. The total 315-mile proposed route crosses federal and state lands, coming within close proximity of the Iditarod National Historic Trail for over 50 miles, and skirting the outside of Denali National Park. The pipeline route will be within 1000 feet of the Iditarod Trail for more than 14 miles.[19]

The pipeline route includes 452 stream crossings, of which 163 streams support native fish populations. There are 42 major river crossings, all of which are essential fish habitat (EFH) for salmon, including six river crossings where horizontal directional drilling (HDD) will likely increase bank disturbance and erosion.[20] Over 100 miles of wetlands and permafrost

[12] DEIS at 2-45.
[13] DEIS at 2-45.
[14] DEIS at 3.2-83.
[15] DEIS at 2-45.
[16] DEIS at 3.2-83.
[17] DEIS Executive Summary at ES-15.
[18] DEIS Executive Summary at ES-17.
[19] DEIS at 3.16-18.
[20] DEIS at 2-113.

will be disturbed on the pipeline route, decreasing or removing "the wetlands' potential to improve water quality by preventing erosion and by settling sediments."[21]

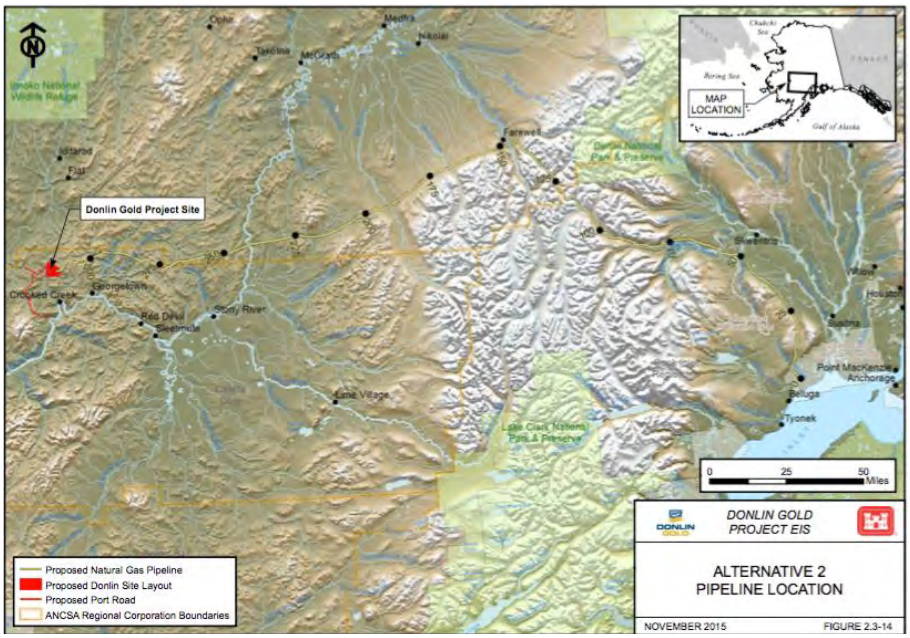


**Figure 2**

**D.**

**Closure, Reclamation, and Monitoring**

After operating the mine for approximately 27.5 years, Donlin says it will implement a closure, reclamation, and monitoring plan that calls for decommissioning mine site installations and removing equipment. The plan involves monitoring for "30 years or more to ensure successful implementation of the reclamation plan, protecting the environment and human health and safety."[22]

The reclamation plan calls for "placing a cover designed to minimize infiltration and support vegetation growth" over the mine's waste rock.[23] The open pit will be allowed to fill with water, and "50 to 55" years after closure Donlin will begin water treatment to de-contaminate the pit lake.[24]

Donlin has not "not determined the future of the pipeline after closure."[25]

[21] DEIS Executive Summary at ES-13.
[22] DEIS Executive Summary at ES-13.
[23] DEIS Executive Summary at ES-14.
[24] DEIS Executive Summary at ES-14.
[25] DEIS Executive Summary at ES-24.

## III. THE DEIS FAILS TO SATISFY NATIONAL ENVIRONMENTAL POLICY ACT REQUIREMENTS

The National Environmental Policy Act ("NEPA") requires the Army Corps to complete a rigorous review of the environmental effects of this federally-permitted mining project.[26] The environmental review must demonstrate the Army Corps considered and provided a full explanation of potential environmental effects, including a comprehensive analysis of all reasonable alternatives, a fair and objective accounting of cumulative impacts, and a thorough description of measures to mitigate harm.[27]

The purpose of NEPA is to provide the agency and the public with enough information to have a "clear basis for choice among options."[28] Thus, it is contingent upon the Army Corps to candidly disclose and discuss all relevant information that could influence the decision-making process for the Donlin Gold Project.

The Ninth Circuit has adopted the "hard look" doctrine for NEPA cases.[29] "NEPA's central requirement is that agencies must take a 'hard look' at the environmental consequences of its proposed action."[30] To satisfy the "hard look" standard, the Army Corps must analyze and rationally explain the effects of the proposed action on the environment.

### A. The Purpose and Need Ignores Federal Subsistence Policy

The Army Corps stated that the purpose and need of this project is "to provide economic benefits to Donlin Gold, Calista, and [the Kuskokwim Corporation (TKC)] shareholders; to produce gold to meet worldwide demand; and to provide local economic development."[31] Specifically, the Army Corps noted that the project's purpose "is to produce gold from the Donlin deposit ore reserve using mining processes, infrastructure, logistics, and an energy supply(s) practicable for application in remote western Alaska, while maximizing economic benefits for Donlin Gold, Calista, and TKC."[32]

NEP 3

Under NEPA, the statement of purpose and need is important because it guides the development and selection of alternatives. Federal regulations provide that the purpose and need statement, "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action."[33] When reviewing an EIS for sufficiency, "a court begins by determining whether or not the Purpose

[26] NEPA, 42 U.S.C. §§ 4231–4370h (2012).
[27] *Id.* at § 4331 (2012); *see Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989); *Flint Ridge Development Co. v. Scenic Rivers Ass'n,* 426 U.S. 776, 778 (1976).
[28] 40 C.F.R. § 1502.14 (2012).
[29] *See, e.g.*, *Native Ecosystems Council v. Tidwell*, 599 F.3d 926 (9th Cir. 2010).
[30] *State of California v. Block*, 690 F.2d 753, 776 (9th Cir. 1982).

NEP 3

[31] DEIS Executive Summary at ES-3.
[32] DEIS at 1-10.
[33] 40 C.F.R. § 1502.13.

and Need Statement was reasonable."[34] Thus, it is critical that an agency correctly frame the scope of the project in the purpose and need statement.

Unfortunately, the purpose and need articulated by the Army Corps leads to an unfairly narrow scope of alternatives by ignoring state and federal subsistence policies. For over forty years Alaska and the federal government have prioritized subsistence hunting and fishing and traditional uses of natural resources. But Donlin Gold's purpose of "maximizing economic benefits" to the corporations undermines continued subsistence uses of a significant portion of the Kuskokwim Basin, and traditional uses across a wide area of rural Alaska. The DEIS acknowledged that significant impacts to subsistence uses will be likely – for decades following mine closure:

NEP 3

> "The Donlin Gold proposed action is far larger and far more geographically widespread than any actions that have occurred in the region to date, and will itself cause alterations in subsistence resources, access to subsistence resources and [competition] for subsistence resources."[35]

In light of state and federal priorities of maintaining subsistence and traditional uses, the purpose and need for the Donlin Gold project should have emphasized sustainability and balance of competing uses. A purpose and need statement that emphasizes sustainability and balancing competing uses of the Kuskokwim Basin would have forced the Army Corps to analyze a more appropriately broad range of alternatives. As discussed in the following sections, the Army Corps should have considered alternatives that provided slower rates of ore production, different gold extraction methods, and higher-cost mitigation and cleanup efforts.

### B. The Purpose and Need Ignores Declining Trends in International Gold Markets

NEP 3

The Army Corps' purpose and need also demonstrates a misunderstanding of current international market realities for gold. The claim that Donlin Gold will aim to "meet worldwide demand" for gold ignores the fact that international gold demand has been in decline. In 2014 – one of the most recent years of complete economic analysis – the World Gold Council concluded that international gold "demand was down 10 percent."[36] The overall decline reflects the fact that gold demand has declined by up to 86 percent in some

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NEP 3

[34] *Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853, 865 (9th Cir. 2004) (citing *City of Carmel-By-The-Sea v. U.S. Dep't of Transp.,* 123 F.3d 1142 (9th Cir. 1995); *Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1066-67 (9th Cir. 1998)).

[35] DEIS Appendix N, at N-23.

NEP 3

[36] World Gold Council, Gold Demand Trends, Full Year 2014 (available at http://www.gold.org/supply-and-demand/gold-demand-trends/back-issues/gold-demand-trends-full-year-2014).

countries.[37] That decline is expected to continue as Asian economic growth slows, undermining one of the key factors that drove high gold demand in the early 2000s.

Gold is currently trading at "its lowest level in 3 years" and "is in the midst of a long term bear market," according to economic experts.[38] Asian countries, including India, have recently raised import duties from 6 to 8 percent, reflecting efforts to "temper demand."[39] And China's demand for gold declined by approximately 10 percent from 2014 to 2015.[40] Combined with the long-term increases expected in gold recycling, production of new reserves is likely to become more expensive and cost prohibitive relative to the low demand.

NEP 3

If meeting "worldwide demand" for gold was truly the project's purpose and need, the DEIS should have considered alternatives analyzing smaller scale production. Maximizing efficiency of delivering gold at levels satisfying projections for international gold demand would require less outputs and smaller resource commitments from Donlin. Unfortunately, no smaller-scale production alternatives were considered. The following section discusses other issues with the scope of alternatives.

## IV. THE DEIS ANALYZED AN UNREASONABLY NARROW RANGE OF ALTERNATIVES

The consideration of alternatives is "the heart of the environmental impact statement."[41] Unfortunately, the DEIS presented an unreasonably narrow range of alternatives, discussing only one form of gold mining and only one alternative pipeline route. The Army Corps also dismissed hundreds of alternatives as infeasible or economically unviable arbitrarily and without explanation. Such errors require the Army Corps to conduct a supplemental EIS before the project can move forward.

PAA 15

NEPA and federal regulations require agencies to consider a "reasonable range of alternatives," [42] meaning alternatives "that are practical or feasible" and not just those alternatives preferred by the agency.[43] NEPA also requires a discussion of the alternatives "in comparative form, thus sharply defining the issues and providing a clear basis for choice

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[37] *Id.*

[38] Ansuya Harjani, *Has Gold Entered a Long Term Bear Market?* CNBC (available at http://www.cnbc.com/id/100847575).

NEP 3

[39] *Id.*

[40] Sumit Roy, *World Gold Council's Artigas: Lack of New Reserves, Decline in Recycling Will Crimp Gold Supply*, ETF.com (available at http://www.etf.com/sections/features-and-news/5925-world-gold-councils-artigas-lack-of-new-reserves-decline-in-recycling-will-crimp-gold-supply?nopaging=1).

[41] *Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853, 865 (9th Cir. 2004).

[42] *Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815 (9th Cir. 1987), *rev'd in part*, 490 U.S. 332 (1989) (reversed in parts not affecting the Ninth Circuit's alternatives analysis).

PAA 15

[43] Council on Environmental Quality (CEQ), Forty Most Asked Questions on NEPA, Questions 2A and 2B; 40 C.F.R. §§ 1502.14, 1506.2(d).

among options by the decision maker and the public."[44] "The touchstone for [a court's] inquiry is whether the EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation."[45]

Although agencies have discretion in selecting the alternatives for analysis, and an EIS need not include every conceivable alternative,[46] the range of alternatives cannot merely ignore reasonable options.[47] "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate."[48] "An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logisitics in light of the overall project purposes."[49]

The exploration of alternatives to an agency's preferred course of action is critical because "[w]ithout substantive, comparative environmental impact information regarding other possible course of action, the ability of an EIS to inform agency deliberation and facilitate public involvement would be greatly degraded."[50] The Council on Environmental Quality's (CEQ) "Forty Questions" makes it clear that a range of alternatives should include quantitative differences in how an agency analyzes a proposal.

In *Center for Biological Diversity v. National Highway Traffic Safety Administration (NHTSA),* the Ninth Circuit reviewed a range of alternatives that would regulate vehicle emissions through fuel economy standards.[51] The Ninth Circuit described the alternatives as "hardly different" from the agency's selected alternative and noted that none of the alternatives would achieve anything more than a small decrease from baseline emission levels.[52] The court noted that the agency considered "a very narrow range of alternatives" with a minimal range of effects.[53] In NHTSA, all of the alternatives derived from a single study – NHTSA's cost-benefit analysis.[54] The court concluded that NHTSA's excuses for failing to consider more stringent standards that allowed for increased conservation benefits were flawed.[55]

PAA 15

In a similar case from the Tenth Circuit, *New Mexico ex rel. Richardson*, the state of New Mexico and a coalition of environmental groups challenged a Bureau of Land Management plan amendment that would have determined which public lands in the planning area would

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[44] 40 C.F.R. § 1502.14.
[45] *California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982).
[46] *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 551 (1978).
[47] *Id.* at 768 ("While nothing in NEPA prohibits the Forest Service from ultimately implementing a proposal that allocates more acreage to Nonwilderness than to Wilderness, it is troubling that the Forest Service saw fit to consider from the outset only those alternatives leading to that end result.").
[48] *Morongo Band of Mission Indians v. Federal Aviation Administration*, 161 F.3d 569, 575 (9th Cir. 1998).
[49] *Id.*
[50] *New Mexico ex rel. Richardson*, 565 F.3d 683, 708 (10th Cir. 2009).
[51] 538 F.3d 1172, 1218 (9th Cir. 2008).
[52] *Id.*
[53] *Id.* at 1218–19.
[54] *Id.* at 1218.
[55] *Id.* at 1219.

be open to oil and gas leasing.[56] The BLM eliminated alternatives that would have increased environmental protections relative to the existing plan, and the analysis considered only two alternatives despite extensive public comments requesting alternatives that would protect environmentally sensitive areas.[57] The court noted that there were "powerful" environmental values associated with eliminated alternatives that provided for more significant reductions in lands open to development, and concluded that multiple-use principles required the BLM to include a conservation-oriented alternative in its NEPA process.[58]

PAA 15

The Donlin Gold Project DEIS failed to offer a reasonable range of alternatives because the Army Corps neglected to consider alternatives that provided conservation benefits and protected subsistence resources. The Army Corps considered only a single alternative for mine-site operations, which provided for a massive, open pit mine. Similarly, the Army Corps considered only two, virtually identical natural gas pipeline routes. In its present form, the DEIS provides an analysis of an unreasonable range of alternatives, necessitating a supplemental EIS before the project may move forward.

### A. THE ALTERNATIVES PRESENTED IN THE DEIS

The DEIS compared seven alternatives. Alternative 1 is the No Action alternative, which is required to be analyzed in every EIS by NEPA and federal regulations. Under the No Action alternative, the mine, transportation facilities, and natural gas pipeline would not be constructed and the project would end.[59]

If the Army Corps does not supplement the DEIS by providing an analysis of a reasonable range of alternatives, and providing disclosures and analysis of the issues raised in the following sections of this comment letter – and other public comments – the agency's selected alternative should be the No Action alternative (Alternative 1). The No Action alternative is the environmentally preferable alternative, and the only alternative that is capable of protecting Alaska's natural resources, subsistence livelihoods, and culture.

PAA 1

#### *1. Alternative 2: Proposed Action*

Alternative 2 is the agency's proposed action,[60] and is the alternative described, *supra*, in Part II, Project Overview. Unless otherwise specified, the comments contained in this letter refer to the issues and analysis of Alternative 2.

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[56] 565 F. 3d 683, 688–89 (10th Cir. 2009).

[57] *Id.* at 709.

[58] *Id.*; *see also Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 812–13 (9th Cir. 1999) (concluding that the Forest Service "failed to consider an adequate range of alternatives [where t]he EIS considered only a no action alternative along with two virtually identical alternatives.").

PAA 15

[59] DEIS at 2-6.

[60] DEIS at 2-6.

### *2. Alternative 3A: LNG Barges*

Alternative 3A reduces diesel fuel barging on the Kuskokwim by using liquefied natural gas (LNG) as a fuel source at the mine site.[61] Instead of barging 42.3 million gallons diesel per year, Alternative 3A would require only 13.3 million gallons per year. The decrease in diesel fuel would be made up for by using LNG, barged from Dutch Harbor to Bethel, and then to the mine site. Alternative 3A would require two round-trip ocean barges, using 6.5 million gallon double-hulled barges – a reduction from the 7 round trips required for diesel in Alternative 2. The total river barge trips would be reduced to 83 round trips – down from 122 under Alternative 2. The storage capacity for diesel at Bethel and the mine site would also be reduced under Alternative 3A.[62]

### *3. Alternative 3B: Diesel Pipeline*

Alternative 3B uses a diesel pipeline from Tyonek to supply the mine site with diesel fuel.[63] Under Alternative 3B, Donlin would install a 344-mile, 18-inch pipeline capable of delivering 120 million gallons per year, or 329 gallons per day.[64] The diesel pipeline would follow Alternative 2's proposed natural gas pipeline route for 18 miles, but in general, the two pipelines would use different alignments.[65] The main benefit of Alternative 3B is the reduction in diesel fuel barging on the Kuskokwim River.[66]

### *4. Alternative 4: Birch Tree Crossing Port*

Alternative 4 proposes creating a new port midway up the Kuskokwim River where diesel would be offloaded from barges and trucked to the mine site.[67] The Birch Tree Crossing port would be a new barge port facility 124 miles upstream from Bethel on the Kuskokwim. Alternative 4 reduces the barging distance for hauling diesel and supplies by 38 percent. Once offloaded at the Birch Tree Crossing port, diesel and supplies would be trucked to the mine site via a new, longer access road, which would be 76 miles long – a 156 percent increase in road distance from Alternative 2.[68]

PAA 23

### *5. Alternative 5A: Dry Stack Tailings*

[61] DEIS at 2-144.
[62] DEIS at 2-144.
[63] DEIS at 2-145.
[64] DEIS at 2-148.
[65] DEIS at 2-148.
[66] DEIS at 2-145.
[67] DEIS at 2-152.
[68] DEIS at 2-152.

Alternative 5 uses a different method for storing and containing the toxic mine tailings.[69] The alternate method uses dry stack tailings (DST) instead of the conventional subaqueous tailings storage proposed in Alternative 2. The DST method applies "filter-presses and vacuum filters to increase the solid content more than 80 percent" in the tailings.[70] The benefits of Alternative 5A include "[r]educed storage requirements within the [tailings storage facility]" and decreased "risk of potential dam failure and release of slurry materials downstream to Anaconda and Crooked Creeks" from the tailings storage dam.[71]

Alternative 5A was "suggested during scoping to avoid the perceived risk of releases from [the] tailings dam."[72] However, the DEIS acknowledges there are several drawbacks to using the DST method. First, the DEIS claims using the DST method at the scale of production and in a sub-arctic climate is novel: "there is no precedent in current mining operations for using the dry stack tailings method at this production rate. The production rate would be three times larger than the current largest facility (La Coipa, Chile in an arid climate) and 24 times larger than the current largest facility in a sub-arctic climate (Pogo Mine in Alaska)."[73]

PAA 23

Second, the DEIS claims the DST method could have significant effects on water quality and quantity. Alternative 5A could result in "reduced discharge to Crevice Creek and Anaconda Creek during the post-closure period, and increased treated water discharge to Crooked Creek."[74] Treatment of water from the tailings and "[p]umping water from the [seepage recovery system] may be required for 200 years."[75]

But the benefits of the dry stack tailings method – reducing the risk of catastrophic mine collapse – should be weighed against the added costs and timeline of water treatment. Overall, the Army Corps discounted Alternative 5A from serious analysis because of the technological requirements, and presumably, high costs. Alternative 5A should be considered more fully as an environmentally preferable alternative compared to Alternative 2.

*6. Alternative 6A: Dalzell Gorge Pipeline Route*

Alternative 6A changes the natural gas pipeline route slightly as it crosses the Alaska Range.[76] The route change redirects the pipeline through the Dalzell Gorge between mileposts 106.5 and 15.7.[77] The result is a 14 percent change in route, and Alternative 6A's total pipeline length (313 miles) is 2 miles shorter than Alternative 2 (315 miles).[78]

PAA 36

[69] DEIS at 2-158.
[70] DEIS at 2-158.
[71] DEIS at 2-178.
[72] DEIS at 2-158.
[73] DEIS at 2-161.
[74] DEIS at 2-172.
[75] DEIS at 2-172.

PAA 23

[76] DEIS at 2-162.
[77] DEIS at 2-162.
[78] DEIS at 2-162.

PAA 36

Alternative 6A is far more environmentally harmful than the proposed route in Alternative 2. Alternative 6A's use of the Dalzell Gorge would requires a "doubled length of high-risk unstable slopes through the Alaska Range portion."[79] The route would require 377 stream crossings[80] and "[d]irect impacts to wetlands would increase by 98 acres compared to Alternative 2."[81] Alternative 6A's effects to recreational users of the Iditarod National Historic Trail would also increase: the Dalzell Gorge route "would affect a medium number of INHT recreationists, but over a greater area [than Alternative 2]."[82]

PAA 36

According to the Army Corps, Alternative 6A "is carried forward for analysis because it is feasible and would allow comparison of environmental impacts to Alternative 2."[83] But providing an alternative with such severe environmental risks as Alternative 6A demonstrates that the Army Corps did not consider it to be a realistic alternative – and rightfully so because it's environmental effects make it completely unacceptable. It is apparent that Alternative 6A is presented merely so the Army Corps can say it considered alternative routes. Moreover, Alternative 6A is not sufficiently different from Alternative 2's proposed pipeline route – the two routes are "hardly different" except for one divergent section.[84] The Army Corps did not consider any alternatives to a natural gas pipeline route or alternatives to using natural gas to supply power for the mine site even though about 90 possible alternatives were proposed and rejected prior to the DEIS.[85] Thus, the Army Corps did not satisfy NEPA's requirement to analyze a "reasonable range of alternatives."

The following section discusses some of the alternatives that the DEIS should have considered or provided more thorough rationales for rejecting.

### B. Alternatives the Army Corps Should Have Considered

PAA 15

The DEIS should have considered a wider range of alternatives to minimize environmental and social effects. Appendix C provided a list of alternatives the Army Corps considered and rejected prior to the DEIS but does not disclose or discuss the specific reasons why some of these reasonable alternatives were dismissed from further evaluation, often merely citing the practicability of the rejected alternative. "An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."[86] Under that standard, the Army Corps should have considered some of the alternatives raised prior to the DEIS, or at least explained more thoroughly why the agency rejected the alternatives were not practicable.

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[79] DEIS at 2-171.
[80] DEIS at 2-172.
[81] DEIS at 2-176.
PAA 36
[82] DEIS at 2-181.
[83] DEIS Executive Summary at ES-29.
[84] *NHTSA*, 538 F.3d at 1218 (alternatives that are "hardly different" do not satisfy NEPA).
[85] *See* DEIS at 2-189; Appendix C.
PAA 15
[86] 40 C.F.R. § 230.10(a)(2).

PAA 15

Approximately 100 alternatives for mine site operations, 50 for transportation and infrastructure, and 100 for the natural gas pipeline were raised and dismissed prior to the DEIS.[87] Some of those alternatives addressed issues that the Army Corps should have incorporated into modified alternatives, including alternative types of mining, methods of tailings deposition and reclamation, water usage requirements, and processing locations. Specifically, the DEIS should have considered a number of alternatives – or combination of alternatives – that are essential to a fair and reasonable NEPA process.

*1. Alternative Leaching Methods*

PAA 50

Appendix C lists two alternatives to the proposed use of cyanide in the leaching process. Alternative MS-25 suggested using thiosulfate or thiourea leaching, and Alternative MS-28 raised the possibility of a "combination of cyanide and other extracting chemicals" as an alternative to the currently designed cyanide process.[88] The Army Corps rejected all alternatives to cyanide leaching, cursorily citing their "higher costs," "complications," and conclusion that any environmental benefits would be offset by the need to use greater quantities of alternative chemicals for the leaching process.[89]

Because cyanide leaching and the resulting contaminated tailings (568 million tons) represents such a significant aspect of the project, and a significant long-term environmental catastrophe, the DEIS should have given thorough consideration to alternative leaching methods. Alternatives to cyanide may cost more and may have some environmental trade-offs, but it might be that there are long-term environmental benefits that justify those higher costs. Disclosing and discussing those implications is required by NEPA and should be part of a supplemental EIS.

*2. Alternative Scale of Production*

PAA 12

Another type of alternative considered but summarily dismissed by the Army Corps were lower production levels, which would have lessened the size and scale of the mining operation. Alternative MS-31 proposed limiting mine production to 20,000 tons per day, and MS-32 proposed 30,000 tons per day. In comparison, Alternative 2 calls for the two open pit mines to blast and remove 422,000 tons of rock per day.[90]

But the Army Corps dismissed MS-31 and MS-32, and other alternatives that called for smaller scale production because those levels were "not economically feasible." According to the DEIS, at "the lower rate of throughput, investors would not fund the large cost of

PAA 15 [87] DEIS at 2-189; Appendix C.

PAA 50 [88] DEIS Appendix C at C-41–42.

[89] DEIS Appendix C at C-41.

PAA 12 [90] DEIS Executive Summary at ES-7.

construction of the natural gas pipeline," which would cause a significant increase in barging. That explanation and underlying logic is strained.[91] Without explaining why lower production volumes would suddenly trigger investor pull out, the Army Corps attempts to link the scale of production with the natural gas pipeline. That exemplifies why the Army
PAA 12 Corps should craft alternatives that offer a "reasonable range of alternatives." For example, pairing alternative energy sources – wind, solar, or LNG – with smaller-scale mine output would make sense, allowing the smaller energy production of those sources to match the smaller energy needs of lower production volumes. Smaller-scale production also has the added benefit of producing less waste and lower reclamation and cleanup costs, which were not apparently considered in the DEIS. Such a combination of middle ground options should have been considered as feasible alternatives.

*3. Secondary Tailings Dam*

Another alternative that was raised in scoping comments involved the installation of a secondary containment dam, downstream from the proposed tailings storage dam.[92] The secondary dam would function as a safety net in case the tailings storage dam failed, thus preventing toxic sludge from devastating the Kuskokwim watershed. Alternative MS-71 called for such a secondary dam, but was rejected by the Army Corps.

PAA 30 According to the Army Corps, the tailings storage dam will be built using best available technology and "there is every scientific, engineering, and construction technique available to design a dam wall that will function properly.[93] Of course, no one builds dams that are expected to fail. Every catastrophic accident is the result of unforeseen circumstances. But every dam failure is evidence that the best available technology still results in incidents that could have been prevented.

A secondary dam is a reasonable alternative considering the high risks and costs associated with a dam failure. The Army Corps should have considered that the best available science went into designing similar dams, including the Mount Polley tailings storage dam, which failed and released contaminated sediments into important salmon habitat.

*4. Alternative Reclamation Plans*

PAA 53 The Army Corps dismissed several alternatives that proposed different ways of cleaning up the mine site and contamination after closure. Alternative MS-90 and MS-96 proposed decommissioning and closing the open pit by using backfill consisting of the waste rock or

PAA 12 [91] DEIS Appendix C at C-43.
PAA 30 [92] DEIS Appendix C at C-54.
[93] DEIS Appendix C at C-49.

tailings. Both alternatives were rejected because of they were considered "economically infeasible."[94]

PAA 53 The DEIS does not explain how the Army Corps reached the conclusion that decommissioning the open pit would be economically infeasible, or what standard the agency was using for feasible, merely stating that "it would also require many years to move the rock, delaying closure and reclamation of the [waste rock facility]."[95] Such a statement is laughable considering the actual cleanup plans for the open pit and tailings storage facilities, which are not scheduled to begin until 50 years following mine closure. Instead of planning a reclamation and treatment program that will not begin for 50 years following mine closure – as in Alternative 2 – it makes sense to consider an alternative that would provide immediate closure and cleanup on the mine site. Costs of cleaning up the open pit should be consider simply part of the full costs of the mining operation.

*5. Alternative Power Sources*

The DEIS rejected alternatives that suggested using alternative forms of energy to eliminate the need for a natural gas power plant and pipeline.[96] Alternative TI-71 raised the possibility of "using wind power as the main source of power" at the mine site.[97] But the Army Corps dismissed that alternative, concluding that "[w]ind power is technologically and economically infeasible given the scale of power needs at the mine site. Wind is, at best a supplemental

PAA 39 intermittent power source."[98]

The Army Corps' conclusion that wind power cannot provide for the "scale of power needs" is a good illustration that the Army Corps should have considered combining different aspects of project alternatives. As explained earlier, supra section IV. 2., combining alternative energy generation, such as wind power, with smaller scale mine production, could achieve economic viability while providing greater levels of environmental protection and sustainability within the Kuskokwim Basin. The Army Corps should have considered alternatives that combined different mine site power requirements with combinations of alternative energy (wind, solar, etc.), or transmission lines from existing power sources.

*6. Alternative Diesel Pipeline Routes*

PAA 10 One of the alternatives raised in the scoping comments called for installing a diesel pipeline from Cook Inlet to the mine site along the same route as Alternative 2's natural gas

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PAA 53 [94] DEIS Appendix C at C-54.
[95] DEIS Appendix C at C-54.

PAA 39 [96] DEIS Appendix C at C-67.
[97] DEIS Appendix C at C-67.
[98] DEIS Appendix C at C-67.

pipeline.[99] Alternative PL-110's parallel pipeline idea would eliminate diesel barging on the Kuskokwim and minimize pipeline right-of-way disturbance across Alaska.

PAA 10 But the DEIS did not provide an adequate explanation for why a parallel diesel pipeline alternative was rejected. Such an alternative would provide numerous environmental benefits. Because the Army Corps was willing to consider a separate route for a diesel pipeline, it makes little sense why a parallel route would be cost-prohibitive. Thus, the Army Corps should re-evaluate the parallel diesel pipeline alternative, presenting a rational discussion of the costs and benefits in a supplemental EIS before making a final determination.

## IV. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S SOCIO-ECONOMICS EFFECTS

SER 23 The DEIS indicates the project will have significant socio-economic effects on the Kuskokwim Basin's communities. But the DEIS left important socio-economic issues unaddressed, including a discussion of whether Donlin's proposed financial assurance would be adequate to cover reclamation costs. The Army Corps must take a hard look at the economic viability of the proposed mine, the financial ability and likelihood that all reclamation costs will be paid, and the likely long-term effects on the local economy.

### A. The Project Represents a Marginal, Short-term Economic Benefit For the Local Communities at Best

SER 3 The Donlin project will provide some jobs and a temporary economic boost to the state, regional, and local economies. Donlin estimates that it will spend at least $12 billion on the project, including $9.6 billion on materials and services during the 27.5 years of operations.[100] The overall profits from the project could be as much as $18.7 billion, which will be paid to Donlin's two Canadian parent companies, Barrick Gold Corporation and NOVAGOLD.[101]

The Kuskokwim region and Alaska native corporations will also receive some financial benefit from the project. The regional corporation, Calista, has already been receiving $1 million per year in advance royalties and is expected to receive $55.4 million per year over the mine's lifetime.[102] Under the Alaska Native Claims Settlement Act (ANCSA) Calista must share 70 percent of those payments with other Alaska native regional corporations, meaning the financial benefits will be shared with other native communities throughout Alaska. In addition to those payments, Donlin will employ local Kuskokwim residents.

PAA 10 [99] DEIS Appendix C at C-84.

[100] DEIS at 3.18-41.

SER 3 [101] DEIS at 3.18-41.

[102] DEIS at 3.18-40.

Donlin anticipates hiring 500 to 600 workers – 50 to 60 percent of the total workforce during the project's operations and maintenance phase – from communities within the Yukon-Kuskokwim region.[103] This will no doubt be important to the region's economy, which has an unemployment rate of 15 percent and more than 40 percent of workers are employed by local government.[104]

But the potential financial and employment benefits will likely be short term, if they even occur. The DEIS should have provided an analysis and more details on how Donlin's expenditures will support Alaska's economy: From where will Donlin source supplies for the mine site? Which supporting industries stand to benefit and where are those supporting industries located? Can the local Kuskokwim economy sustain a rapid influx of investment and personnel? What are the associated socio-economic costs of rapid infusions of capital without the existing infrastructure to handle the demand?

SER 3

In fact, most of the economic forecasts and projections for benefits in the DEIS are overstated and, at the same time, the long-term economic negatives and risks of the project are downplayed. The DEIS's economic analysis does not account for the potential for the Kuskokwim or Alaska economies to lose revenue from other sources, such as tourism, the risk of high cleanup costs from a spill, or the long-term losses to important fish habitat.

### B. The Economic Viability Analysis Should Reflect the Mine's Likely Full Costs

The DEIS failed to consider a number of other likely costs to Donlin. A similar mining proposal in Bristol Bay, the Pebble mine, has been stalled due to broad-based local, state and national opposition to large-scale impacts to fish habitat and the ways of life salmon and other fisheries support. These issues have promoted concern among Pebble investors, and similar uncertainties apply to the Donlin project. As a result, the DEIS should disclose the potential for various transaction costs to increase the overall mine's costs, and the potential for investor withdrawal.

BER 3

### C. The DEIS Underestimated Closure and Cleanup Costs

The DEIS did not take a hard look at the closure and cleanup costs that should be expected for the Donlin project. The DEIS states that "costs for long-term post closure activities were estimated out to 200 years after the closure of the operation."[105] The Army Corps estimates total cleanup costs will be approximately $259 million, with the following breakdown by sector:

BER 7

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SER 3 [103] DEIS at 3.18-3.

[104] DEIS at 3.18-11.

BER 7 [105] DEIS Appendix A at A-7.

- $22.5 million for construction management and support
- $150.2 million for "earthworks"
- $6.1 million for detoxification and water treatment
- $22.4 million for structure and equipment removal
- $1.8 million for monitoring, and
- $55 million for indirect costs.[106]

To fund the cleanup costs two centuries into the future, Donlin's financial assurance describes a trust fund set up in coordination with the state of Alaska. Donlin will contribute $2.3 million per year to the trust fund during mine operations, leading to approximately $73 million in the trust fund when the mine closes.[107]

But the cleanup plan, particularly for water treatment beginning 50 years after the mine's closure, cannot be reasonably expected to be covered by a $73 million trust fund.[108] Water treatment costs alone should be expected to exceed $6.1 million based on the volume of water in the pit lake and the length of time required for complete remediation. In a study by the Center for Science in Public Participation (CSP2), hard rock mining bonds in Alaska "have been significantly underestimated" by an average of 43 percent.[109] That puts the public at risk of having to pick up the extra costs of cleaning up Donlin's contaminated waste. In 1998, there were more than 250,000 abandoned hardrock mine sites in the United States.[110]

BER 7

The DEIS also fails to disclose information about Donlin's corporate structure, which should lead the government and public to be skeptical of the cleanup and reclamation plan. Donlin is a subsidiary created for the sole purpose of producing gold. Once mining operations end, Donlin will presumably have few assets, and questionable ability to pay additional cleanup costs if it is found to be liable for unforeseen problems. State and federal authorities would be forced to pay the costs or rely on complicated corporate liability statutes to hold the parent companies responsible.

Finally, the DEIS failed to disclose and analyze the likely costs of the pipeline closure. According to the Army Corps, pipeline closure costs are estimated at $10 million. But Donlin admitted that it did not have a plan for pipeline closure – Donlin has not "not determined the future of the pipeline after closure."[111]

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[106] DEIS Appendix A at A-6.
[107] DEIS Appendix A at A-7.
[108] DEIS Appendix A at A-7.
[109] DAVID M. CHAMBERS, ALASKA LARGE MINE RECLAMATION BONDING, CENTER FOR SCIENCE AND PUBLIC PARTICIPATION (2005).
[110] John F. Seymour, *Hardrock Mining and the Environment: Issues of Federal Enforcement and Liability*, 31 ECOLOGY L.Q. 795, 810 (2004).
[111] DEIS Executive Summary at ES-24.

### D. The DEIS Should Disclose Full Social and Economic Risks to the Community

SER 16 The DEIS should take a hard look at the full social and economic risks the mine poses to Kuskokwim basin communities. Undisclosed and unanalyzed risks include the potential for Donlin to rely on out-of-state workers, changes to Kuskokwim's social structures, impacts to Cook Inlet rural communities, and potential liability for Calista and TKC for abandoned contaminated sites.

#### *1. Uncertainty that Donlin will hire local workers*

SER 16 Although Donlin estimates that it will hire 500 to 600 local workers for the operations phase of the mine, there is no guarantee. Donlin has not provided assurances that it will hire local workers, and there is no data on whether there are 500 to 600 qualified local workers available to fill those positions. And even if Donlin does hire that many qualified local workers, the DEIS does not discuss how many of those workers already have jobs that will then need to be filled.

#### *2. Changes in social structures and conditions*

SER 7 The DEIS failed to analyze the likely social changes resulting from an influx of development and outside mine workers to the local Kuskokwim community. The likely changes are indicated by problems associated with the Red Dog Mine – located in a comparably rural part of western Alaska. "About half the [native corporation] shareholders recruited to work Red Dog decided to move their families and live outside the [region] for lifestyle and/or economic reasons."[112] The DEIS should have addressed the likelihood that a similar scenario will occur in the Kuskokwim region, with workers hired by Donlin moving away from the region.

SER 17 Although the DEIS disclosed several of the documented social issues that resulted from the Red Dog mine, the Army Corps did not discuss the likely effects on the Kuskokwim communities if the same issues arise. The communities affected by the Red Dog mine experienced:

- An influx of outsiders to work
- Limited access to mine related jobs due to inadequate training levels
- Lack of economic diversification and unsustainable growth
- Increased burdens to local health care system and social services
- Challenges to tribal community cohesiveness resulting from family relocations
- Long-term alterations to traditional cultures and lifestyles

SER 7 [112] DEIS at 3.18-40.

SER 17

- Health problems resulting from environmental contamination.[113]

SER 17

The DEIS should also have addressed some of the issues surrounding the influx of outsiders to rural communities associated with gold mining operations. There have been numerous reports of environmental and personal damage associated with Canadian mining corporations, thus, contributing to the deterioration of community social well-being.[114]

*3. Effects to Cook Inlet communities*

SER 27

The DEIS failed to consider potential socio-economic effects on communities in the Cook Inlet region, including Beluga. The addition of infrastructure and operating the natural gas pipeline will require new personnel and supplies in the area. The socio-economic effects in Cook Inlet will also likely include increased recreational use of the pipeline's right-of-way.

*4. Potential liability for native corporations*

BER 5

The DEIS does not disclose or analyze potential liability for cleanup costs that might fall to the state or native corporations. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 provides liability for any landowner of an abandoned contaminated site. If Donlin abandons the mine site, leaving a contaminated site without any owner financially responsible, the native corporations, Calista and TKC could be held liable as landowners.

## V. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S EFFECTS ON GROUND AND SURFACE WATER QUALITY

WAQ 28

The DEIS failed to take a hard look at the effects on ground and surface water quality, particularly the long-term implications of toxic metal contamination in the Kuskokwim Basin. The massive Donlin mine poses a serious threat to the Kuskokwim River Basin's ecological stability, especially in the long-term, after Donlin has completed mining operations and left the region. The Army Corps should re-evaluate whether the proposed action meets the least environmentally harmful criteria, and a supplemental EIS should discuss in more detail the mine's cumulative and long-term effects on water quality and the resulting ecological implications.

SER 17

[113] DEIS at 3.20-14.

SER 17

[114] *See* Sara L. Seck, Environmental Harm in Developing Countries Caused by Subsidiaries of Canadian Mining Corporations: The Interface of Public and Private International Law, 37 THE CANADIAN YEARBOOK OF INTERNATIONAL LAW 139 (1997).

WAQ 28

The proposed mining plan would result in 3 billion tons of waste rock, of which 7 to 8 percent is "potentially acid generating."[115] "Both metal leaching [] fluids and acid rock drainage [] could react with local soils and rocks and negatively impact surface and groundwater in the vicinity of the site."[116] Given the high environmental consequences of toxic contamination to surface and groundwater, the DEIS should have taken a more thorough look at the likely effects to water quality.

### A. Likely Violations of Water Quality Standards

Even conservative estimates of the project's effects to water quality suggest there will be significant negative impacts. The DEIS acknowledged that water quality standards – which are the minimum amounts of contamination that pose threats to human and ecological health – will be exceeded during the lifetime of the mine. These water quality effects are likely to have significant consequences for fish and aquatic health.

The waste rock facility (WRF) and tailings storage facility (TSF) are two sources of leaching that will contribute to water quality standard violations. The Army Corps concluded that "[a] number of constituencies are predicted to exceed [Alaska water quality standards] throughout the mine life."[117]

WAQ 20

The WRF will store potentially acid generating (PAG) rock. Surface water runoff coming into contact with those rocks will lead to leaching and contamination of surface and groundwater down gradient. "The chemistry of seepage from rocks in the WRF is predicted to remain relatively constant over time for the first 20 years or so of operations. However, if the non-acid generating (nag) and PAG 5 rocks are not well mixed, the PAG rocks may begin to produce higher-concentration, more acidic seepage by the end of the mine life."[118] And even non-acid generating rocks stored in the WRF have the "potential for impacts to surface water quality as a result of metal leaching."[119]

Like the WRF, the TSF will be a source of ground and surface water pollution. The TSF will store highly contaminated waste tailings resulting from the chemical leaching and processing of gold-bearing ore:

> "Gold is removed from ore-bearing rocks in a process that includes crushing, grinding, flotation, pressure, oxidation, and cyanide leaching. The finely-ground rock and process water mixture remaining after the gold is removed is called tailings. In

WAQ 28

[115] DEIS Appendix H at H-1.
[116] DEIS Appendix H at H-1.

WAQ 20

[117] DEIS Appendix H at H-16.
[118] DEIS Appendix H at H-20.
[119] DEIS at 3.7-144.

the proposed project, the tailings would be deposited in a large impoundment called the Tailings Storage Facility."[120]

WAQ 20 "The tailings formed from proposed ore processing are planned to be deposited as slurry in a conventional TSF with a fully lined impoundment."[121] The contents of the TSF will be 64 percent water and 36 percent solids by weight.[122]

Groundwater leakage and surface water runoff from the TSF are both expected to exceed Alaska standards. Although seepage to groundwater through the plastic containment liner is expected to be small, "ranging from 1.4 gpm in Year 1 to 17.6 gpm in Year 27," there will still be some seepage.[123] The surface water runoff will also contain dangerously high levels of antimony, arsenic, manganese, molybdenum, selenium, and mercury.[124] The level of mercury expected in runoff from the TSF is expected to exceed legal thresholds by 4 times.[125]

The project relies on promises to treat collected water from the WRF, TSF, and pit lake before discharging effluent to the nearby creeks and rivers. The main aspect of the treatment system is a Seepage Recovery System (SRS), which would "consist of an unlined pond, pumps, pipeline, ditches, and monitoring/seepage recovery wells."[126] Water contained in the SRS that exceeded water quality standards "may be treated at the [water treatment plant] and discharged to Crooked Creek when needed, for water management."[127] Nevertheless, surface
WAQ 10 water is "predicted to exceed [water quality standards]: sulfate, [total dissolved solids], fluoride, antimony, arsenic, cadmium, manganese, molybdenum, selenium, and mercury."[128]

The project's water treatment plant would operate from April to November, and would be capable of operating year-round if required. But the DEIS relies on treatment volumes that likely underestimate the amount and rates of contaminated water in need of treatment. "The design capacity of 4,672 gpm is based on the predicted maximum flow to the WTP during Year 12. However, if required the WTP capacity can be expanded to 6,600 gpm."[129] Of that capacity, the "main source of water that would be treated and discharged to Crooked Creek during construction would be from pit dewatering (up to about 1,700 gpm)."[130]
The problem with the project's water treatment proposal is that there is no plan for several likely scenarios. An excess volume of water at any given time often results in water treatment plants dumping untreated effluent directly into water sources. The DEIS should have

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WAQ 20
[120] DEIS at 3.7-104.
[121] DEIS Appendix H at H-3.
[122] DEIS Appendix H at H-3.
[123] DEIS Appendix H at H-29.
[124] DEIS Appendix H at H-29.
[125] DEIS Appendix H at H-8.
[126] DEIS at 3.6-31.
WAQ 10
[127] DEIS at 3.7-123.
[128] DEIS at 3.7-121.
[129] DEIS at 3.7-141.
[130] DEIS at 3.7-143.

WAQ 10 addressed contingency plans and storage capacity for avoiding such treatment plant overflows.

### B. The DEIS Failed to Analyze Likely Scenarios of a Tailings Dam Failure

An earthen tailings dam will be built within the Anaconda Creek valley to hold back the 568 million tons of toxic slurry mine tailings. The failure of that dam represents one of the most catastrophic risks of the entire project.

The DEIS analyzed a partial tailings dam failure and resulting water pollution. The modeling concluded that a partial failure and small contamination leak would pollute waters from Anaconda Creek to the confluence of Crooked Creek and the Kuskokwim River. Surface water quality would obviously be significantly impaired: "surface water quality would have impacts exceeding water quality standards from the Anaconda and Crooked Creek drainages to the Kuskokwim confluence."[131]

Consequences for ecological resources of even a partial tailings dam failure would be significant. "[F]ish and aquatic resources could be highly impacted in the event a release."[132] The pollution of the Kuskokwim and salmon spawning headwaters would have significant effects on subsistence hunting and fishing, and even commercial fishing downstream toward the mouth of the Kuskokwim would likely be affected.

DAM 3 Unfortunately, the DEIS's analysis of a partial tailings dam failure gravely underestimates the risks and likely effects of a more complete tailings dam failure. Because the consequences of a partial failure include "potentially high impacts"[133] to human health, particularly "minority and low-income communities,"[134] the Army Corps should have made an effort to analyze and disclose the effects of a complete tailings dam failure.

A complete tailings dam failure – the result of which would be the release of millions more tons of highly contaminated slurry – is not unprecedented. The Army Corps should have examined the Mount Polley mine tailings dam failure in British Columbia and the conclusions reached by a team studying what went wrong in that case.

The Mount Polley mine tailings dam failed in August 2014, releasing 25 million cubic meters of contaminated tailings into Hazeltine Creek and Quesnel Lake – salmon spawning tributaries of the Fraser River.[135] The dam failure and subsequent pollution of the Fraser

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[131] DEIS at 3.24-213.
[132] DEIS at 3.24-215.
[133] DEIS at 3.24-216.
[134] DEIS at 3.24-216.
[135] CBC News, *Mount Polley Mine Spill 78% Larger than 1st Estimates*, September 4, 2014 (http://www.cbc.ca/news/canada/british-columbia/mount-polley-mine-spill-78-larger-than-1st-estimates-1.2755974).

River has been called one of the biggest environmental disasters in modern Canadian history.[136]

Following the Mount Polley disaster, a panel of independent experts convened by the British Columbia government made several recommendations for future designs. The panel recommended using best available technology to shift away from storing tailings in ponds, to dry tailings storage. The panel also recommended eliminating surface water from tailings impoundments, promoting unsaturated conditions in the tailings through drainage, and achieving solid conditions throughout the tailings deposit through compaction.

DAM 3 Experts in the U.S. have warned of similar tailings dam failures and risks to downstream environments. A 2010 study concluded that 28 percent of sampled copper mines had experienced partial or full tailings dam failures. Of worldwide tailings dam failures, 39 percent occur in the United States, including a 2012 tailings release in Alaska at the Nixon Fork dam.[137]

The DEIS analyzed an alternative that would alleviate many of the safety concerns associated with the tailings dam. The dry stack tailings method would eliminate much of the water from the mine tailings before storage. Dry stack storage would then require a smaller area and a smaller containment dam, lessening the likelihood of a catastrophic tailings spill. The dry stack method would not eliminate all dangers, however, but the lowered probability of a dam failure should have received greater attention from the Army Corps, and is an environmentally preferable option.

## VI. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S LIKELY EFFECTS ON THE KUSKOKWIM RIVER

Currently barges deliver supplies to Bethel and upstream villages during the summer months, but the Kuskokwim River's use is predominantly low-impact and minimal in scale. The project's plan to increase barging on the river by 180 percent[138] requires the Army Corps to take a hard look at the likely effects to the river system, especially cumulative effects and likely accident scenarios.

The proposal calls for 150-foot long barges to be operated 24 hours per day, 7 days per week on the Kuskokwim River.[139] Donlin will make a total of 122 round trips during the 110-day

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[136] *Id.*

DAM 3 [137] Alaska Department of Natural Resources, "Warning for Violation of Certificate of Approval to Operate a Dam Nixon Fork Tailings Dam," March 19, 2012.

[138] DEIS at 3.2-83.

[139] DEIS at 2-45.

season.[140] Diesel will be hauled to the mine site by four fuel barges pushed by a tug boat, with a capacity of 1.29 million gallons of fuel per trip.[141]

In addition to the barge trips, the project calls for terminal and port facilities to be constructed. Donlin will build a barge terminal at Jungjuk "approximately 177 river miles upstream of Bethel and approximately 57 river miles upstream of Aniak."[142] Supplies and diesel will be offloaded from the barges and trucked to the mine site via a newly constructed mine access road. Port facilities, including massive diesel storage tanks, will also be constructed and expanded in Bethel.[143]

FISH 2

Disturbance to local river uses, disruption of local supply barges, dislocation of subsistence hunting and fishing sites, stream bank erosion, and the potential for oil spills in the river are just a few of the potential effects of Donlin's barging plan on the Kuskokwim River. The cursory discussion and analysis of those effects presented in the DEIS does not rise to the level of a hard look required by NEPA.

## VII. THE DEIS FAILED TO TAKE A HARD LOOK AT THE LIKELY EFFECTS OF NOISE AND DISTURBANCES

The DEIS did not disclose likely noise and disturbance impacts caused by the natural gas pipeline, particularly the compressor station located within the Susitna Flats Game Refuge. The analysis of noise disturbance to the community of Beluga, more than five miles away, does not accurately describe the impacts of noise and disturbance on the natural environment. There will likely be effects to birds and wildlife, and consequently, human uses of the refuge resulting from the increased noise and disturbances from ongoing pipeline use.

NOI 1

Construction and operation of the natural gas pipeline will involve "noise impacts" to the surrounding area.[144] During construction there will be "drilling and blasting"[145] and the use of heavy equipment.[146] Those activities have a high likelihood of disturbing birds and other wildlife within the refuge. Even though construction activities are expected to be temporary, the DEIS does not disclose the likely effects, or analyze whether those construction activities will disturb important ecological functions.

Ongoing noise and disturbances are also likely to affect birds, other wildlife, and refuge users. The DEIS acknowledges that there will be noise caused by the pipeline's day-to-day operations. "Noise generated at the compressor station during the operations phase would

[140] DEIS at 3.21-155.
[141] DEIS at 2-45.
[142] DEIS Appendix R at R-1-1.
[143] DEIS Appendix R at R-1-1–3.
[144] DEIS at 3.9-28.
[145] DEIS at 3.9-58.
[146] DEIS at 3.9-28.

NOI 1

originate mainly from operation of two compressor machines and electric motors, fin-fan coolers, blowdown processes, and pipeline pig(s)."[147] And the DEIS concludes that the operations noise will not be significant in Beluga, five miles away, where there is expected to be only a 1 dBa increase in ambient noise – a change not perceptible by humans.[148]

But the DEIS does not analyze the noise effects in the area of the refuge surrounding the compressor station. A 1 dBa increase 5 miles away means that ambient noise increases will be greater closer to the source. Birds and wildlife are likely to be affected by that noise and disturbance, and may avoid the area.

NOI 1

The Susitna Flats Game Refuge was established by the Alaska Legislature in 1976 "to ensure the protection of fish and wildlife populations and habitat, and to provide for public opportunities for wildlife viewing, photography, recreation, and the use of fish and wildlife and their habitats."[149] The Alaska Department of Fish and Game manages the refuge to "protect, maintain, and improve the fish, game, and aquatic plant resources of the state, and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle.[150] Thus, the legislative and management purposes of the refuge are likely to be significantly affected by the compressor station noise and disturbances. The Army Corps should have considered those effects and any changes to wildlife viewing in the refuge.

## VIII. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S EFFECTS ON WETLANDS

The DEIS failed to take a hard look at the effects to wetlands. Wetlands are a critical ecological component, performing ecological functions such as providing aquatic and terrestrial habitat, water filtration, and flood mitigation. The long-term effects of wetland loss across the U.S. are just beginning to be felt, and will be exacerbated by climate change-induced loss to even more wetland acreage. The DEIS should have disclosed and analyzed how the cumulative effects of wetland loss resulting from the project will affect local and regional ecosystems.

CWA 5

"Eighty-two percent of the mine transportation wetland study area is wetland."[151] And "between 10 and 35 percent of the mine site study area wetlands that are rated high for any [hydrologic] functions would be altered by mine construction."[152] The pipeline route will

[147] DEIS at 3.9-58.
[148] DEIS at 3.9-65.
[149] DEIS at 3.15-15.
[150] 5 A.A.C. 95.420.

NOI 1

[151] DEIS at 3.11-29.
[152] DEIS at 3.11-59.

CWA 5

affect wetlands "across the Alaska Range region from MP 82 to MP 156."[153] "Forty five percent of the pipeline wetland study area is wetland."[154]

The DEIS acknowledges a Clean Water Act Section 404 permit is required for each aspect of the project (mine site, transportation, and pipeline).[155] The preliminary disclosures for the Section 404 permit indicate at least 15,984 acres of wetlands will be destroyed – a result of 1.5 million cubic yards of fill.[156] That level of wetland destruction should be cause for alarm, and necessitates careful consideration of a mitigation plan.

CWA 5

But the DEIS failed to adequately consider the cumulative effects on wetland destruction. The mitigation plan, as described in the DEIS, is not fully developed, nor does it explain how losses in ecological functions will be mitigated. Wetland and riparian area improvement projects in other areas may satisfy legal requirements for Section 404 mitigation, but are not apparently aimed at replacing the ecological functions that wetlands provide in the affected area. That distinction is important because of the role wetlands play in anchoring the ecology on which subsistence livelihoods in the Kuskokwim region depend.

Additionally, the DEIS did not take a hard look at the cumulative effects of wetland loss, particularly caused by climate change. Warmer and drier conditions are expected for most of Alaska in the coming decades. The DEIS mentions climate change as a cumulative impact in one paragraph on the discussion of wetlands, declaring, obviously, that "warming may also increase the thawing of permafrost over time."[157] That level of analysis is unacceptable for a project openly proposing the destruction of 16,000 acres of wetlands.

## IX. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S LIKELY EFFECTS ON SALMON AND OTHER FISH

The Kuskokwim River supports all five species of Pacific salmon and a variety of other native fishes. Salmon, particularly Chinook salmon, form the basis of an interconnected food

FISH 2

web in the Kuskokwim Basin and the subsistence way of life for local communities. The project's likely effects on salmon and other fish in the Kuskokwim and its tributaries were underestimated by the DEIS. The project is likely to have significant effects on salmon spawning and availability for subsistence harvest for generations to come.

The mine site is situated in the headwaters of the Kuskokwim River, which supports prime salmon spawning and rearing habitat within tributary streams. Streams adjacent to the mine site, including Anaconda, American, and Crooked Creeks "support spawning by Chinook,

[153] DEIS at 3.11-41.
[154] DEIS at 3.11-41.

CWA 5

[155] DEIS Appendix J at J-1.
[156] DEIS Appendix J at J-18.
[157] DEIS at 3.11-118.

coho and chum salmon and rearing by juvenile Chinook and coho salmon."[158] "On average, 170 redds are documented each year in the Crooked Creek watershed during summer surveys."[159] "Fall redd surveys have documented a five-year average of 288 redds in the Crooked Creek watershed."[160]

But the mine's location in the Crooked Creek basin means that over 8 river miles of river habitat will be completely lost.[161] "Construction and operation of mine site facilities within the American Creek watershed would result in a loss of 4.1 miles of perennial aquatic habitat, of which approximately 0.5 mil is documented as anadromous water for coho salmon rearing."[162] "In American Creek there would be a direct loss of stream channel habitat that may support up to 196 (SE=94) juvenile coho salmon."[163]

FISH 2 And "construction and operation of the TSF would result in a loss of 1.5 miles of aquatic habitat for resident fish and aquatic invertebrates. Approximately 865 feet of stream channel upstream from the mouth of Anaconda Creek is cataloged as Anadromous Water for coho salmon rearing."[164] According to the DEIS, "[m]oderate impacts are associated with loss of Chinook and coho rearing habitat through direct loss of two creek channels and the effects of reduced flow in Crooked Creek."[165]

Despite those impacts, the DEIS concludes that overall salmon and fish losses will be minor or moderate.[166] That conclusion demonstrates a severe underestimation of the importance of the headwaters habitat for salmon. The Army Corps should reevaluate several important issues associated with salmon loss, including the effect of the mine on already declining salmon populations, increasing water temperatures caused by climate change, increases in turbidity that will result from mine-associated stream disturbances and erosion, and the cumulative impacts of climate change and other mines and placer operations in the Kuskokwim watershed.

## X. THE DEIS FAILED TO TAKE A HARD LOOK AT THE LIKELY EFFECTS OF THE PIPELINE

REC 6 In addition to all of the specific concerns raised throughout this letter, the proposed 315-mile natural gas pipeline from Beluga to the mine site raises general questions about the

[158] DEIS Appendix Q at Q-iii.
[159] DEIS Appendix Q at Q-10.
[160] DEIS Appendix Q at Q-10.
[161] DEIS at 2-178.
FISH 2 [162] DEIS Appendix Q at Q-24.
[163] DEIS Appendix Q at Q-24.
[164] DEIS Appendix Q at Q-24.
[165] DEIS Appendix Q at Q-iii.
[166] DEIS at 3.13-179.

effects to human uses and natural resources.[167] The DEIS failed to take a hard look at the those effects on rural Alaska communities and the environment.

REC 6 The precedent of creating a new pipeline to bring energy to a remote part of the Alaskan frontier, particularly for a temporary project, raises significant concerns. Pipelines are permanent structures on the land – the right-of-way cleared by Donlin for this pipeline will likely remain in perpetuity, affecting recreation and resource-use for generations to come. Other pipelines to rural places in Alaska might be proposed following this project, increasing the likely environmental impact of a single right-of-way. Consequently, the DEIS should place a special emphasis on analyzing any plausible alternative to the pipeline's construction.

FISH 13 The cumulative effects of the pipeline construction, operation, and decommissioning also warrant significantly greater analysis than the DEIS provides. There are 77 locations along the pipeline route where construction and pipeline alignment will occur near and up gradient from essential fish habitat.[168] The pipeline route involves 452 stream crossings, of which 163 support native fish populations, and 42 major river crossings, all of which are essential fish habitat.[169] The DEIS did not analyze the cumulative effects on salmon of multiple stream crossings within the same essential fish habitat, or the cumulative effects to fish populations in general.

REC 6 The DEIS also failed to analyze the likely increases in recreational use of the pipeline right-of-way and the approximately 156 miles of "temporary" roads. Increased use of those trails could lead to human-caused wildfires, made worse by climate change and the drying of Alaska's interior forests.

## XI. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S EFFECTS ON SUBSISTENCE USES

SUB 1 Subsistence livelihoods define the Yukon-Kuskokwim region and rural communities therein. Unfortunately, the DEIS fails to consider the project's actual effects on the subsistence way of life. The Army Corps should re-evaluate whether this project is consistent with federal policy of protecting subsistence and traditional uses of resources in rural Alaska.

The Alaska National Interest Lands Conservation Act (ANILCA) directed federal agencies in Alaska to protect resources for traditional ways of life. Under ANILCA, subsistence means "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation."[170] Congress declared it to be policy that "non-wasteful subsistence uses of

REC 6 [167] *See* DEIS at 3.25-1.

FISH 13 [168] DEIS Appendix Q at Q-47.

[169] DEIS at 2-113.

SUB 1 [170] ANILCA at § 803.

fish and wildlife . . . shall be the priority consumptive uses of all such resources on the public lands of Alaska."[171]

Before issuing the permits for this project, federal agencies must determine whether it will interfere with subsistence uses.

> "In determining whether to . . . permit the use, occupancy, or disposition of public lands under any provision of law . . . the head of the Federal agency having primary jurisdiction over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes."[172]

Subsistence hunting and fishing has occurred on and near the Kuskokwim River "for thousands of years."[173] Thirty-eight communities and villages exist along the Kuskokwim River, containing approximately 4,600 households.[174] The Kuskokwim River subsistence fishery is one of the largest in Alaska, and the local communities are highly dependent on subsistence fishing for their livelihoods. Of the 4,600 households in the region, more than 1,500 engage directly in subsistence fishing.[175] "In some communities, fish have contributed as much as 85 percent and salmon 53 percent of the total pounds of the annual fish and wildlife harvested."[176]

SUB 1

Chinook salmon provide the most sought after and harvested fish in the Kuskokwim. The 10-year average subsistence harvest includes 82,099 Chinook, 65,266 chum, 41,093 sockeye, and 37,173 coho salmon.[177] But recently, runs of Chinook have been in sharp decline. "The reduced run size and escapement in recent years represent some of the lowest recorded in 35 years, except for the mid-1980s and the year 2000."[178]

The decline in Chinook runs has already affected subsistence harvest along the Kuskokwim. "The annual subsistence harvest of Chinook salmon has decreased 3 years in a row from a 10-year high of 98,103 fish in 2008."[179] And the 2012 harvest was 22,527 – significantly below the 10-year average.[180] Low runs of Chinook have meant that there has been no commercial harvest since 2013.

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[171] ANILCA at § 802.
[172] ANILCA at § 810.
[173] DEIS at 3.13-47.
[174] DEIS at 3.13-47.
[175] DEIS at 3.13-47.
[176] DEIS at 3.13-47.
[177] DEIS at 3.13-48.
[178] DEIS at 3.13-48.
[179] DEIS at 3.13-62.
[180] DEIS at 3.13-48.

The BLM's Section 810 Preliminary Analysis of Subsistence Impacts is included in the DEIS at Appendix N. The BLM's findings indicate that the "effects to subsistence from the mine site would have the most effect on communities closest to the mine … [and] change the distribution of wildlife species important to subsistence (moose, caribou, furbearers)."[181] Importantly, those effects "would be long term."[182]

The BLM correctly determined the project posed significant threats to continued subsistence use of the resources in the project area. Berry picking "would be directly affected by the mine, and adjacent areas would potentially be contaminated with dust emissions containing various particulate materials from ore processing."[183] And "water released from the mine during operations has the potential to affect salmon and resident fish populations important to subsistence."[184]

The effects of a diesel spill, tailings dam failure, or some other environmental disaster also pose significant threats to continued subsistence uses. According to the BLM, "The effect of this spill scenario would have major impacts to subsistence resources on the Kuskokwim River."[185] And a tailings dam failure would result in

> "impacts to subsistence resources and use [including] reduced access for local subsistence users, and contaminated water resources important for fish and terrestrial wildlife, including salmon and resident fish populations. A tailings dam failure could not be easily or quickly cleaned up, and affects would continue long term, and would affect subsistence fish resources in communities down river from the mine."[186]

SUB 22

The BLM's overall Section 810 findings concluded that

> "Alternative 2 may result in significant restriction to subsistence uses for the communities of Crooked Creek and Napaimute . . . Bethel, Napaiak, Napaskiak, Oscarville, kwethluk, Akiakchak, Akiak, Tuluksak, Upper and lower Kalskag, Aniak, Chuathbaluk, Napaaimute. . . . [and] the communities of McGrath, Nikolai and Takotna for increased access and competition from non-local users at the Farewell airstrip [and] along the pipeline right-of-way."[187]

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[181] DEIS Appendix N at N-10.
[182] DEIS Appendix N at N-10.
[183] DEIS Appendix N at N-10.
[184] DEIS Appendix N at N-11.
[185] DEIS Appendix N at N-12.
[186] DEIS Appendix N at N-13.
[187] DEIS Appendix N at N-14.

The draft findings conclude that the Donlin project "is far larger and far more geographically widespread than any actions that have occurred in the region to date, and will itself cause alterations in subsistence resources, access to subsistence resources and comp[etition] for subsistence resources."[188]

SUB 22

BLM's Section 810 conclusion is accurate and demonstrates that at least one federal agency recognizes the serious implications of the project to subsistence uses. As a result, the Army Corps should select the no action alternative to preserve subsistence hunting and fishing opportunities in the Kuskokwim.

## XII. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S EFFECTS ON ENVIRONMENTAL JUSTICE

The Kuskokwim River region and communities are predominantly Native American. As evidenced by the level of subsistence use and dependence on the Kuskokwim's natural resources, the burdens of the project will fall disproportionately on the local native communities. The DEIS understated the importance of that obvious conclusion.

Federal policy has stressed the need to eliminate all forms of environmental racism and injustices, including the imposition of disproportionate pollution and contamination in minority communities. Executive Order 12898 defines environmental justice as,

EJ 2

> "[t]he fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies."[189]

The DEIS should have concluded that the project will result in unfair treatment (bearing "a disproportionate share of negative environmental consequences") for various local native communities. That conclusion should have been disclosed to the local communities prior to the public comment period, giving the communities a fair opportunity to comment on the project and its likely effects.

SUB 22 [188] DEIS Appendix N at N-23.

EJ 2 [189] Executive Order 12898.

## XIII. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S LIKELY EFFECTS ON RECREATION

REC 6 The project will significantly affect recreation in remote parts of Alaska and very likely lead to increased use of new and existing trails. The consequences of likely changes in recreation are significant to the natural and social environments. Unfortunately, the DEIS did not take a hard look at the project's likely impacts to recreation, particularly the detrimental effects to the Iditarod National Historic Trail (INHT).

The 315-mile natural gas pipeline from Cook Inlet to the mine site would follow a 50-foot wide right-of-way through the Alaska Range, skirting to the south of Denali National Park.

IDIT 6 Over 150 miles of new roads would be used to construct the pipeline. It is unclear whether those roads will be decommissioned following construction or continuously used for pipeline maintenance. The pipeline route would follow the INHT closely for over 10 miles.

The INHT is a 900 mile trail historically used for the Iditarod sled dog race. The INHT has been recognized "[a]s a principal recreational resource of the area, and one of historic significance to Alaska and the nation."[190] The INHT was congressionally recognized as a national historic trail "to protect the historic route and its historic remnants and artifacts for

IDIT 6 public use and enjoyment."[191]

The INHT is predominantly known and appreciated for its natural qualities, and "the undeveloped or primitive nature of this trail system was identified as a unique feature."[192]

IDIT 8 Unfortunately, the Donlin project would completely change the undeveloped and primitive nature of much of the trail. "Effects would come from disturbance during construction, clearing of shrubs from the pipeline right-of-way at approximately 10-year intervals during the operations and maintenance phase."[193] The pipeline route overlaps with the INHT for 4 miles and is within 1,000 feet of the route for an additional 10 miles.

Many recreational activities would be displaced during pipeline construction and operation. Other recreational users would likely avoid the area and seek recreation opportunities

IDIT 6 elsewhere because of the disturbances caused by the pipeline. Off-road vehicle use, non-motorized recreation, and sport and subsistence hunting and fishing would all be affected by the pipeline.[194]

IDIT 6

According to the DEIS, "[t]he ROW could become an overland access route for off-road vehicles and snowmachines in a remote region that currently lacks easy access."[195] The

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IDIT 6 [190] DEIS at 3.16-2.
[191] DEIS at 3.16-4 (citing NPS, 2012).
[192] DEIS at 3.16-4.
IDIT 8 [193] DEIS at 3.16-4.
IDIT 6 [194] DEIS at 3.16 at 17.
[195] DEIS at 3.16-20.

IDIT 6 effects of increased motorized use on the INHT will significantly change the character of that remote and primitive recreational opportunity.

In a February 2016 op-ed, Iditarod racer, Dan Seavey argued that the effects of the pipeline will be "complete, irreversible destruction of the scenic and cultural nature of a 58-mile stretch of our Iditarod National Historic Trail."[196] That conclusion is supported by the DEIS's statement that "the duration of impacts would be long-term due to the proposed pipeline corridor."[197]

REC 6 Although the DEIS acknowledged the likely significant impacts of the pipeline on recreation, the analysis failed to consider the likely long-term increase in motorized use of the new access roads used to construct the pipeline. The DEIS simply disclosed that the pipeline would "intersect or follow along 12 state-claimed R.S. 2477 ROWs"[198] and those rights-of-way "may provide an optional route as attractive to winter recreationists as the INHT, and may increase the use of both the INHT and the proposed pipeline ROW for commercial guided and dispersed recreation off-road travel, sport hunting, and sport fishing where the two are in close proximity."[199]

REC 6 But the DEIS failed to analyze likely impacts of permanent recreational and transportation use of those new and claimed R.S. 2477 rights-of-way. The BLM has authority to make administrative determinations of the existence and scope of R.S. 2477 rights-of-way for planning purposes, but the legality of the rights-of-way for all other purposes must be determined by a federal court.[200] The improvements and construction of maintenance roads on those claimed, but un-adjudicated R.S. 2477 routes will likely lead to increased use and degradation of primitive parts of Alaska. Increased use of the R.S. 2477 routes will likely cause increased hunting pressures, and negative effects on wildlife. The Army Corps should consider those effects, and the cumulative impacts of increased use of the R.S. 2477 routes and pipeline in a supplemental EIS.

## XIV. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S LIKELY EFFECTS ON WILDLIFE

WILD 8 The DEIS analyzed some of the project's direct effects on wildlife, including displacement of wildlife and habitat from the mine site, transportation facilities, and pipeline corridor. But throughout the DEIS, the Army Corps attempted to minimize the significance of the

[196] Dan Seavey, *Iditarod Trail: Proposed Pipeline to Donlin Gold Mine Would Ruin a Piece of History*, ALASKA DISPATCH NEWS, February 17, 2016.

[197] DEIS at 3.15-22.

REC 6 [198] DEIS at 3.15-23.

[199] DEIS at 3.16-21.

REC 6 [200] DEIS at 3.15-22; *see Southern Utah Wilderness Alliance v. BLM*, 425 F.3d 735, 758 (10th Cir. 2005) (BLM may make administrative determinations of the existence and scope of R.S. 2477 rights-of-way for planning purposes and management).

project's effects on wildlife. And more importantly for NEPA purposes, the DIES failed to consider a broad range of indirect and cumulative effects on wildlife.

WILD 8 This section discusses some of the likely significant effects on wildlife that the Army Corps should consider in more detail as part of a supplemental EIS. The Army Corps should analyze and disclose the likely effects of changes to and increased hunting practices, threats to marine mammals from vessel strikes, likely consequences for birds, and likely effects to threatened and endangered species.

### A. Increased Hunting Pressures on Predator and Game Species

The Kuskokwim Basin is home to many of Alaska's keystone wildlife species, most of which are important for subsistence or sport hunting and trapping. Predators such as bears, wolves, and wolverines should have been a focus of the DEIS's analysis because those species are of particular concern to the public and have been targeted for intensive management by the state of Alaska.

WILD 8 The DEIS noted that the study area provides good habitat for bears, wolves, and wolverines; and all three species are found in areas that will be significantly affected by the project. The project area likely supports "20 bears per 1000 mi²" which means that at least "200 bears" will be directly displaced.[201] Good bear habitat quality also means that there will likely be a significant number of wolves and wolverines directly displaced or harmed by the project.

Indirect and cumulative effects on the project include the likely increased pressures on wildlife from subsistence and sport hunters. The DEIS noted that predators in western Alaska are already subject to state policy that encourages predator hunting and trapping to artificially inflate ungulate (moose) population numbers: "Since 2004, programs have been in place to deliberately reduce the wolf populations in GMU 19A (in the vicinity of the proposed mine)."[202] And the DEIS disclosed that the mine will cause increased hunting pressures on wildlife populations due to changes in subsistence hunting grounds and increased hunter access through the project's road and trail development.[203]

But the DEIS failed to consider the likely cumulative effects on wildlife from increased hunting, habitat loss, mine pollution, and climate change. Each of those factors alone raises significant concern for the future of Alaska's wildlife. Together, the potential effects are alarming. The DEIS should have taken a careful look at the combined effects on wildlife from all of the identified environmental stressors.

WILD 4

### B. Vessel Strikes on Marine Mammals

[201] DEIS at 3.12-19.
WILD 8 [202] DEIS Appendix S at S-7.
[203] DEIS at 3.12-17.

The potential effects on marine mammals from increased barging near the Kuskokwim River mouth and in Cook Inlet also raises significant concerns and was inadequately addressed in the DEIS. The Army Corps should have taken a closer look at the likely effects of increased motorized marine shipping and the cumulative effects on marine mammals.

WILD 4

The DEIS stated that "the potential for vessel strikes in the Kuskokwim River and at the mouth of the river would be minimized by the relatively slow speed at which tugs and barges are expected to travel in that portion of the Project Area."[204] The DEIS, however, cites no studies to show that marine mammals in a riverine or estuary environments like the Kuskokwim will be adequately protected by slow speeds. The sheer number of barges and barge trips – a 120 percent increase in barge travel on the Kuskokwim –suggests that vessel strikes on marine mammals are more likely than the Army Corps expects.

There was also no analysis of the cumulative impacts of the project on marine mammals. Climate change is already decreasing habitat, warming waters, and reducing important marine mammal populations. The increased barge traffic will lead the already at-risk populations of marine mammals to be further stressed by barges and tugs.

MIT 32

The Army Corps should conduct additional studies of the potential effects of marine mammal strikes in the Kuskokwim River and Cook Inlet. Even assuming the vessels will travel at "relatively slow speed[]s" there is a potential for collisions, and the Army Corps should know what the effects of those collisions will be on individuals and populations. The Army Corps should also work with the Coast Guard to develop and implement effective mitigation measures, such as restricting timing of barges or enforceable speed limits. The mitigation measures should apply to other barging operations as well – not just the barges related to the Donlin mine. Those important deficiencies should be resolved in a supplemental EIS.

### C. Effects on Birds

BIRD 3

Over 10,000 bird pairs will be directly affected by the project.[205] "Both common and important species could be affected."[206] There are 29 "important" bird species in the project area, including raptors, such as bald and golden eagles.[207] The DEIS acknowledged the importance of the project's site for raptor habitat: "Raptor species are using the proposed mine site for breeding."[208]

Unfortunately, the DEIS fails to take a hard look at all of the likely indirect and cumulative effects on bird species, especially raptors. The DEIS characterized the effects on birds as localized, presumably meaning that the primary effect will be direct loss of habitat within the

WILD 4 [204] DEIS at 3.12-75.

BIRD 3 [205] DEIS at 3.12-154.
[206] DEIS at 3.12-155.
[207] DEIS at 3.12-138.
[208] DEIS at 3.12-105.

project area.[209] That conclusion ignores likely indirect effects, including loss of prey, population displacement, and increased competition for new nesting sites. Likely cumulative effects include loss of habitat due to climate change, prey loss, and population declines due to multiple factors. A supplemental EIS is necessary to fully disclose and explain each of those effects on birds.

BIRD 3

Most importantly, the Army Corps should supplement the DEIS with a more thorough analysis of how surface water contamination will likely affect birds. The project will leave an open pit lake filled with contaminated water for decades following mine closure. Migrating and resident birds may land in the water, becoming mortally poisoned or chronically affected and unable to successfully reproduce. In other open pit lakes, migrating birds have landed in the water and suffered mortality. The Army Corps should take a hard look at the effects of leaving a contaminated open pit capable of poisoning birds, and passing those contaminants up the food chain.

### D. Effects to Threatened and Endangered Species

Alaska hosts numerous threatened or endangered species. The project is likely to affect Steller's and spectacled eiders, and Cook Inlet belugas – both of which are listed species under the Endangered Species Act. A heightened analysis of the likely effects to these sensitive species is required by NEPA and the ESA.

ESA 2

The DEIS disclosed that both eider species are likely to be affected by development and disturbances caused by the project.[210] Eiders will experience "behavioral disturbance from increased barge traffic; injury or mortality from collisions with barges; and contamination, injury, or death from fuel or chemical spills."[211] Unfortunately, the DEIS inadequately analyzed those likely effects and failed to provide any mitigation measures specifically designed to preserve eiders. The Army Corps should take a harder look at mitigation measures, including mandated speed limits and barge number restrictions, and regulated operating hours for barges. A supplemental EIS is needed to analyze the full array of indirect and cumulative effects to eiders caused by increased use and development of the Kuskokwim, habitat loss, climate change, and increased risk of environmental contamination.

MIT 32

ESA 2

Cook Inlet belugas have been listed under the ESA and are categorized as a depleted species under the Marine Mammal Protection Act (MMPA).[212] The DEIS recognized the potential for beluga injury and mortality from vessel strikes, as well as effects from noise and fuel spills and contamination.[213] Unfortunately, the DEIS understated the significance of those

MIT 32

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BIRD 3 [209] DEIS at 3.12-155.

ESA 2 [210] DEIS at 3.14-1.
[211] DEIS at 3.14-12.

MIT 32 [212] DEIS at 3.14-24.
[213] DEIS at 3.14-34–36.

effects: "behavioral disturbance and temporary avoidance are possible."[214] Indeed. But the DEIS failed to state whether measures designed to avoid effects to belugas were likely to be implemented.

MIT 32 According to the DEIS, "the barge route traverses Cook Inlet Beluga Designated Critical Habitat Area 1 during the time that it is actively used."[215] The DEIS should have disclosed probabilities and likely effects to population dynamics of barge strikes to belugas. The DEIS should also have contemplated a variety of mitigation measures and committed to implementing enforceable, effective mitigation measures designed to minimize barge strikes to belugas. Merely concluding that "[i]njury or mortality of Cook Inlet beluga whales from vessel traffic associated with pipeline construction, is, therefore, considered unlikely"[216] does not rise to the level of a hard look analysis required by NEPA.

ESA 2 And contrary to the DEIS's conclusion that barge traffic is "not considered a major threat to belugas [because] large ships generally travel in relatively straight lines at slower speeds, enabling belugas to more readily avoid them,"[217] there is scientific evidence that marine mammals might avoid any areas with increased surface vessel traffic. A 2009 study by Williams found "that Southern Resident killer whales travel greater distances in the presence of vessels, presumably to avoid these vessels, leading to increased energy expenditure and reduced fitness."[218] Moreover, ""disturbance noise from a passing barge (acute stress) can add to the overall stress budget of an individual marine mammal contributing to general distress and deleterious effects."[219]

The new barges associated with this project in addition to existing barge traffic will contribute to cumulative effects on Cook Inlet belugas. Those effects should have been more thoroughly analyzed, and the conclusion that barging "may affect, not likely to adversely affect"[220] should have been supported with additional scientific information and research unique to the situation and geography of Cook Inlet.

## XV. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S EFFECTS ON INVASIVE SPECIES

INV 2 The analysis of the effects of invasive species on ecological systems throughout Alaska does not rise to the level of a hard look under NEPA. The DEIS discloses some possible vectors of invasive species spread resulting from the project, but does not consider important direct

MIT 32 [214] DEIS at 3.14-34.
[215] DEIS at 3.14-40.

[216] DEIS at 3.14-40.
[217] DEIS at 3.14-40.
ESA 2 [218] DEIS Appendix O at O-35; Williams, R., D.E. Bain, J.C. Smith, and D. Lusseau, *Effects of Vessels on Behavior Patterns of Individual Southern Resident Killer Whales* Orcinus ora, 6 ENDANGERED SPECIES RESEARCH 199 (2009).
[219] DEIS Appendix O at O-35; Williams 2009.
[220] DEIS Appendix O at O-50.

sources of invasive species introduction or cumulative effects on the native ecosystems. Similarly, the Army Corps' reliance on mitigation measures without explaining the likelihood that those mitigation measures will succeed or how mitigation will replace ecological functions lost due to invasive species.

Invasive species will likely be introduced to new areas of Alaska and spread as a result of this project. The DEIS discloses some of the potential vectors of invasive species spread, including proliferation of existing populations, equipment, natural processes, vehicles, vessels, airplanes, and marine vessels.[221] And the DEIS acknowledged that the effects of invasive species could be significant: "the intensity of the impacts of introduction of non-native invasive species on vegetation could be high in locations with known existing highly invasive species, high concentrations of known invasive species, or areas subject to vegetation removal (mine site, road, dock, [etc.]."[222]

In addition to those possible vectors, the DEIS should have analyzed the highly likely scenario that increased recreational use in the vicinity of the mine site and on the natural gas pipeline right-of-way and maintenance roads will facilitate the spread of invasive species. The DEIS failed to take a hard look at the effects of increased invasive species from those potential vectors.

INV 2

The DEIS also irrationally relied on mitigation measures that focused on best management practices and construction equipment.[223] Those mitigation options are important, but do not address the most likely and significant sources of invasive species introduction: vessels and recreational equipment. Population growth, and increased use of the surrounding area is likely to make invasive species a more significant problem in areas like Bethel, which already has relatively high invasive species populations.[224]

Finally, the DEIS failed to take a hard look at the cumulative effects of invasive species, particularly when combined with the effects of climate change. Climate change is expected to result in more significant wildfires, and "an increase in wildlife frequency or size due to drying may increase the potential for invasive species introduction and spread."[225] The "overall warming /drying trend would tend to convert some wetlands to uplands and tend to increase the cover of shrubs and trees in previously open areas."[226] Despite those correct observations, the DEIS offered no analysis of the combined effects of invasive species, wetland loss, and habitat modification; or mitigation measures aimed at any of those combined effects.

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[221] DEIS at 3.10-48.
[222] DEIS at 3.10-48.
[223] DEIS at 3.10-45–46.
[224] DEIS at 3.10-48.
[225] DEIS at 3.10-52.
[226] DEIS at 3.10-52.

## XVI. THE DEIS PRESENTED THE BEST-CASE SCENARIOS FOR SPILL RISKS AND FAILED TO CONSIDER LIKELY SPILL SCENARIOS

The DEIS failed to take a hard look at the risk and consequences of a diesel spill on the Kuskokwim River. The diesel spill scenario analyzed in the DEIS provided a best case scenario. The Army Corps should have examined a spill scenario where more than one diesel barge spilled into the Kuskokwim River.

The state of Alaska oil spill response plans call for preparations and analysis for oil spills based on a best case scenario.[227] For this project, the DEIS analyzed a spill from the oil storage tank farms based on the largest tank, capable of holding 2.8 million gallons. The Oil Discharge Prevention and Contingency Plan deducted amounts of oil that Donlin would have to be prepared to clean up based on a number of "prevention credits."[228] Donlin received a deduction of 5 percent of the maximum spill capacity for implementing a drug and alcohol testing program for workers. Donlin also received a 60 percent credit for planning to install a lined impoundment area. Thus, for Donlin's final oil spill response plan, the total amount of spilled oil considered was only 1.06 million gallons out of the possible 2.8 million gallons.[229] Based on that spill volume, the DEIS disclosed that the plan was to use two tanker trucks collecting a maximum of 2,500 gallons per hour, and skimmers collecting 1,428 gallons per hour.[230] At that rate, the environmental damage will be severe. And the DEIS should have considered the consequences of a much larger spill.

FSR 9 For the diesel barges on the Kuskokwim, the oil spill response plan analyzed a similar best case scenario. Under Alaska regulations, "the owner or operator must plan to contain and control within 48 hours, and clean up within the shortest possible time, 15 percent of the total cargo capacity of the tank vessel or barge."[231] For the ocean barges with a capacity of 70,00 barrels, the oil spill response plan contemplates a spill of 10,500 barrels. For the river barges with capacities of 8,004 barrels (each), the response plan is for a maximum spill volume of 1,200 barrels.[232]

Recovery of spilled oil will be accomplished by skimmers with a capacity of 4,200 barrels daily. The total recovery rate for a river spill is thought to be 175 barrels an hour – but that is based on a scenario where containment equipment has already been deployed. The DEIS disclosed that the recovery of 175 barrels per hour is based on the third day of recovery operations – meaning that the uncontained spill, even for a best case scenario will likely be much larger than disclosed in the response plan.

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[227] DEIS Appendix R at R-1-1.
[228] DEIS Appendix R at R-1-22.
[229] DEIS Appendix R at R-1-22.
[230] DEIS Appendix R at R-1-22.
[231] DEIS Appendix R at R-5-1 (citing 18 AAC 75.440).
[232] DEIS Appendix Q at Q-5-1.

FSR 9 The problem with the oil spill response for river and ocean barging is that Donlin analyzed only 15 percent of a single barge spilling, even though barges will be moved 4 at a time up the Kuskokwim. Thus, a spill affecting more than one barge at a time is highly likely. The DEIS should have analyzed the likely spill scenario of more than one barge spilling diesel into the Kuskokwim.

## XVII. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S EFFECTS ON CLIMATE CHANGE

The DEIS failed to take a hard look at the effects of climate change and the project's contributions to climate change-inducing greenhouse gases. Climate change implications should be a central part of the DEIS, particularly given the scale of greenhouse gases that will be directly and indirectly emitted by the project. A supplemental EIS is required to disclose and analyze the full effects on climate change.

NEPA's purpose is to "help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment."[233] NEPA requires that an agency must provide a level of analysis that is proportionate to the significance of an issue.[234] High quality information and accurate scientific analysis are essential to implementing this mandate.[235] The DEIS should have stated the relevance of reasonable and foreseeable adverse impacts of climate change, and summarized existing, relevant scientific evidence.[236]

CLIM 12 In NEPA analyses, climate change effects are often considered in the context of cumulative effects. NEPA requires agencies to consider the effects, including the cumulative effects, of any action that has "individually insignificant but cumulatively significant impacts."[237] The CEQ defines a "cumulative impact" as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency . . . or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[238] An EIS is "deficient if it fails to include a cumulative impacts analysis."[239]

The Ninth Circuit concluded that "the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to

[233] 40 C.F.R. § 1508.1(c).
[234] *Id.* at §§ 1504.(b), 1504.(g), 1501.7.
[235] *Id.* at § 1508.1(b).
[236] 40 C.F.R. §§1502.22, 1502.24.
[237] 40 C.F.R. § 1508.27(b)(7).
[238] *Id.* at § 1508.7.
[239] *CBD*, 538 F.3d at 1215; *see also Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 895 (9th Cir. 2002).

conduct."[240] There is no question that incremental increases in greenhouse gases can have a cumulatively "significant" effect on climate change.[241] "The fact that climate change is largely a global phenomenon that includes actions that are outside of [the agency's] control . . . does not release the agency from the duty of assessing the effects of its actions on global warming within the context of other actions that also affect global warming."[242] "We cannot afford to ignore even modest contributions to global warming. If global warming is the result of cumulative contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees."[243]

The DEIS violated NEPA because it failed to state the relevance of the proposed mining project and climate change to reasonably foreseeable adverse impacts and summarize existing, relevant scientific evidence.[244] In CBD, the court concluded that the NEPA analysis must not only quantify carbon dioxide emissions, it must "evaluate the 'incremental impact' that these emissions have on climate change or on the environment more generally" and discuss the actual environmental impacts.[245]

Both the U.S. Supreme Court and Ninth Circuit have recognized that climate change is "an issue of national importance."[246] And the Council on Environmental Quality directed that climate change should be a central part of any major EIS:

CLIM 12

> "The analysis of impacts on the affected environment should focus on those aspects of the human environment that are impacted by both the proposed action and climate change. Climate change can affect the environment of a proposed action in a variety of ways. Climate change can increase the vulnerability of a resource, ecosystem, human community, or structure, which would then be more susceptible to climate change and other effects and result in a proposed action's effects being more environmentally damaging. For example, a proposed action may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is exposed to increasing atmospheric temperatures. Such considerations are

[240] *CBD*, 538 F.3d at 1217.
[241] *Id.* at 1222.
[242] *Id.* at 1217.
[243] *Id.* (citing *City of Los Angeles v. NHTSA*, 912 478, 501 (D.C. Cir. 1990) (Wald, C.J. dissenting); *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1032 (9th Cir. 2006) ("no provision of NEPA . . . allows [agencies] to eliminate possible environmental consequences form analysis by labeling the risk as "unquantifiable").
[244] 40 C.F.R. §§ 1502.22; 1504.24; *Center for Biological Diversity*, 538 F.3d 1172, 1216 (9th Cir. 2008).
[245] *See also* CEQ 2014 (agencies should project greenhouse gas emissions, and assess potential changes in carbon sequestration and storage)
[246] *Massachusetts v. EPA*, 549 U.S. 497, 521 (2007) ("The harms associated with climate change are serious and well recognized."); *CBD*, 538 F.3d 1172, 1221–24 (9th Cir. 2008).

> squarely within the realm of NEPA, informing decisions on whether to proceed with and how to design the proposed action so as to minimize these impacts, ultimately enabling the selection of smarter, more resilient actions."[247]

The DEIS discussed some aspects of climate change, concluding that it "will impact vegetation, and subsequently wetlands, wildlife, fish, and subsistence resources."[248] And climate change's importance to Alaska in general was disclosed: "changes to fish and wildlife resources are anticipated by the state of Alaska;" "expected changes [to fish] include species range shifts to fish tolerant of warmer waters; temporal shifts in prey and predators; food web alterations due to temperature and acidification changes; habitat changes such as turbidity increases; or shifts in run timing."[249] Consequently, subsistence harvest activities "may be affected by potential shifts in hunting seasons. . . . [i]n other cases, shifts in distribution or abundance of favored species may affect harvest opportunity."[250]

But the DEIS downplayed the significance of the project's contributions to climate change: "Donlin Gold Project would overall cause minor impacts to climate change."[251] The evidence presented in the DEIS contradicts that conclusion.

According to the DEIS, "the intensity of direct [greenhouse gas] emissions from project activities at the mine site would be medium (between 1 and 10 percent of Alaska annual [greenhouse gas] emissions."[252] The entire project would cause the direct emissions of up to
CLIM 12 1,760,469 tons per year of CO2-e during operations.[253] That amounts to roughly 3 percent of the annual emissions of the entire state of Alaska.[254]

In comparison, other industrial emitters in Alaska do not even come close to Donlin's expected emissions. "[T]he oil and gas industry in Alaska emits a total of about 11,800,000 MT per year; and three large operating mines in Alaska (Greens Creek, Kensington, and Red Dog)each have reported annual [greenhouse gas] emissions in the range of roughly 25,000 to 150,000 MT."[255] The closest comparison is the Red Dog mine in western Alaska, which reports emitting approximately 152,985 MT per year.[256]

NEPA's purpose is to "help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the

[247] CEQ 2014 Guidance at 22.
[248] DEIS at 3.26-1.
[249] DEIS at 3.26-22.
[250] DEIS at 3.26-23.
[251] DEIS at 3.26-2.
[252] DEIS at 3.26-2.
[253] DEIS at 3.26-26.
[254] DEIS at 3.26-7.
[255] DEIS at 3.26-26.
[256] DEIS at 3.26-7.

environment."[257] By not providing an accurate description of the likely greenhouse gas emissions of the project, the Army Corps distorted the ability for the public to weigh in on the project.

NEPA also imposes a duty on federal agencies to gather information and do independent research when missing information is "important," "significant," or "essential" to a reasoned choice among alternatives.[258] But the DEIS failed to present information or analyze the effects of producing and transporting the natural gas that will be burned to power the mine. For example, the DEIS fails to discuss the implications of hydraulic fracturing operations to
CLIM 12 produce natural gas, and the impacts regarding waste disposal and climate change they implicate. The Army Corps irrationally considers these integral components of the project to be beyond the scope of the DEIS. Yet, that information, and the effects to climate change and the environment of producing and transporting natural gas to the Donlin mine are important, significant, and essential to a reasoned analysis of this project.[259]

Finally, the DEIS failed to provide a rational and thorough discussion of the cumulative impacts of climate change. The addition of over 1 million tons of greenhouse gases per year is significant, and will hasten environmental changes in Alaska. The failure to consider cumulative effects on stream flow, water temperature, salmon habitat and other key components of ecosystems is arbitrary and capricious in light of the case law in the Ninth Circuit.[260]

## XVIII. THE DEIS FAILED TO TAKE A HARD LOOK AT THE PROJECT'S CUMULATIVE IMPACTS

NEP 6 The DEIS failed to take a hard look at the project's cumulative effects on the environment. NEPA defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions."[261] The Ninth Circuit requires agencies to take a hard look at cumulative impacts of a project.

---

[257] 40 C.F.R. § 1500.1(c).

[258] *Oregon Environmental Council v. Kuzman*, 817 F.2d 484, 495 (9th Cir. 1987) (citing *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1244, n.5, 1248–49 (9th Cir. 1984)).

[259] *Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 43 (1983) (an "agency
CLIM 12 must examine the relevant data and articulate a satisfactory explanation for its action" and its decision is arbitrary and capricious when an agency "entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view of the product of agency expertise.").

[260] See *South Yuba River Citizens League v. National Marine Fisheries Service,* 723 F. Supp.2d 1247, 1273–74 (E.D. Cal. 2010).

NEP 6 [261] 40 C.F.R. § 1508.7.

But the DEIS's 57 pages of cumulative impacts analysis is insufficient when compared to the thousands of pages total in the DEIS. The Army Corps lists potential impacts, but does not describe or analyze them in detail; it refers to paragraphs in specific sections of the DEIS but does not combine different effects; and it provides no quantifiable data on the likely effects of the project when considering each of the separate impacts together.

NEP 6

The Ninth Circuit has made it clear that the NEPA demands more from an EIS. "Consideration of cumulative impacts requires 'some quantified or detailed information; [g]eneral statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent justification regarding why more definitive information could not be provided."[262] The Army Corps failed to include a rigorous review of cumulative impacts. Thus, a supplemental EIS to disclose and discuss those impacts is necessary before the project may move forward.

NEP 6

[262] *Kern v. BLM*, 284 F.3d 1062, 1075 (9th Cir. 2002) (quoting *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1379 (9th Cir. 1998)).

February 18, 2016

Keith Gordon, Project Manager

U.S. Army Corps of Engineers

P.O. Box 6898

JBER, Alaska 99506-0898

Dear

VIS 1

I wish to comment on the Draft Donlin Gold Project Environmental Impact Statement. I'm opposed to the construction of the proposed gas pipeline traveling through our public lands. The construction will result in irreplaceable impacts to the existing high visual qualities of these lands. Specifically, I understand that the Bureau of Land Management (BLM) parcels that would be affected have recently been formally inventoried, identified, and documented as containing Lands with Wilderness Characteristics (Bering Sea Western Interior Resource Management Plan and EIS [BSWI]).

The impacts to the visual qualities would be high and permanent. This is due to the fact that the BLM public lands in question have been identified as being entirely undisturbed and natural. It's documented within the BSWI plan that there are no existing man-made features in proximity to the proposed pipeline corridor. The proposed project would introduce man-made impacts resulting in significant visual impacts to a large area for the very first time. I feel that these impacts would significantly change the overall characteristics and naturalness of these public lands forever. Naturalness and lack of evidence of man on remote lands is what makes Alaska unique and valued.

SER 22

Second, I'm requesting the U.S. Army Corps of Engineers identify somewhere within the EIS what the minimum market price of gold would have to be for this project to be feasible and economical (e.g., at least $1,200 an ounce for project viability, etc.).

CLA 1

Third, please identify the cost(s) to Donlin Gold for any rights-of-way or encroachment permits required by them from public agencies (e.g., Alaska Department of Natural Resources, BLM).

Sincerely,

Audrey Cooper

**From:** Karen Matthias [mailto:kjmatthias@alaskaproducers.org]
**Sent:** Friday, May 13, 2016 11:44 AM
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Comment letter from Council of Alaska Producers

Please find attached a comment letter on the Donlin Gold draft EIS. Thank you.

Karen Matthias
Executive Director
Council of Alaska Producers
PO Box 220193
Anchorage, AK 99522-0193
cell/text (907) 301-
1022 kjmatthias@alaskaproducers.
org Blockedwww.alaskaproducers.
org

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Council of
Alaska Producers

# Comments on Donlin Gold
# Draft Environmental Impact Statement

May 13, 2016

Keith Gordon, Project Manager
U.S. Army Corps of Engineer
Alaska District CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK, 99506-0898

Dear Mr. Gordon:

The Council of Alaska Producers (CAP) is writing to support Alternative 2 of the Draft Environmental Impact Statement (DEIS) for the Donlin Gold project and offer some comments on the other alternatives.

CAP is a statewide, non-profit trade association formed in 1992 for the large metal mines and major metal development projects. CAP provides accurate information on mining related issues and it promotes economic opportunity and environmentally sound mining practices in Alaska. Alaska's five large metal mines are operating to the highest environmental and safety standards and in harmony with our renewable resources.

Donlin has been a member of CAP since the mid-1990s. Over the many years the Donlin team has worked on this project, they have shown that they are truly guided by their values:

- to develop a safe and environmentally responsible project;
- to provide jobs and opportunities for families and businesses in the Yukon Kuskokwim region and Alaska; and,
- to communicate with transparency and respect.

**Alternatives**

SER 1

CAP strongly supports **Alternative 2**, Donlin Gold's proposed project. Lack of development will have a negative social and economic impact on the Yukon Kuskokwim region, particularly as the Alaska economy retracts as a result of low oil prices and cuts in both federal and state budgets. The jobs and the economic stimulus provided by Donlin Gold would help sustain communities in the Yukon Kuskokwim region and fund traditional subsistence activities.

Donlin Gold's proposed project demonstrates an understanding of environmental concerns and features vigorous environmental management principles. It was designed to reduce the overall footprint of the mine and allow for safe management of the water both during the mine life and after closure.

GAS 1 Potentially bringing natural gas closer to Western Alaska could be a game changer in a place where high energy costs are so challenging for businesses and residents. An open access pipeline would bring valuable infrastructure and provide potential opportunities for other users.

Donlin Gold should be commended for such an innovative solution to the mine's energy needs. Natural gas burns much cleaner than diesel and it is also safer to transport. The company listened to public concerns about barge traffic on the Kuskokwim River and they responded by proposing this pipeline so far less diesel would be transported on the river for the mine.

SER 1 **Alternative 1 (no project):** Having no project would have a negative impact on the Yukon Kuskokwim region and Alaska. No project means no new jobs, no local and state revenue, no revenue sharing to other native corporations, and no natural gas pipeline that could bring cleaner cheaper energy opportunities to the region.

PAA 4 **Alternative 3B – Diesel Pipeline:** Alternative 3B is not favored since natural gas is a cleaner, cheaper and safer option with a smaller footprint than diesel power generation.

PAA 46 **Alternative 5A – Dry Stack:** The feasibility of a dry stack approach is questionable due to its high costs and technical challenges; this method is more common for smaller projects and in less severe operating environments. There are no operating dry stacks of this order of magnitude, particularly in a similar climate. Also, a dry stack would increase fugitive dust emissions.

IDIT 4 **Alternative 6A – Dalzell Gorge:** This route would dramatically increase overlap with the Iditarod. We appreciate Donlin Gold relocating the pipeline away from the narrow canyon and difficult terrain of the Dalzell Gorge to the less risky route proposed in Alternative 2.

In closing, Donlin Gold has proposed a safe and environmentally responsible project (Alternative 2) that would be a major economic driver for the Yukon Kuskokwim region by providing high paying, year-round jobs, contracting opportunities, and potential access to a cleaner and cheaper source of energy. Thank you for the opportunity to outline the benefits of the project and to affirm our strong support for Alternative 2 of the Draft EIS.

Sincerely,

Karen Matthias
Executive Director

## Smith, Neal

**From:** Cox, Bob <Bob.Cox@crowley.com>
**Sent:** Wednesday, April 27, 2016 11:28 AM
**To:** donlingoldeis, POA
**Cc:** Kurt.Parkan@donlingold.com; Thomas, Sean
**Subject:** [EXTERNAL] Donlin Gold Project EIS Comment

Keith Gordon, Project Manager
U.S. Army Corps of Engineer
Alaska District CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK, 99506-0898

Dear Sir:

I am writing today in support of the Donlin Gold Project proposed to be constructed in Western Alaska.

As Business Unit leader for Crowley Fuels, I deal with the energy needs of rural Alaska every day. Our company delivers fuel to over 280 communities in western Alaska, including our own fuel terminals in Bethel, Nome, Kotzebue, McGrath, Aniak, Hooper Bay, Fort Yukon, Galena and St Mary's. The logistics of fuel deliveries in western Alaska are extremely challenging, especially given the lack of infrastructure, e.g. port facilities, throughout the region. In our view, the development of the Donlin Gold project will bring new energy supplies to this region leading to lower cost energy to Bethel and the Kuskokwim River region, benefiting thousands of residents.

GAS 1

SER 8 In addition, a successful mine will bring many job opportunities and spin off economic benefits for a region that has a very limited private economy. Family values run deep in the native Alaskan communities of western Alaska and consequently when young people have to move away from their home in order to find a paying job it can be devastating. Donlin Gold will therefore strengthen communities by providing numerous in-region jobs.

Thank you for the opportunity to comment.

Bob

Robert E. Cox
Vice President | Crowley Fuels
bob.cox@crowley.com
Office: 907.777.5534 | Mobile: 907.229.6395

***Safety Is Not Silent***

| | |
|---|---|
| **From:** | Danielle Craven |
| **To:** | donlingoldeis, POA |
| **Cc:** | Josh and Danielle Craven |
| **Subject:** | [EXTERNAL] Donlin Gold EIS Comment |
| **Date:** | Tuesday, May 31, 2016 11:02:58 PM |
| **Attachments:** | Donlin_EISComment_DCraven.docx |

To Whom It May Concern:

My name is Danielle Rae (Dizon) Craven, Tanuk'aq (Yup'ik name), and I am from Bethel, a tribal member of Orutsararmiut Native Council, writing this letter concerning the Environmental Impact Survey and my ultimate decision to oppose the continuous development of the Donlin Gold Mine. I belong to the Calista corporation and am also a descendant of a Bethel Native Corporation shareholder, my mother, Barbara (Nick) Liu. The document that has been well put together raises fear, anxiety, and uncertainty concerning the risks of the waste, the hauling of fuel and waste, and the chemicals and toxins that will harm and effect the ecosystem.

I am 32 years old and have been raised in Anchorage, Nunapitchuk, and for the majority of my schooling and life, in Bethel. My mother is from the village of Nunapitchuk where many of my family members reside.

TWL 3

We have a family fishcamp belonging to our late grandparents Nick O. and Elena Nick of Nunapitchuk, down river from Bethel near the villages of Oscarville and Napaskiak. My childhood summer memories all take place on the bank of the Kuskokwim River, known to many residents and river travelers as "Nick O. Nick's Camp" and our family continues to raise our children valuing the harvest of fish and what the land provides, respecting all animals, water, and beings that inhabit the land. The EIS document outlines many factors that will have an effect upon our river and people, that will have a lasting impact not only upon our summer traditions, but the survival and pursuit of happiness in many Alaska Native and multi-cultural families, such as my own.

HZM 2

The amount of waste that this mine will produce has insurmountable risks. On page 20 of the Executive Summary it states "An estimated 3 billion tons of waste rock would be excavated from the mine pit with
2.5 billion tons placed in the WRF and the remainder backfilled to the completed pit or used to construct the TSF." This is a massive amount of rock waste. The land is not worth the waste the mine is going to produce. It goes to add that 123 million tons of waste will be put into cells to reduce contact with water. In the history of rural development, I don't think any city or village in the Yukon-Kuskokwim Delta has ever had 123 millions tons of waste used for anything. Waste period, is what threatens the ecosystem and rivers.

BARG 1

The amount of river traffic that is going to be added and hauled up and down the Kuskokwim through Dutch Harbor and then on to Anchorage and Seattle has a negative affect on the routines and lifestyles of the people in this region. Many families reside in smaller rural communities, such as Aniak, Chuathbaluk, Stony River, Crooked Creek, down to Akiak, Tuluksak, and Akiachiak, and further down to Tuntutuliak and the coastal villages. The dependence on boats and fuel already has a current impact. Many families not only travel from village to fishcamp, but village to village, village to city, and as far away as village to Bristol Bay for various reasons. The number of round trips per season is not needed along the river. I don't want to avoid barges and have the cargo ships, pipe and equipment shipts, fuel

BARG 1

ships, interfering the daily lives. The biggest impact is on the fish that continue to arrive (though in smaller bundles with this year's King Salmon closures for the second year) and our depending on the fishing and subsistence. Families rely on fish. It is like rice to the Chinese, Potatoes to the Irish.

SUB 13

SVE 5

5,880 trips per season is not needed. It is not worth the annual operation and a 27 year gold mine. When I am 59 years old, and my children who are 5 and 3 now will be adults, we want to continue to care and participate in our valuable fishing and gathering lifestyle, uninterrupted by the effects Barack of this foreign companies gain for wealth.

HAB 1

Lastly, the chemicals and toxic effect of the natural gas pipeline and the waste rock facility has life threatening risks for disaster. The construction of the 315 foot gas pipeline is already having an effect on our environment, cutting down trees and and interrupting the the natural ecosystems. I had a chance to visit the Donlin Gold Mine in the summer of 2007 as a teacher-chaperone for Lower Kuskokwim School District students to visit the mine and learn about the jobs. Seeing a brown bear run across the mountain where the Donlin pit was one my most memorable memories. I had never seen a brown bear in real life. Then, one of the Donlin workers said, "That's where the mine will be, quite a shame isn't it?" I agreed. There is life around Donlin Creek and the land behind Crooked Creek, belonging to Calista and the Kuskokwim Corporation. It is a habitat. The pipeline, just like others all over the state of Alaska has failures. It will fail.

HZM 4

The proposed Angyaruaq port is unnecessary. How can people control the safety of the many chemicals that will sit, particularly the 2,535 tons of cyanide? It will fail and the cyanide will kill fish, harm the waterfowl that land in the water streams and even the animals that drink and swim near these waters.

There are many other factors written and detailed in this document that continue question the ethic and purpose behind this proposal to move forward. The work behind this document is impressive and has communicated the most obvious to me, which is, do not allow this mine to move forward. I speak myself and my family, for all those who can't email, or haven't written a letter, who can't access the internet or navigate a website, those who can't even speak or are literate in English, who haven't listened during the meetings or even our City Council meetings, who want to voice, but are passive or don't know the means. I was talking briefly with my my Uncle Joseph Trim Nick, who is bilingual, and I asked how he felt about the mine, and he told me in his mother-tongue, Yup'ik, "Alingnarquq." He was the first of my immediate family members to voice his opinion. This translated in simple terms means, "It is very scary and creates fear." Please, make the most difficult decision and oppose the progress of this mine for benefit of the people, the ecosystem and our humanity. The documents makes the solution very clear; do not move forward

SVE 2

for the purposes of wealth. Thank you for your detailed work and listening to my concerns.

Thank you for your time and consideration.

Sincerely,

Danielle Craven
PO Box 943
9123 Ptarmigan
Bethel, AK 99559

907-545-3379
joshndanielle@gmail.com (personal e-mail)
danielle_craven@lksd.org (work e-mail)

**From:** Craig, Bill
**To:** Bellion, Tara; Evans, Jessica
**Subject:** FW: [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Wednesday, March 16, 2016 8:02:40 AM

---

Bill Craig
Environmental Department Manager
D 1-907-261-6703 C 1-907-441-7207
bill.m.craig@aecom.com

AECOM
700 G Street, Anchorage, Alaska 99501
T 1-907-562-3366 F 1-907-562-1297
www.aecom.com

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Monday, March 14, 2016 12:32 PM
To: Craig, Bill
Subject: FW: [EXTERNAL] Donlin Gold Draft EIS comment

-----Original Message-----
From: Ryan Cross [mailto:ryanscross@gmail.com]
Sent: Thursday, March 10, 2016 11:16 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

I support Alternative 2 of the Donlin Gold Draft EIS. I believe that the mine can be constructed and operated safely and will provide valuable economic support to the Alaska and the specifically the Kuskokwim River communities.

MON 1 I am however concerned about the significant increase in barge traffic on the upper Kuskokwim River. I believe that for river operations to be performed safety there will need to be frequent and accurate monitoring of river conditions. Inland rivers in Alaska lack accurate charting that is common in navigable waterways of other states. The Kuskokwim River will require a detailed hydrographic survey using modern equipment such as multibeam sonar. Infact, Initial surveys should be performed on a regular basis (annual or biannual) to monitor changes in river shoaling. These surveys should be performed prior to the construction of the Donlin Gold mine.

MON 1 To fully understand river dynamics and the changes in river bed morphology that are associated with discharge rates, current monitoring with stationary and profiling sensors should be performed in conjunction with the hydrographic surveys.

MON 1 Stakeholders have expressed concerns about shoreline erosion. The best tool for accurate and detailed monitoring of shoreline erosion along the entire route will be a vessel based scanning LiDAR. This survey equipment can be used to document conditions and monitor change overtime.

BARG 12 Detailed data and an understanding of the dynamic river conditions will be our best tools for implementing risk mitigation associated with barge traffic on the Kuskokwim River.

--Ryan

--

==========
Ryan Cross
Geophysicist
Eagle River, AK
907-982-8212

Cruz COMPANIES • ALASKA •
7000 East Palmer-Wasilla Hwy • Palmer, Alaska 99645 Tel: (907) 746-3144 Fax (907) 746-5557
www.cruzconstruct.com

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March 1, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Donlin Gold Project

U.S. Army Corps of Engineers,

Cruz Companies is writing this letter in support of the Donlin Gold Project. For the past 30 years, Cruz has been involved in resource development and has provided jobs to 500 working Alaskans from all regions of the state. In a time where oil prices are drastically declining it is vital for Alaska to diversify its economic opportunities. Cruz believes the Donlin Gold Project will help sustain Alaska's future economic growth and development. For instance, the Red Dog Mine has created a stable environment for the North West Arctic region of Alaska for the past 25 years. Below are a few reasons why Cruz is in support of the Donlin Gold Project.

SER 4

- The Project is committed to environmentally responsible development and was designed to reduce the overall footprint of the mine over its life span and post closure.

- The Donlin Gold Project will provide 3,000 new constructions jobs for four years to working Alaskans. As well as 600 to 1,200 jobs for the 27.5 estimated life of the mine.

- Since Calista has the mineral rights and The Kuskokwim Corporation has the surface rights of the mine, their shareholders will ultimately benefit from its development and production. In addition to the skills and training that will be acquired from the thousands of new jobs created.

SER 2

Given the reasons above and Alaska's need to diversity its revenue streams, Cruz Companies is in support of the Donlin Gold Project.

Sincerely,

Dave Cruz
President
Cruz Companies

ANCHORAGE AK 995

01 MAR 2016 PM 4 T

Cruz Construction, Inc.
7000 East Palmer-Wasilla Hwy
Palmer, Alaska 99645

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

995 D6*0898

| | |
|---|---|
| **From:** | Arianna Cruz |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Cruz Companies Support of Donlin Gold |
| **Date:** | Monday, April 25, 2016 11:10:11 AM |
| **Attachments:** | 20160425103433898.pdf |

---

Hello,

Please see attached letter for Cruz Companies support of the Donlin Gold Project.

Thank you,

**Arianna Cruz**
**Cruz Companies**
**CIG, LLC**
**Cell: (907) 841-5150**
**Email: acruz@cruzconstruct.com**

**Labels - Checks**

Cruz COMPANIES • ALASKA •
7000 East Palmer-Wasilla Hwy • Palmer, Alaska 99645 Tel: (907) 746-3144 Fax: (907) 746-5557
www.cruzconstruct.com

April 21, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Donlin Gold Project

U.S. Army Corps of Engineers,

Cruz Companies is writing this letter in support of the Donlin Gold Project. For the past 30 years, Cruz has been involved in resource development and has provided jobs to 500 working Alaskans from all regions of the state. In a time where oil prices are drastically declining it is vital for Alaska to diversify its economic opportunities. Cruz believes the Donlin Gold Project will help sustain Alaska's future economic growth and development. For instance, the Red Dog Mine has created a stable environment for the North West Arctic region of Alaska for the past 25 years. Below are a few reasons why Cruz is in support of the Donlin Gold Project.

SER 4

- The Project is committed to environmentally responsible development and was designed to reduce the overall footprint of the mine over its life span and post closure.

- The Donlin Gold Project will provide 3,000 new constructions jobs for four years to working Alaskans. As well as 600 to 1,200 jobs for the 27.5 estimated life of the mine.

- Since Calista has the mineral rights and The Kuskokwim Corporation has the surface rights of the mine, their shareholders will ultimately benefit from its development and production. In addition to the skills and training that will be acquired from the thousands of new jobs created.

SER 2

Given the reasons above and Alaska's need to diversity its revenue streams, Cruz Companies is in support of the Donlin Gold Project.

Sincerely,

Dave Cruz
President
Cruz Companies

**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline.

SER 5

I hope this is not a E.I.S. stalling gesture we are having poor state of state people, the Kuskokwim need work not useless words.

Only those presently employed will pay this game

Wilben H. Dahl
1319 Juneau Street
Anchorage, AK 99501

Mr. Wilben Dahl
1319 Juneau St
Anchorage, AK 99501

ANCHORAGE AK 995
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USACE
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MAY 26 2016
AK REGULATORY

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

| | |
|---|---|
| **From:** | donlingoldeis, POA |
| **To:** | Craig, Bill |
| **Subject:** | FW: Donlin Gold Draft EIS - Comment |
| **Date:** | Thursday, February 25, 2016 6:51:37 AM |
| **Attachments:** | image001.png<br>image002.png<br>image003.png |

-----Original Message-----
From: David Davenport [mailto:ddavenport@tclcon.com]
Sent: Monday, February 15, 2016 2:24 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS - Comment

Dear Sir/Madam:

NSB 1

Firstly, I wish to commend the USACE team for the clarity and conciseness with which you have represented this project concept to date.

Secondly, as I insert a very strong personal opinion of this project concept, I yet do so with great restraint, as I happen to know a great deal more about the true nature of the current EPA Administration than the general public would care to process.

On the surface, the general public believes the EPA to fiercely fend for the vulnerability of our landscape and wildlife, when in fact deep beneath the surface lay federal funding toward the sole aim of destroying the national economy. As extreme as this sounds, it happens to be more true than most within the American public would choose to believe (more clarity on that note, in a moment).

Thirdly, to keep my position quite simple, is to remind the general public that the proposed footprint of this project is all of 16,300 acres-within a staggering Alaskan landmass of 586,400 square miles. The potential negative environmental impact, in every regard, is at best inconsequential.

By sobering contrast, we must all remain mindful that the two most frightful elements presently threatening the very existence of our nation, and as I type in fact, are: 1) a dangerously decaying military (i.e., national security), and: 2) an economy that has never rebounded since the Great Recession of 2008; for we are in fact in a Depression, and our nation is but a few months away from an economic crash far greater than that experienced in 2008. To therefore flippantly dismiss this project concept for the sake of a largely inconsequential environmental impact, when 80 million people are out of work, is borderline insanity (yes, you read that correctly; 80 million people). The "unemployment rate" presently being circulated by the federal government is a gross falsehood. And yes, I do realize that the USACE is a branch of the federal government. However, the USACE organism is yet quite far removed from the nefarious federal architects I've alluded to thus far.

In closing, I will offer that there are two means by which to more readily condition oneself to accept the

NSB 1

reality of what I have written-and the subsequent reality of the critical points herein which should be seriously considered: 1) understand that I am a nature-lover and an animal-lover-a naturalist. 2) understand that 97% of all news media in the U.S. presently, constitutes a gross distortion of reality-by design. The "Designers" are those many layers deep, beneath what the public understands of the EPA Administration, for example ( <---------the promise of "further clarity," fulfilled).

The U.S. Army Corps of Engineers sports a history of tremendous accomplishment in championing some of the most complex construction projects in the nation's history. It has carried out such with the utmost in professionalism, to include supreme priorities upon Safety and Environmental management. As such, and when weighing the gravity of the certain economic boost to the Alaskan economy as the result of managing such a project, I would not doubt that Donlin Gold, LLC, as a noble gesture of good faith toward the collective Alaskan wildlife conservatory of citizens, would in turn, following my personal challenge and suggestion of such; readily opt to contribute a substantial financial gift to the conservators of the very preservation of the same, throughout Alaska.

In the end therefore, I can see nothing but the quintessential "Win-Win" proposition herein; several thousand people are awarded with excellent job opportunities, and a commensurate number of Alaskan Moose become so jaded with preservation funding by the good graces of Donlin Gold, LLC, that their greatest daily challenge lay not in their survival, but much rather in an ongoing argument over who gets the "remote" - as they recline in Lay-Z-Boy chairs designed just for Moose.

With respect for the remaining elements of our government which are worthy of such, and wishes of goodwill for all involved and impacted; may the first golden shovel touch soil before 2016 comes to a close.

Sincerely,

David Davenport

DAVID.DAVENPORT

Superintendent/Quality Control Manager

TUNISTA.CONSTRUCTION.LLC

33400 8th Avenue South, Suite 105 / Federal Way / WA, 98003

C: 614.271.4399 / O: 253.517.9988x140

8(a), Small Business Administration | An Alaska Native Corporation

ddavenport@tclcon.com <mailto:ddavenport@tclcon.com> | www.tclcon.com <http://www.tclcon.com/>

<https://www.facebook.com/Tunista-Construction-LLC-148712315328254/timeline/> | <https://www.linkedin.com/company/tunista-construction-llc> | <https://twitter.com/tunista1>

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"22 CFR Part 125.4 (b) (9) applicable."

davis constructors & engineers inc.

6591 A Street, Suite 300 • Anchorage, Alaska 99518
*Phone* (907) 562-2336 *Fax* (907) 561-3620
www.davisconstructors.com

February 16, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

RE: Donlin Gold

As a leader in the Alaskan building community, Davis Constructors and Engineers, Inc. would like to provide comments in support of the Donlin Gold Project.

SER 5

Extensive studies have been performed by Donlin Gold to develop an environmentally and socially responsible gold mine project. We are pleased that 3,000 construction jobs will be available for 4 years. With an additional 600- 1,200 jobs for the estimated life of the mine. This 30 year impact to the state construction economy will have a significant and positive impact. The job skills and training received while working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine.

Please let us know if you have any questions.

Regards,

Josh Pepperd
President

davis
constructors
& engineers inc.

6591 A Street, Suite 300 • Anchorage, Alaska 99518
*Phone* (907) 562-2336 *Fax* (907) 561-3620
www.davisconstructors.com

From: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Sent: Thursday, February 25, 2016 6:56 AM
To: Craig, Bill
Subject: FW: Donlin Gold Draft EIS comment
Attachments: Davis Donlin Gold Support Letter.pdf

-----Original Message-----
From: Jenith Flynn [mailto:jenithf@davisconstructors.com]
Sent: Wednesday, February 17, 2016 10:55 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Cc: Josh Pepperd <josh@davisconstructors.com>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

Thanks again, please call with questions.

Jenith Flynn

Marketing Coordinator

Ph: 907-562-2336

Ext: 222

jenithf@davisconstructors.com

Blockedwww.davisconstructors.com

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Thursday, February 25, 2016 6:53:10 AM

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-----Original Message-----
From: Malissa Degroat [mailto:m.degroat@cmiak.com]
Sent: Tuesday, February 16, 2016 8:47 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

NSB 1

Donlin will be a great Project and a decades long benefit to All Alaskans...it has already been great to the region and we need to get on with it ASAP

I am in support 100%

Thanks

Malissa DeGroat

Parts Manager

Construction Machinery Industrial, LLC

5302 Commercial Blvd.

Juneau, Alaska 99801

m.degroat@cmiak.com <mailto:m.degroat@cmiak.com>

Direct: 907-780-4049

Fax: 907-780-4800

Cell: 907-321-4405

**From:** Craig, Bill
**To:** Bellion, Tara; Evans, Jessica; Smith, Neal
**Subject:** FW: [EXTERNAL] Comments on Donlin Mine EIS
**Date:** Thursday, April 21, 2016 8:07:17 AM

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-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Thursday, April 21, 2016 7:57 AM
To: Craig, Bill
Subject: FW: [EXTERNAL] Comments on Donlin Mine EIS

-----Original Message-----
From: Jim Deininger [mailto:jdeining86@gmail.com]
Sent: Wednesday, April 20, 2016 10:53 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Comments on Donlin Mine EIS

I strongly support Alternative 2, Donlin Gold's proposed project. The Donlin Gold project is a rare opportunity to improve the local economy where few other opportunities exist. If this project does not go forward, lack of development will continue the negative social and economic climate of the Yukon Kuskokwim region, particularly as the Alaska economy retracts.

SER 1

Donlin could produce gold for 27.5 years, while providing well-paying jobs. The region experiences some of the highest unemployment rates in the State, with little other employment opportunities. Through the exploration stages, Donlin has shown a strong commitment to local hire as well as showing support to communities and cultures in the region. Alaskan village communities desperately need cash economies that these types of projects provide to instill pride in self worth by providing a viable option dependence on State and public assistance.

SER 10

The development of Alaska mineral resources and protection of the the environment is not an either or judgement as the stilted environmental conversation would have you to believe. Impacts to wetlands would be negligible in a State where far less than 1% of its wetlands has been developed to date. The project will be scrutinized under a rigorous permitting process that reviews and analyzes all potential impacts. Alaska currently has six large-scale mines that adhere to stringent permit requirements required by the National Environmental Policy Act (NEPA) and permitted by a scientifically based permitting process. Donlin would require as many as 100 State and Federal permits and authorizations.

WET 6

Thank you for your consideration.

James W. Deininger

Fairbanks, Alaska

**From:** Lulu Raye
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] No to Donlin Mine
**Date:** Tuesday, May 10, 2016 5:40:35 AM

---

NO to Donlin. We need to step up and take action!! This is our future, our kids futures we are trying to save!!

SUB 1 Shut down Donlin!!! It is the death of subsistence for the villages around the whole area...

*Lulu Demantle*
*Sent from my LG G4, an AT&T 4G LTE smartphone*

Denali Drilling

February 17, 2016

U. S. Army Corp of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Ref: Donlin Gold Project EIS

To Whom It May Concern:

We are writing in support of the Donlin Gold Project. Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project. This project was designed to reduce the overall footprint of the mine and allow for safe management of water over the mine life and after closure.

SER 5

More than $480 million has been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel, and other supplies, with most of that expended in the last ten years. With a proposed 3,000 construction jobs for four years and between 600 and 1200 jobs for the 27.5 estimated life of the mine, this will have a significant and positive impact on the economy of the region and the state.

SER 2

Through the ANCSA 7(i) and 7(j) revenue sharing provisions, the Donlin Gold project will provide revenue to all Alaska Native regional and village corporations and their shareholders. The jobs and the economic stimulus provided by Donlin Gold will help sustain communities in the Yukon Kuskokwim region and fund traditional subsistence activities.

Donlin Gold has worked very hard and spent ten years getting this ready. This needs to get permitted this year so they can get started.

Sincerely,
DENALI DRILLING, INC.

Hal Ingalls

Hal Ingalls
CEO

HI:kh

Denali Drilling, Inc. · 8240 Petersburg Street · Anchorage, Alaska 99507-3131 · 907 562-2312 · Fax 907 562-5971
www.denalidrilling.com · E-mail: denali@ak.net

From: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Sent: Thursday, February 25, 2016 7:03 AM
To: Craig, Bill
Subject: FW: [EXTERNAL] Donlin Gold Draft EIS comment
Attachments: 20160222084535304.pdf

-----Original Message-----
From: Denali@ak.net [mailto:Denali@ak.net]
Sent: Monday, February 22, 2016 8:46 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

This E-mail was sent from "RNP0A2D82" (MP C2550/LD525C).

Scan Date: 02.22.2016 08:45:35 (-0900)
Queries to: Denali@ak.net

| | |
|---|---|
| **From:** | Chris Hamre |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Comments on the Dolin Gold Project |
| **Date:** | Saturday, May 21, 2016 8:32:47 PM |
| **Attachments:** | image003.png |

Denali General Contractors has operated in the lower Kuskokwim area since 1992 and has successfully completed 25 public projects in this region valued in excess of $50 million. We support the proposed Donlin Gold mine project for a number of reasons.

SER 10
- The job skills and training for workers in the mine will create a workforce that will be able to better provide a future in a traditionally economically depressed region.
- 3,000 construction jobs and over 600 jobs for the life of the mine, will have a significant and positive impact on the economy of the region and the state.

SER 18
- Improved transportation and communications infrastructure to support the mine, including port and pipeline facilities, can provide better services and lower cost of energy, goods and services to local residents.

SER 12
- In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care.
- The jobs and the economic stimulus provided by Donlin Gold would help sustain communities in the YK region and fund traditional subsistence activities.

SER 11
- New, high-paying jobs will allow more residents to remain in the YK region and finance the purchase of supplies needed to maintain their traditional way of life for generations to come.
- With a local hire record of up to 90% at their camp during exploration, Donlin Gold has proven their commitment to hiring local residents.

GAS 1
- The proposed natural gas pipeline will have excess capacity should there be an interest in accessing natural gas to address the energy needs of the YKI region.
- The Donlin Gold project was designed to reduce the overall footprint of the mine and allow for safe management of water.
- The natural gas pipeline proposal will result in reducing the amount of diesel barges on the Kuskokwim River.
- Donlin Gold will use a synthetic liner underneath it's entire tailings impoundment.
- A dry closure of the tailings storage facility at the end of the mine's life is a "best practice" Donlin Gold is proposing to ensure an environmentally responsible mining project.
- Donlin Gold will construct an active water treatment plant to ensure that water that is discharged from the site is treated to meet water quality standards.
- TKC and Calista support development of their natural resources for the benefit of the people of the region.
- This economic opportunity for shareholders and descendants is precisely the purpose behind Congress' grant of entitlement of these lands to Calista and TKC.
- The ANCSA corporations recognize the importance of subsistence lifestyle and the possibility of achieving unity and managing the land for both modern and traditional uses.

Please accept our strong support for this great opportunity for our region.

Thank you:

Chris Hamre, President

P.O. Box 111490, Anchorage, AK 99511
907.561.1840, Blockedwww.denaligc.com, chris@denaligc.com

**Smith, Neal**

**From:** STEVE DENTON <dcandm@mtaonline.net>
**Sent:** Friday, April 22, 2016 2:44 PM
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Project EIS

This message is submitted in support of the Donlin Creek EIS Alternative 2, the Applicant's proposed project.

Alaska is feeling significant strains to its economy as a result of the current slowdown and low prices in the oil industry. Given that oil revenues provide over 90% of the revenue to the State, it is imperative that our economy be diversified. No where is the impact of reduced oil revenue felt more acutely than in Alaska's rural communities, which are much more dependent upon State spending than larger urban communities. Mining provides a local source of good jobs and revenue for local governments. The Donlin Project will provide a significant boost to jobs and the local economies in a part of Alaska the needs it badly.

SER 5

Barrick Gold has a long history of responsible mine development and Alaska's regulatory system is second to none for protection of our natural environment. The mine's footprint will be relatively small and it will yield enormous benefits. I urge you to complete the NEPA process as expeditiously as possible and select Alternative 2 as the preferred alternative.

Sincerely,
Steve Denton
PO Box 149
Healy, Alaska 99743

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April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15 Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

Donlin Gold has also demonstrated a notable commitment to the environment. Donlin has 16+ years of extensive studies focused on creating an environmentally and socially responsible project; and has purposefully designed its project to reduce the overall footprint of the mine and diminish any social impacts it may have on the YK region. Proposals such as building a natural gas pipeline have been developed in an effort to minimize barge traffic on the Kuskokwim River. Furthermore, a specific route for the pipeline has been selected to minimize disturbance to IDIT 1 known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims LAND 1 Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Signature

Willis Derendoff

Print Name

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May 20, 2016

Dave Diehl
Esther Donhauser-Diehl

## Mr. Keith Q. Gordon,

We write to you in response to the Donlin Gold Project. Esther and myself are residents of Aniak, Ak. We've lived in Aniak for 35 years. I've lived in the Mid-Kusko area for 38 years, while Esther has resided in this area all her life. Esther is a shareholder in both Calista Corp. and The Kuskokwim Corp.

I was an educator in this region for 18 years. Many of the young men and women from Aniak that Donlin Gold claims will have jobs to construct and implement their mine, I taught, coached, and tried to counsel. I wish for nothing more than these individuals to be self-sufficient and to be able to make money to care for themselves and their families.

Currently, Esther and I run the only take out food industry in our area. Esther has done this for 20 years. We employ local people. We have donated a large amount of money and food to our schools and community events. In the process of us teaching and working in our business, we raised three children. All three are college graduates and self sufficient.

Being business owners we want the community and the area's population to have decent jobs and good incomes. But, obviously, that isn't what is taking place. Aniak has very little cash money with a huge portion of the residents on Food Stamps, Welfare, Aid to Dep. Child., Energy Assistance, etc. When PFD dividends, Calista checks, Kuskowkwim Corp. Dividends come out we have a marked increase in sales. We should be the number one supporters of this Donlin Gold Project to infuse funds into the area. But we do not stand with the project. We support Alternative #1. Which means No Action on a Mine Project. Our rational is as follows:

## Barge Traffic

PAA 8

At EIS meetings in Aniak and in the US Army Corp of Eng. Booklet it's stated that each summer, during operation, 180 barge trips will be made from Bethel toward the mine. If the Jungiuk port site is selected that would mean almost every summer day Aniak would have tugs shoving 4 tandem barges up the river and tugs shoving 4 tandem barges down the river. EVERY DAY- 4 BARGES GOING UP AND 4 BARGES GOING DOWN. Our house and property abut the Aniak dike.

PAA 8

About one mile from our bedroom window is an extremely shallow place where barges are constantly hung up on a sand bar. We listen to their props all night long trying to motor through their situation. Now, imagine these 4 tandem barges passing through 2 times a day and getting hung up in this shallow stretch of river. It's unimaginable. There would have to be decoupling and pushing of single barges through this section. But nowhere in the paper-work have I seen how that will occur. The EIS booklet does not mention it. What is the effect of this constant prop wash on salmon roe, migrating salmon, and the river banks?

What will be in these barges? Ungodly amounts of diesel, mercury, cyanide, and other toxic materials. All items that if leached into the river system through some accident could have severe effects on all marine habitat and life. Not just the fish that swim in the river, but the game that drink it's waters and swim across it and/or the birds that land in eddies looking for food. And what of the humans that eat these moose and birds that consumed toxic materials? If Alternative #2 were to be reached- a Donlin Gold Go- we strongly recommend/support Alternative #4. This would be a Birch Tree Port, some 12 miles downriver from Aniak, with a 60 mile road then proceeding up to the mine and eliminating all barge traffic in front of Aniak all summer long.

## The Pipeline

GAS 7

We do not believe that the LNG pipeline from Beluga to Donlin will take place. We've read articles that state it's just not a matter of pumping the gas through a line for some 300 plus miles to the mine. There will need to be large plants/ facilities to liquify the gas.The costs will be much greater than is being publicized. I don't think Donlin Gold has been up front on the actual expenditures of this pipeline. And if they're talking about pipelines, why not a diesel pipe right alongside the LNG pipe? Would this not eliminate a huge portion of barge traffic? I'm aware of the feasabiility studies that state this is not a possibility. The pipe is too small for the diesel to be moved, etc., etc. Why can numerous oil piplines zig zag across the U.S. and Canada, pumping oil from one destination to another? Keystone is a particular example; some 1,100 miles from Canada to the Gulf Coast. If Donlin Gold was really concerned about environmental issues on the Kuskokwim River they would come up with solutions to piping/pumping the diesel/LNG into the mine area and eliminating the huge projected barge traffic.

## The Workforce

During the 15 or so years of exploratory drilling by the Donlin Gold Project Aniak had a large number of residents employed. In the end only a handful- and we can count them on one hand- were still working. People failed drug tests, were terminated, and just plain quit. Working 12 hour days for 2 straight weeks requires a hungry mindset. If the mine is approved and the aspects of construction and start-up become reality will these individuals be considered for jobs- or black balled because of their previous employment problems? Donlin's big speech is about pouring money into the community through jobs. In the Mid-Kusko/Aniak area we have hardly any individuals that have competencies in framing or finish carpentry; plumbing or pipe-fitting; any of the trades that will be needed during construction and start-up. And there has been no training going on to teach individuals these skills. EXCEL, a high school based vocational program, brings in people that run programs for a couple of weeks. Then it's over and nobody has a chance to continue on with their learning in a particular area. It will do nothing for the economy of the Mid-Kusko to have Bethels, Anchoragers, and lower 48ers, employed and taking the money out of the area.

## The Tailings Pond/Dam

DAM 7

This would be the most important environmental issue for us on this river. The leaking and breaching of the toxins out of this pond and into the watershed. A humongous pond full of toxins. Kuskokwim Corporation CEO Maver Carey ran a front page ad/article in the Alaska Dispatch News in mid April extolling the project and explained how a liner would prevent leakage from the tailings pond. It's really that simple? A liner is the answer? Possible earthquakes, possible shifts in the land at extremely cold temperatures, and numerous other possibilities will not guarantee this liner will stay put and not tear. But it's only going to stay in place and not rot out to perpetuity- which is eternity?? Too many dams and holding ponds don't hold and eventualy corrode and wear down and cause leakage, or even totally collapse. We cannot jeoparadize the Kuskokwim Valley to this possibility.

## In Summation

SVE 2

In the past 15 years we have watched Donlin come into our area with bags, trinkets, barbeque material, and all kinds of ways to try and buy our support. People have only recently realized how they've been duped. There are others who have also been duped. Donlin Gold has pretty much rewritten the Iditarod

PUB 1

PUB 1

Dog Sled Race rule book with a new stipulation- Rule 52- which disallows any comments in a derogatory fashion directed at them by participants in the race. They totally control the Iron Dog Snowmachine race.

SVE 2

They've moved into our local school district, The Kuspuk School District, and in collaboration with EXCEL, have pretty much brain washed our young people into thinking about their so-called positive aspects. Everything geared toward huge earnings to go to Canada and beyond. Prostitutes for Financial Profit, in our eyes.

The bottom line in this whole projected gold mine project is the Mid-Kusko's watershed.That watershed containing game, fish, birds, and humans. All of these animals depend on the area and the river for subsistence needs. And they will, well into the future. Can it, can we, survive with the impact of this mine? My wife and I say no, it is not something we want to see happen in this area. The possibilities of a major catastrophe are too apparent and too possible. We support Alternative #!.

Sincerely,

**David G. Diehl and Esther Donhauser-Diehl**

David G. Diehl

Esther Donhauser-Diehl

**From:** Rainy Diehl
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] EIS comments in support of Alt 1
**Date:** Tuesday, May 31, 2016 11:57:37 AM
**Attachments:** Alternative 1.docx

---

To whom it may concern:
Attached are my comments re: Donlin Gold Mine.
Thank you,
Rainy Diehl

To:
Keith Gordon, PM
US Army Corpos of Engineers, Alaska District
CEPOA-RD-Gordon, PO Box 6898
JBER, AK, 99506-0898

From:
Rainy Diehl
6305 Connors Trail Circle
Anchorage, AK 99502
rainydiehl@yahoo.com

Mr. Gordon:

I strongly encourage all permitting committees to consider Alternative 1-NO ACTION.

I was born and raised in Aniak, just down the Kuskokwim River from the proposed Donlin Creek gold mine. My non-Native Dad absorbed as much of the local culture from the elders as he could and with my mom, who is from Stony River, raised three of us primarily on a subsistence lifestyle. We fished year round, for salmon in the summer and for lush in the winter with a fishtrap under the ice. We even ice fished for eels in the winter. We ate moose meat and went on camping trips to pick berries in the early fall time. We lived off of the land and the river.

In my professional life, I went off to college and earned a BS in Biological Sciences from Western Washington University. I also took marine biology and environmental science courses. I worked for ADF&G, KNA, and AVCP in fisheries for 7 or 8 summers. I then went on to graduate school and earned a Doctor of Physical Therapy. I now practice in the field of physical therapy, while fighting to ensure my region is safe from environmental harm is my personal passion.

I give you the history of my childhood because that is how I want my son's childhood to be. My husband, also from Aniak, retires from the US Navy in September 2016 and has always planned to return home. He has a fishcamp, where he spent the majority of his upbringing, 6 miles downriver from Aniak, on the Kuskokwim River. We spend time there with our son every summer and winter.

PHL 16 This mine may be the deciding factor on whether or not we move back. I am scared to death of living downriver from potentially North America's largest open pit gold mine. I fear for the drinking water to become polluted with heavy metals, for mercury emissions to blow over towards Aniak and my family be stuck inhaling them, for one of many barges or transfer stations to have a massive diesel spill in the Kuskokwim, for the destruction of the salmon population, for birds to land in the tailings ponds and then be eaten, or for our river to dry up because this mine requires so much water.

SUB 1 Sadly, our own Native Corporations (Aniak Traditional Council, TKC and Calista) have been hugely supportive of it and do not seem to place the potential environmental destruction, health disparities, or

subsistence lifestyle over the financial benefit from this mine. They have not even advocated for stricter environmental protection aside from the tailings liner. Many of the people in the native corporations making these decisions do not even live on the Kuskokwim. They live in Anchorage, on the road system, where they can go to the grocery store to buy food. They do not need to hunt or fish, eat the local berries or worry about the repercussions of mercury emissions or heavy metal bioaccumulation in the moose and caribou and migratory birds. Yet they speak boldly in support of the mine and act as a voice for all of their shareholders. They have not asked for my opinion as a shareholder. *I want the permitting committees to know that the Aniak Traditional Council, TKC AKA The Kuskokwim Corporation and Calista do not represent my voice, my husband's voice, or my son's voice.*

I have not had a chance to read the full EIS. I have read the executive summary and skimmed the EIS but could not find the time to read the entire EIS.

My concerns:

**Transportation:**

BARG 18

Using the river as a transportation corridor is risky. The amount of barges going up and down the Kuskokwim River carrying supplies, and astronomical amounts of fuel and chemicals, is simply asking for an environmental disaster. As a child I remember often seeing diesel slicks on the river where barges parked. Over the years the river seems to be lower and lower, and the potential for grounding seems high. Not to mention, the mine itself will require significant amounts of water which I fear could decrease levels in the watershed, leaving the Kuskokwim even lower with more potential for barge grounding and spills. The prop wash from the barges is sure to affect salmon travelling up and salmon smolt travelling down the river, most notably the juvenile salmon. The fumes & pollution from that much barge traffic also cannot be good for the adult or juvenile salmon. Who will be testing these fish to monitor for bioaccumulation of heavy metals or chemicals? Willl there be studies to determine if barges impact the smolt population from the get go? The Kuskokwim fishery is already drastically low with multiple restrictions set for subsistence users. Are there any plans to stop barge traffic if the fishery is significantly reduced after the introduction of heavy barge traffic? Who will monitor this and look for a correlation to hault barge traffic if the subsistence fishery is ruined? The heavy barge traffic comes at a time when the state is also trying to rebuild the salmon population. Salmon is, afterall, the lifeblood of the Kuskokwim. *This all needs to be addressed.*

Tugs will be pushing multiple barges in a 2x2 formations, however, with low water levels they will need to decouple and move to single 1x2 formations. This will not be done in the middle of the river. Will these barges be allowed to tie off wherever they want to along the river to switch formations? There should be designated tie off locations with the amount of barge traffic there will be to minimize impact on the riverbanks along the river. There are no designated tie off stations in the EIS. I certainly would not want them tying off on the beach in Aniak or just upriver from our fishcamp where their downwash can erode the bank, as well as have diesel slicks floating downriver torwards us. I would also not want to see them tying off right in the town of Aniak where prop wash can easily erode the existing beach

where villagers tie their boats off, have fish cutting tables, and float planes are tied down. The EIS should address designated tie off locations in areas that will not affect salmon spawning, beach erosion, village beaches, or fishcamp sites. *This needs to be addressed.*

Another concern with large amounts of barge traffic is that the river is also a highway for the local people. A reality on the river is that not all local people drive boats sober or in daylight, nor do all local people have lighting on their boats. What are the plans to avoid barge/small boat collisions in the entirety of the Kuskokwim? Will there be an increase in public safety on the rivers to monitor and/or prevent these situations? Who will provide the public safety on the river? *This needs to be addressed.*

HZM 4 At the dock facilities in Bethel, I am concerned for fuel and chemical spills as barges from Dutch need to transfer large amounts of fuel, chemicals, and supplies at this port to barges heading up the Kusko. The same goes for the proposed dock at Jungjik. Potential for spills and leaks is just way too high. The current Bethel port also currently cannot handle the increase in mine operations and would have to be updated to accommodate the increase in mine traffic. *Enlarging the Bethel Port to accommodate mine traffic definitely needs to be addressed in the EIS*.

AIQ 2 The 30 mile road from the mine site to the dock at Jungjik has potential to kick up significant dust, and with it chemicals and pollution from the large amount of heavy equipment moving back and forth. A few years back I recall reading a scientific article where the berries were tested along the road from Red Dog Mine and came back positive for carcinogens. How will the dust be kept down?

FSR 10 Who will monitor the road to ensure diesel spills from the heavy equipment are monitored quickly?

This next concern falls in with the pipeline and barging. If the pipeline proves not feasible, will the EIS have in place a cap for the number of barges on the river at any given time? Preferably 3. As it stands, there is no cap on the number of barges on the river, and if the pipeline is not feasible, the mine can simply add more barges to haul more gas. *This needs to be addressed.*

**Pipeline:**

FSR 1 The natural gas pipeline will cross several waterways including the Kuskokwim River and its tributaries and the potential for leakage due to breaks is not worth it.

GAS 1 Several years ago, when Donlin was in the initial stages of the mine, they told the villages they would build a gas pipeline to the mine and feed all of the villages to provide heating at significantly lower rates than what people pay now. That is obviously not part of the plan; it was simply a ploy to buy people's support.

SUB 5 Another concern I have heard from the river is the overpressure on hunting. When the influx of people to the region and the pipeline/road brings easier access to the mid Kuskokwim to hunt and fish out the resources, people on the Yukon have raised concerns that people on the Kuskokwim will begin to fish and hunt in their region. It would be an easy portage across the hills to the Yukon River. If Kuskokwim fisheries and hunting resources are depleted, can the Yukon River drainage support increased hunting and fishing pressure from all the villages along the Kusko? *This needs to be addressed.*

**Mine Site:**

SUB 17 The waste treatment facility will not be covered or fenced, leaving it open to animals and birds trying to land on it or drink it. The chemicals will either cause death or bioaccumulation of heavy metals and chemicals which will then be transferred to the locals who eat the meat. Why won't they treat the waste

WAQ 5 water immediately after closure of the mine? Why wait 50 years? Also, are there any clauses for Barrick

BER 3 or NovaGold to have a back up to monitor the water treatment after mine closure if they go bankrupt or fold?

MIT 22 Right now there is no plan for fencing around the tailings pond to ensure animals do not try to drink or approach this water. I strongly advocate for fencing around the pond, and some kind of cover so that birds cannot land on it. *This needs to be addressed.*

PHL 16 Mercury Emissions is a big one. There is the potential for volatile/airborne emissions, emissions into the water table, and bioaccumulation into our meat, fish and salmon. This ties into my below section on the local community. Have there been studies looking at the local population and current rates of neurological problems? There should be a baseline. To my knowledge, there are very few people with neurological conditions in the middle Kuskokwim. What happens if we start to see infants born with very clear neurological problems? Or adults starting to walk a little ataxic, starting to lose sensation in their hands and feet, and then be diagnosed with a neurologic condition? If there is not a significant concern now, then it could certainly be related to mercury emissions. *This needs to be addressed* with baseline studies.

PHL 16 Have cancer rates in the Kuskokwim been studied? If we see an increase in rates of cancer, there certainly could be a correlation. Open pit gold mines release loads of carcinogens and teratogens, too many to name. The people will be exposed similar to mercury-airborne, on the berries, in our meat, in our fish, and in our drinking water. *This needs to be addressed.*

**Local Community:**

WAQ 19 Will the drinking water be closely monitored throughout the life of the mine, in all villages along the Kuskokwim River and after closure of the mine? What are the plans, if a disaster happens, to ensure clean drinking water? How do we know that our water tables will not be contaminated with carcinogens, neurotoxins, or teratogens? Along the same lines, will large mammals be tested regularly

PHL 16 for carcinogens? Or bioaccumulation of heavy metals? What happens if the game starts to test positive for chemicals and recommendations are made not to eat the animals? Will Donlin be held accountable?

**Local Population:**

PHL 9 Western Alaska and Native people already struggle with drug and alcohol abuse. An unfortunate reality is, sometimes when Native people come into large amounts of money i.e. from shareholder dividends and/or paychecks from the mine, we will very likely see an increase in substance use/abuse. The shift work that Donlin offers will allow 2 weeks off, and even in the early stages of the mine we saw locals use their paycheck to fly to Anchorage or place an alcohol order and literally drink their paycheck away. In rural Alaska we are not raised to put money away for 401Ks; when you have money you spend it. What are the plans to mitigate an increase in substance abuse amongst employees, families, and TKC/Calista

shareholders? Will there be a substance abuse facility in Western Alaska? With substance abuse also comes an increase in crime. Where will funding come from to increase public safety in these villages? Substance abuse also brings with it negative health ramifications. Where will the increase in funding be for health care? Will Donlin pay for this? *This needs to be addressed*.

On a similar note, will there be financial management classes for the employees at Donlin?

MON 9 Who will monitor the local population for health disparities? Who will monitor rates of cancer from the heavy metals on the land and in the food sources, from the barge pollution, from mercury emissions, or from the drinking water being contaminated? Who will monitor communities for an uptick in substance abuse? Who will monitor rates of obesity? Once people have to switch from a subsistence lifestyle to that of predominantly store bought food source, obesity rates are likely to increase. Along with obesity you may see an increase in obesity related health disparities including diabetes, hypertension, joint problems, just to name a few.

If there are health disparities related to the mine; i.e. increase rates of cancer from the carcinogens, neurological problems from the mercury, increases in substance abuse, increases in obesity, etc who will pay for the healthcare? Will Donlin pay for the healthcare? I highly doubt it. Most rural Alaskans do not carry private health insurance as the majority of qualify for Medicare (elderly), Medicaid (low income), or Indian Health Service (Native people). If there are health disparities related to the mine, it will mostly be covered by the federal government. *Can we afford it? Can this be addressed?*

**Hazardous Spill Response:**

FSR 5 Diesel slicks and spills from barge traffic is very likely. Growing up on the river, pretty much any barge that docked in Aniak had a diesel slick flowing downriver behind it. The increase in barge traffic on the river stands to increase the amount of diesel in the river considerably. Currently, the nearest response team is in Anchorage. If weather is down, they will not be able to respond immediately. Will there be a local presence of DEC, EPA, or Coast Guard at the mine site and/or in one of the hub communities along the Kuskokwim River to immediately respond should spills occur on the river, on the land, and to hold Donlin accountable? Is there a plan in place should diesel spills or chemical spills occur in the river? Is there a plan in place should a tailings pond breach occur? *This needs to be addressed.*

**Wood Bison:**

WILD 1 Wood Bison were released into the same vicinity as the Donlin Gold mine in May 2015 and have recently reproduced, making them a wild bison population in the middle Kuskokwim/middle Yukon. They have been sighted on the banks of the Kuskokwim in the past year. They will be sharing the land with the mine, the heavy equipment, breathing the air, drinking the river water. Bison/equipment collisions are a possibility. When the pipeline is built, it will bring more traffic to the area, making bison exploitation, poaching, and hunting a more likely possibility. The National Bison Legacy Act was signed into law in May 2016, making this the national mammal of the US. Does this animal receive special protection now? As does the bald eagle? It now reproducing in western Alaska, afterall, and was not covered in the threatened/endangered animal section of the EIS.

In summary, I do not believe the mine can operate without significant environmental and human impacts. In reading the EIS I couldn't help but think how many other mines and environments are being destroyed for this SINGLE mine. All the diesel that has to be used, all the natural gas that will come out of Cook Inlet, all the metal that will be needed for the pipeline and minesite-that all comes from somewhere. When does it end? Why can't we push for recycling gold and metals instead of destroying people's homes, culture, lifestyles? I strongly recommend alternative 1-NO ACTION.

Sadly, I feel like a needle in a haystack and that my meager opinion won't hold much weight regarding Alternative 1 when I am competing with two of my native corporations and a multinational corporate mine. If the mine does go through, I would strongly recommend a combination of three other alternatives.

1. I support alternative 3A over alternative 2. Use the LNG powered Haul Trucks to minimize emissions and minimize barge traffic on the river which is less risk of spills, less impact to the salmon habitat. The gold is not going anywhere so they can wait until the technology is available. Nowhere in the world is climate change more evident than rural Alaska; minimizing emissions is absolutely essential if this mine is to go forward.

CLIM 3

2. I support Alternative 4 over alternative 2-Birch Tree Crossing. Minimize barge traffic on the river, lower risk for spills, less impact to the salmon. Keep the road closed to the public.

PAA 8

3. I support Dry Stack Tailings with a liner. Less risk for tailings breach. Not the greatest option but better than a tailings breach.

PAA 29

Army Corp, please, please, please think about the children on the river and the people who live there. People's lives are literally in your hands. The mine has the potential to destroy everything. I want to see people in the workforce as much as anyone else, but this mine is simply not worth 27 years of economic stimulation.

Sincerely,

Rainy Diehl and my 3 year old son, Hunter

**From:** Bellion, Tara
**To:** Evans, Jessica
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Tuesday, March 08, 2016 10:57:27 AM

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-----Original Message-----
From: DiMarchi, Jack [mailto:Jack.DiMarchi@stantec.com]
Sent: Tuesday, March 08, 2016 10:33 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

Please accept these comments on the Donlin Gold EIS.

I support the project.

As a general comment I find the DEIS difficult to read and overly verbose. The 100 page Table of Contents must set a new record for EIS's - That's an unfortunate thing.

The ACOE should take more responsibility for the quality (including quantity) of the EIS.

ANIL 13

It is more than unfortunate that the ACOE and the BLM could not come to the same conclusion on the potential impacts of barge traffic on the Kuskokwim River.

I suggest that these agencies redress their approach and concerns and have their resource specialists find a means to come to the same conclusion in this regard and offer a single view in the final EIS.

This disparity between conclusions is confusing to the public ( as was evident at certain public meetings) and other resource agencies, and is a glaring inconsistency with the intent of NEPA.

Jack DiMarchi

1935 Red Berry Road

Fairbanks, Alaska 99709

**From:** john diumenti
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Tuesday, May 31, 2016 6:39:44 PM

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I am in favor if Option 2 of the draft Environmental Impact Statement.
I believe Donlin has done a fair assessment of the impact to the environment and believe that a natural gas pipeline and diesel barges are the safest way to mine at Donlin Creek. I believe that Option 1, no action, will be harmful to the economy of the state. The economic impacts outweigh the environmental impacts.
Harming the environment is bad for business. I don't believe that any mining company intends to harm the environment. It costs them too much in the long run.
There will be oversight on Donlin Creek from cradle to grave on the mine, and with modern technology, I believe that the deposit can be safely mined.
Donlin Creek is also a good corporate citizen in the state. It provides local jobs where it can and supports the community.
I would like to see them be able to open a mine.

SER 1

John Diumenti
Palmer, AK

US Army Corps of Engineers

# Donlin Gold Project EIS

## Comment Form

**The Corps welcomes your comments on the Draft Environmental Impact Statement. If you'd like to mail your comments, please feel free to use this form. Write your comments below then fold this page in thirds so the mailing address shows. Additional pages can be inserted. Remember to affix first class postage. You can also email your comments to POA.donlingoldeis@usace.army.mil, or fax them to (907) 753-5567.**

Important topics for comments would include:

- *Comments and questions about the accuracy of information in the Draft EIS.*
- *Comments and questions about the adequacy of methods or assumptions used.*
- *New information to be considered in preparing the Final EIS.*
- *New reasonable alternatives or revisions to current alternatives.*
- *Additional measures to reduce impacts (mitigation).*

5-31-16

Fr: Louise Donhauser
201 E. 9th Ave.
Anchorage, AK 99501

NSB 1

Written COMMENT for
DONLIN GOLD PROJECT EIS

Any/all action regarding Donlin Gold Project must CEASE & DESIST unless action is taken to enforce DONLIN GOLD PROJECT CEASE & DESIST action.

Thank you.

Louise Donhauser

LOUISE DONHAUSER

Fax to:
Keith Gordon
(907) 753-5567

COMMENT FORM

# Donlin Gold Mine EIS

## ANILCA 810 Subsistence Hearing

**Give form to BLM or mail to:**
BLM Anchorage Field Office
Attn: ANILCA 810 Subsistence Hearing
4700 BLM Road
Anchorage, AK 99507

**You may also fax this form to 907-267-1267 or email to bseppi@blm.gov**

**OPTIONAL: Your name and contact information**

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

5-31-16

**Your commen** **line:**

Fr: Louise Donhauser
201 E. 9th Ave.
Anchorage, AK 99501

Written COMMENT for
DONLIN GOLD MINE EIS

NSB 1 Any/all action regarding Donlin Gold Mine must CEASE & DESIST unless action is taken to enforce Donlin Gold Mine CEASE & DESIST action.

Thank you.
Louise Donhauser

LOUISE DONHAUSER
Fax to: BLM Anchorage Field Office
907-267-1267

USACE
RECEIVED
MAY 17 2016
AK REGULATORY

DONLIN GOLD

May 13, 2016

Mr. Alan Bittner
Field Manager
Anchorage Field Office
Bureau of Land Management
4700 BLM Road
Anchorage, AK 99507

**RE: Donlin Gold Project – ANILCA § 810 Preliminary Analysis of Subsistence Impacts Comments**

Dear Mr. Bittner:

This letter contains comments prepared by Donlin Gold LLC (Donlin Gold) for consideration by the Bureau of Land Management (BLM) in revising the Alaska National Interest Lands Conservation Act (ANILCA) § 810 Preliminary Analysis of Subsistence Impacts (810 analysis) found in Appendix N of the Donlin Gold Project Draft Environmental Impact Statement (DEIS).

Donlin Gold appreciates the opportunity to provide these comments and notes for the record that these comments are specifically addressed to BLM. We will be providing a separate set of comments to the U.S. Army Corps of Engineers on the DEIS.

If we can provide any additional information to aid in preparation of your final analysis, please let me know. Thank you.

Sincerely,

Stan Foo

cc:
Keith Gordon, US Army Corps of Engineers
Jeff Bruno, Project Coordinator, Alaska OPMP

Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

## INTRODUCTION

Donlin Gold has a number of concerns regarding the objectivity, the scope, and the often unsupported conclusions of the draft 810 analysis and its lack of alignment with the Donlin Gold Project Draft Environmental Impact Statement (DEIS).

ANIL 13 First, BLM is a cooperating agency on the DEIS, and we strongly encourage BLM to ensure that its 810 analysis is consistent with the analysis in the DEIS.

ANIL 2 Second, Donlin Gold believes that BLM's 810 Tier 1 analysis and any Tier 2 determinations should be limited to the potential effects on subsistence on federal public lands where agencies are making decisions within the meaning of Alaska National Interest Lands Conservation Act (ANILCA) Section 810(a). Specifically, the 810 analysis should not address potential impacts on private and state lands. The history of ANILCA, the court decisions interpreting Section 810, and the BLM's Section 810 guidance all support the conclusion that the scope of BLM's authority is limited to federal public lands in Alaska. We understand that BLM is following an Instruction Memorandum from the State Office;[1] however, that guidance is plainly inconsistent with the language of Section 810, which limits the analysis to federal public lands. BLM has not yet concluded whether any Tier 2 determinations are warranted. We believe it is imperative that BLM limit any Tier 2 determinations under Section 810(a)(3)(A)-(C) to that portion of the natural gas pipeline on BLM lands.

Last, Donlin Gold urges BLM to ensure that the potential impacts of construction of the pipeline on BLM-managed lands are evaluated in the context of existing activities on those lands, including subsistence and sport hunting, recreation, and organized events such as the Iditarod Trail Sled Dog Race, the Iron Dog Race, and the Iditarod Trail Invitational.

As discussed more fully below, we have concerns related to the scope of BLM's analysis, the speculative nature of some conclusions, the lack of proper context for some comments, and the inadequate consideration of the environmental and land-use controls built into the proposed action. Following are our comments.

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ANIL 2 [1] U.S. Dep't of the Interior, Bureau of Land Mgmt., Instructional Memorandum No. AK-2011-008 (2010), http://www.blm.gov/style/medialib/blm/ak/aktest/ims.Par.80745.File.dat/im_ak_2011_008.pdf.

## General Comments

(1) Scope

ANIL 2 BLM's authority under Section 810 is limited to federal public lands[2] under its management, which applies to a relatively minor portion (less than one-third) of a right-of-way application for the proposed natural gas pipeline.

ANILCA Section 810(a) states that:

> In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions,[3] the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

The public lands under BLM's primary jurisdiction are those associated with a portion of a right-of-way (ROW) for the natural gas pipeline that would supply natural gas to be used to power the proposed mining operation. Donlin Gold has submitted a Standard Form 299 in application for the ROW and a corresponding Plan of Development for the pipeline. Neither the mine site nor the transportation facilities that Donlin Gold proposes to develop would be located on public lands. ANILCA Section 810 applies to public land in Alaska and requires an analysis of effects on those lands. Specifically, Congress directed federal agencies to evaluate the effects of "such use" (i.e., the use of public lands) on "subsistence uses and needs." Section 810 does not require an analysis of effects on lands that are not public lands. The limitation of BLM's obligations under Section 810 to public lands has been confirmed by the Ninth Circuit Court of Appeals in *City of Angoon v. Hodel*, 803 F.2d 1016, 1028 (9th Cir. 1986) ("The plain language of the statute, however, cannot fairly be read to require . . . an [810] evaluation for actions regarding private lands. Sierra-Angoon argue strenuously that they are not advocating regulating private lands but only spillover 'use' of public lands. This seems a distinction without a difference."). BLM's own guidance regarding implementation of Section 810 indicates that the analysis is limited to potential impacts to subsistence on public lands.[4] In preparing the final 810

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[2] ANILCA defines "public lands" as "land situated in Alaska which, after the date of enactment of this Act, are Federal lands." ANILCA § 102 (3). (Federal lands are lands the title to which is in the United States after the date of enactment of ANILCA. ANILCA § 102 (2).)

[3] Section 810 is limited to those federal public lands where a federal agency will be making a decision to "withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands." In short, Section 810 applies only to circumstances where a federal agency is *making a decision* to dispose of or allow a use of public lands.

[4] "Conducting ANILCA 810 evaluations in Alaska on public lands is mandatory for virtually all Federal land use decisions." Instruction Memorandum No. AK-2011-008, *supra* note 1, at app. 1, 1-1 (emphasis added).

analysis, BLM should limit the analysis to the effects on subsistence use of the public lands to which the ROW will apply.

BLM notes that the project consists of three components and that the National Environmental Policy Act (NEPA) prohibits segmenting a project into smaller components. This is the appropriate interpretation of NEPA; however, ANILCA does not address segmentation, and its only reference to NEPA is that if an EIS is developed, it should include results of the 810 analysis findings. There is no direction under ANILCA to use NEPA's approach to segmentation, and to use such as justification to expand BLM's analysis is beyond its authority. Indeed, the authorities referenced above clearly demonstrate that ANILCA Section 810 applies solely to the public lands affected by BLM's decision on the ROW application.

ANIL 13

(2) Inconsistency with the DEIS

As written, BLM's 810 analysis subjectively extracts portions of the DEIS to eliminate the context that places many of the potential impacts in perspective. The result is that the 810 analysis differs from the DEIS in its conclusions regarding the nature and extent of impacts to subsistence resources and activities. We are concerned that BLM, a NEPA cooperating agency, has prepared an evaluation without reference to the extensive information assembled by the U.S. Army Corps of Engineers in the DEIS. BLM's guidance clearly states, "The 810 Evaluation is an exercise in distilling and summarizing the information provided in the main body of the EIS."[5] This guidance recognizes that the EIS is a comprehensive evaluation of the potential impacts of a proposed action and that the 810 analysis focuses on a specific potential impact: subsistence use of public lands. In preparing the Section 810 analysis for the Final EIS, BLM (as a cooperating agency in the EIS process) should ensure that the bases for the findings in the impact analysis presented in the final 810 analysis are consistent with the analysis presented in the Final EIS.

ANIL 2

(3) Application of the Analysis to Private Land

BLM's 810 assessment fails to acknowledge that the mine and transportation facilities would be located on non-federal land in most instances, including on land selected by the Calista Corporation and the Kuskokwim Corporation (TKC) under provisions of the Alaska Native Claims Settlement Act (ANCSA). As discussed above, we believe that this approach is fundamentally inconsistent with the requirement of the statute, which is focused on circumstances where federal agencies make decisions concerning the use of federal public lands. Indeed, the comments during various Section 810 hearings to the effect that BLM lacks a sound understanding of the non-BLM-managed lands and the surrounding communities underscore

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ANIL 13

"The proposed action of guiding for big game hunting in the North Fork drainage would not appreciably reduce harvestable wildlife resources that are available for subsistence taking on BLM administered lands." *Id.* at App 9, p. 1. *See also* Joris Naiman, "ANILCA Section 810: An Undervalued Protection for Alaskan Villagers' Subsistence," 7 Fordham Envtl. L. Rev. 211, 253 (1996) ("Congress drafted section 810, like the management sections, to protect subsistence on all of Alaska's federal lands.").

[5] Instruction Memorandum AK-2011-008, *supra* note 1, at 6.

the reason that BLM should limit its 810 analysis to the public lands that are the subject of the ROW application. We request that BLM modify the 810 analysis to limit it to the public lands under BLM's authority. However, if BLM is unwilling to change the scope of the 810 analysis, then it should clearly denote in the 810 analysis the land ownership status for each of the findings. For example, if BLM determines that an impact is occurring, it should indicate where that impact is occurring (federal land, state land, ANCSA land, or other private land).

(4) Any Tier 2 Evaluation Must Be Limited to Public Lands

ANIL 2 If in the final 810 analysis BLM finds that granting the ROW over the BLM-managed public lands "may significantly restrict subsistence uses," it is imperative that BLM limit any Tier 2 determinations pursuant to ANILCA § 810(a)(3)(A), (B), and (C) to the public lands managed by BLM. Not only does the language of those sections expressly refer to "the public lands," but also it is not appropriate for BLM to make decisions regarding "sound management principles" or to impose substantive mitigation requirements on lands that are not within BLM's jurisdiction.

(5) Any Tier 2 Determination Must Account for the ANCSA Mandate to Support the Development of the Donlin Gold Project

ANIL 6 If BLM ultimately finds that granting the ROW over the BLM-managed public lands "may significantly restrict subsistence uses," Donlin Gold believes that BLM's evaluation of the three statutory criteria in ANILCA Section 810(a)(3)(A)-(C) must account for the ANCSA mandate for Calista Corporation and TKC to develop the lands they selected pursuant to ANCSA for the benefit of their shareholders. The pipeline alternative provides superior environmental benefits compared to other alternatives, and the pipeline route itself has been designed to minimize impacts on subsistence resources. This use of BLM-managed public lands is necessary for the development of Calista's and TKC's resources[6] and provides a clear justification for any Tier 2-based determination regarding potential restrictions on subsistence uses.

## SPECIFIC COMMENTS

**Subsistence Evaluation Factors, Findings**

(6) Page 2, last paragraph

ANIL 1 Definition of Significance: The 810 analysis defines a significant restriction as a substantial reduction, which in turn is defined by the following language:

> *Substantial reductions in the opportunity to continue subsistence uses generally are caused by: large reductions in the abundance, or a major redistribution of resources;*

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ANIL 6 [6] The justification to allow Alaska Natives to develop lands transferred to them under ANCSA is far more compelling than the justifications seen in other Section 810 cases. *See, e.g., City of Tenakee Springs v. Clough,* 750 F. Supp. 1406 (D. Alaska 1990) (court found that Forest Service determination that providing timber under a timber sale contract satisfied the "necessity" criterion under Tier 2 analysis).

> *extensive interference with access; or major increases in the use of those resources by non-subsistence users.*

The 810 analysis does not define what is meant by "large reductions in abundance," "major redistribution of resources," "extensive interference with access," or "major increases in the use of those resources by non-subsistence users." Further clarification of these terms (or definitions) is needed. The 810 analysis needs to define the thresholds that BLM is using to evaluate these criteria. BLM's guidance provides that:

> [T]he determination of significant restriction must be made on a reasonable basis, since it must be decided in light of the total subsistence lands and resources that are available to individuals in surrounding areas living a subsistence lifestyle.
>
> . . .
>
> Then, assess the significance of the impact in the context of the following factors:
> - Magnitude of the impact (how much)
> - Duration or frequency of the impact (how long or how often)
> - Extent of the impact (how far)
> - Likelihood of the impact occurring (probability)
> - Intensity of the impact (e.g., unique setting, unprecedented impacts, uncertain impacts, controversial nature of the impact)[7]

Donlin Gold believes that because the ROW impacts largely would be a result of the construction of the buried pipeline, the potential impacts would be limited to the pre-construction clearing work, the movement of materials, and the installation and backfilling of the pipeline itself. The entire pipeline construction is scheduled to be completed within a two- to three-year time frame, although direct impacts to any particular segment would generally last no longer than a single construction season. The extent of direct effects would be typically limited to the pipeline ROW itself except in the limited areas where shoo-fly road access would be necessary; impacts in those locations would again be limited to a short construction window. Based on these proposed activities, disturbances to subsistence activities would be of limited duration and extent given the extensive subsistence lands and resources that are available to individuals living a subsistence lifestyle in areas surrounding the ROW. Section 3.21 of the DEIS provides a detailed analysis of potential subsistence effects from the proposed project (Alternative 2). Impacts are judged to be minor for the entire pipeline ROW with the exception of the immediate area around the Farewell airstrip where "there is little overlap between subsistence use areas and the pipeline right-of-way and because the disturbance during

[7] Instruction Memorandum AK-2011-008, *supra* note 1, at app. 6, 6-2.

construction is limited to short periods." At Farewell, "localized" impacts are judged to be moderate. The closest public lands are, however, more than 20 miles from the Farewell airstrip. Therefore, the DEIS fully supports a finding of no significant restriction on subsistence activities on public lands.

ANIL 2

(7) Page 2, last paragraph:

*A proposed action and/or alternatives may be found to not create a significant restriction, but it may be appropriate for the analyst to identify and attempt to mitigate localized, individual restrictions created by an action.*

ANILCA Section 810 provides that BLM shall impose mitigation (Section 810(a)(3)(C)) only in circumstances where there is a use of public lands that would significantly restrict subsistence uses. Section 810 does not provide BLM a broad mandate to impose mitigation on any impact, regardless of its significance. There is no statutory basis for "the analyst to identify and attempt to mitigate localized, individual restrictions." This phrase is inconsistent with Section 810, and accordingly, it should be removed from the document.

**Alternative 1 (No Action Alternative) – Evaluation and Findings**

ANIL 5

(8) Page 4:

The draft 810 analysis concludes that the impacts of Alternative 1 would be minimal without analysis. Testimony provided at the 810 and DEIS hearings support the findings in the DEIS that the economic benefits generated by the construction and operation employment created by the Donlin Gold project would benefit local communities in maintaining a subsistence way of life by providing cash that is necessary to buy the materials (e.g., fuel, equipment) essential to support subsistence.[8] Donlin Gold recommends that BLM consider the deteriorating economic climate in Alaska in evaluating whether the No Action Alternative would represent a significant restriction of subsistence in the region as part of the final 810 analysis.

ANIL 5

**Alternative 2 (Proposed Action) – Evaluation and Findings**

**Evaluation of the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

ANIL 5

[8] "Nowadays, as they were talking about, we are living off money. We are living with money. Without money, we can't do subsistence stuff. And because I've experienced it, we go down to the Kuskokwim River to fish. Nowadays, it's not like it was a long time ago." James Nicholai, Nunapitchuk 810 Hearing, p. 4. *See also* Mark Matter, Aniak 810 Hearing, pp. 23-24; Elena Phillips, Crooked Creek 810 Hearing, p. 17; Andres Gusty, Anchorage 810 Hearing, pp. 6-8; Evelyn Thomas, Anchorage 810 Hearing, pp. 9-12; Bob Aloysuis, Anchorage 810 Hearing, pp. 12-15; Willie Kasayulie, Bethel DEIS Hearing, pp. 41-43; Native Village of Napaimute, NVN comments on Draft Donlin Environmental Impact Statement – Part 1, http://napaimute.org/2016/04/27/nvn-comments-on-the-draft-donlin-environmental-impact-statement-part-1/.

(9) Page 10, paragraph 4:

*The direct and indirect effects of Alternative 2 on subsistence resource...and socio-cultural effects (job, incomes, shift work) are detailed in Section 3.21.6.3 of the Donlin Gold Draft EIS.*

The preliminary 810 analysis refers to the DEIS analysis and implies that it takes into account socioeconomic effects of the project. However, the 810 analysis does not discuss socioeconomic effects, including whether increased income would have a positive effect on residents' ability to more effectively harvest subsistence resources. The 810 analysis should draw on relevant portions of the EIS and related records, including the input from various members of the public who testified that subsistence activities require money to purchase the tools of subsistence: fuel, transportation, and equipment.

**Mine Site**

(10) Page 10, last paragraph:

ANIL 14 *Mine activities...would likely change the distribution of wildlife species important to subsistence (moose, caribou, furbearers), would be long term...*

A. "Long term" for the purposes of the 810 analysis should be defined.

B. The 810 analysis does not provide any context for the nature, intensity, and frequency of subsistence activities in the mine site area. The mine site is approximately ten miles from the Village of Crooked Creek, and it is important to provide information regarding the current use of the area to evaluate what impacts could occur to these uses. Exploration and environmental baseline sampling have been ongoing at the project site for 20 years, which has precluded subsistence use of the project site.

C. The EIS notes that Crooked Creek residents use the George River, East Fork George River and Oskawalik River for subsistence moose harvest; the analysis provides no data or literature to suggest that mine site activities would affect moose that far from the project site.

D. The effects on the changes in distribution of caribou and furbearers should be more clearly defined and presented in the appropriate context. The DEIS states that "direct loss or modification of habitat, while substantial, is relatively small compared to the similar amount of common natural habitats within the Project Area."

(11) Page 10, last paragraph:

ANIL 14 *Areas important to Crooked Creek for berry picking would be directly affected by the mine...*

DEIS Figure 3.21-16 (Crooked Creek Subsistence Harvest Locations) illustrates that the Crooked Creek harvest locations for berries do not include the mine site. The 810 analysis lacks context and support for the premise that subsistence users travel (or would want to travel) ten miles from Crooked Creek to pick berries near the mine site. In contrast to the 810 analysis, the DEIS notes that while fugitive dust deposited on berries near the mine site would make some subsistence users wary, "most berry picking by residents of Crooked Creek takes place in a large area away from the mine site." The fact that most berry picking by Crooked Creek residents takes place more than five miles from the mine indicates that fugitive dust across a relatively small portion of the watershed does not represent a significant restriction to berries as a subsistence resource.

ANIL 7

(12) Page 11, paragraph 1:

*Water released from the mine during operations has the potential to affect salmon and resident fish populations important to subsistence, as well as the aquatic food web in Crooked Creek and the Kuskokwim River.*

The 810 analysis presents an unsupported conclusion regarding the impact of treated water discharges on the aquatic environment. The DEIS notes that water released from the mine during and after operations would be subject to an Alaska Pollutant Discharge Elimination System (APDES) permit. The permit would establish discharge limits at levels such that the discharge would meet Alaska Water Quality Standards, which are based on federal standards developed by the U.S. Environmental Protection Agency (EPA) and are established to protect aquatic life and human health. The Alaska Department of Environmental Conservation administers the APDES program, with the EPA providing oversight. Therefore, for water discharged from the mine during operations or after closure to potentially affect salmon or resident fish populations, the discharge would have to violate the APDES permit and the Clean Water Act. It is unreasonable for the 810 analysis to assume that the treatment plant would be operated in violation of permits issued pursuant to state and federal statutes. BLM appears to be using NEPA as the model to guide the 810 analysis; NEPA does not call for an analysis of noncompliance conditions or worst-case scenarios. Even if an APDES permit limit were exceeded, BLM provides no analysis indicating how treated discharges would impact aquatic uses in Crooked Creek. The 810 analysis even suggests that aquatic uses could be impacted in the Kuskokwim River, over 10 miles downstream from the mine. This sentence on water discharges should be stricken entirely or revised to simply state that discharges from the mine must meet water quality standards that are designed to protect the aquatic environment and that no impacts to subsistence resources are expected from water discharges associated with operation of the mine.

ANIL 7

(13) Page 11, paragraph 1:

*After mine closure, the pit lake would fill with untreated water (containing mine site reagents, traces of sodium cyanide, traces of mercury suppressant and insoluble sulfide-mercury particles,*

*autoclave discharge, and human waste) that could be toxic to fish and wildlife, and run off from the tailings dam and pit lake would have potential to contaminate fish resources important to subsistence in Crooked Creek and the lower Kuskokwim River into perpetuity, impacting subsistence fish resources important to all communities from Crooked Creek to the mouth of the Kuskokwim River.*

This analysis assumes that there would be "runoff" from the tailings dam and pit lake, ignoring the analysis in the DEIS that explains how water is captured on site and treated before discharge. There will be no untreated runoff.[9] Again, discharges from the mine during operations and following closure would be subject to APDES discharge limitations designed to protect aquatic life and human health. Moreover, the State of Alaska requires financial assurance to ensure that long-term water management and treatment systems and monitoring will be maintained. The potential impact described here is a worst-case scenario, which is inappropriate for a NEPA analysis and an 810 analysis. Further, no details are provided regarding how the extent of impact was derived to show that communities "from Crooked Creek to the mouth of the Kuskokwim River" could be impacted, and thus, this discussion is not supported by data.

**Natural Gas Pipeline**

ANIL 10

(14) Page 11, paragraph 2:

*During construction, the effects of clearing the ROW, trenching, drilling and the presence of machinery, pipeline transport, workers, and infrastructure on and along the pipeline ROW would cause a redistribution of moose, caribou and furbearers, and affect access to subsistence use areas and availability of subsistence resources.*

This statement should be revised to state that the pipeline ROW would cause a temporary redistribution of moose, caribou and furbearers, consistent with the analysis presented in the DEIS.

ANIL 10

(15) Page 11, paragraph 2:

*During mine operations, the airstrip that would remain along the pipeline ROW at Farewell would increase access to subsistence resources by non-local residents using aircraft, and increase competition for those subsistence resources along and adjacent to the pipeline ROW.*

The airstrip at Farewell has been and will continue to be operational. As such, it already provides subsistence and nonsubsistence hunters access to the region and will continue to do so with or without the Donlin Gold project. There is no difference between the No Action alternative and any of the action alternatives in terms of access to and functionality of the Farewell airstrip.

ANIL 7

[9] Donlin Gold's Plan of Operations calls for a dry closure of the tailings impoundment.

**Transportation Infrastructure**

ANIL 8

(16) Page 11, paragraph 3:

*Impacts from barging include displacement, disruption or reduced access to subsistence fishing activities and sites (set nets, fish wheels, processing rafts) along the river.*

As a threshold matter, the river is clearly beyond the scope of Section 810. In the context of the river, neither BLM nor any other federal agency is making a decision regarding the disposition of or use of federal public lands. The 810 analysis lacks critical context on the nature and frequency of barging and provides no analysis on the extent to which barging would cause displacement, disruption, and reduced access. In contrast, the DEIS finds that for the majority of the river, the effect of barging on subsistence would be minor; moderate effects to subsistence could occur in five localized narrow sections of the river in the vicinity of Aniak. The 810 analysis should be revised to incorporate the DEIS conclusions on the impacts from barging. Moreover, the 810 analysis lacks context by not describing the potential impacts of the proposed action in relation to other activities that currently affect subsistence. These include existing barge and other boat traffic, agency management activities, socioeconomic conditions in the region, commercial fishing activities (which have an impact on Kuskokwim River salmon runs), bycatch, and natural changes in the river hydrology. We contend that the impacts of these existing activities greatly outweigh the effects of three additional barges on 177 miles of river at any given time.

ANIL 8

(17) Page 11, paragraph 3:

*Subsistence fish resources (salmon and resident fish species populations) may also be negatively affected by the magnitude and intensity of barge traffic proposed in Alternative 2.*

This statement lacks important context. The DEIS found that effects on salmon would be limited in duration and localized. The 810 analysis should be revised to reflect the temporary and local nature of any impacts on fish.

ANIL 8

(18) Page 11, paragraph 3:

*Affects to fish may increase when river water levels are low, as barge rafts will need to be uncoupled and barges towed individually or in pairs, or lighter barge loads per trip would be required to navigate to the Jungjuk port.*

It is unclear how this statement fits into the 810 analysis since the definition, frequency, and duration of low water conditions are not presented.

The DEIS reference AMEC 2013 describes river barge fleet design including cargo and fuel management and should be read to support the 810 analysis. The barging scenario presented in the DEIS assumes that barges would be loaded to draft 4.5 feet, not the 7.5-foot maximum draft. The AMEC report evaluated the ability to ship the cargo and fuel based on measured

Kuskokwim River flow levels over a 59-year period and concluded that, over a 110-day shipping season, cargo tows would successfully deliver the specified annual volume with a success rate of 99% and fuel tows would experience a success rate of almost 97%. The flexibility provided by this configuration would minimize the need for relaying (uncoupling) single barges or pairs of barges; where relaying was necessary, it would occur across short river segments. Based on the historical data set and Donlin Gold's proposed barging approach, the frequency and duration of relaying would be inconsequential in terms of influence on subsistence activities.

**Spill Impacts**

(19) Pages 11 – 12, General Comment on Spill Impacts:

ANIL 11 This analysis lacks important context. It is critical that BLM disclose the relative likelihood of the various spill scenarios under consideration and explain how the likelihood will factor into making a determination of whether or not a significant restriction could occur. NEPA requires impacts to be foreseeable and does not require analysis of "worst case," speculative impacts or scenarios. If anything, Section 810 requires a more restricted, limited analysis than NEPA, given the statutory language, which is focused on circumstances where the use of federal public lands "*would* significantly restrict subsistence uses." In addition to requesting disclosure of the likelihood of any of the spill scenarios potentially occurring, we offer the following detailed comments on other aspects of the spill scenarios.

(20) Page 12, first bullet: Scenario 1: Ocean Barge Rupture at Sea

ANIL 11 *In this scenario, approximately 735,000 gallons of diesel would be released from a grounding south of the Kuskokwim River mouth... The effect of this spill scenario would have major impacts to subsistence resources on the Kuskokwim River.*

See the previous comment. There is essentially no precedent for such spills over the past several decades. As such, this represents an unforeseeable, worst-case scenario that is beyond the scope of NEPA or the 810 analysis.

(21) Page 12, second bullet: Scenario 2: River Barge Release

ANIL 11 *The spill scenario indicates that up to 37,817 gallons would be released... The effect of this spill scenario would have major impacts to subsistence resources on the Kuskokwim River.*

See the previous comment. There is essentially no precedent for such spills over the past several decades. As such, this represents an unforeseeable, worst-case scenario that is beyond the scope of NEPA or the 810 analysis. If the discussion remains, it should note that if a diesel spill does occur, the effects would be short-lived because diesel fuel is not persistent in the environment for an extended period of time. This spill scenario could have temporary major impacts to subsistence resources on the Kuskokwim River.

ANIL 11

(22) Page 12, third bullet: Scenario 3: Tank Farm Release

*Storage of diesel fuel would occur in tank farms located in Dutch Harbor, Bethel, Angyaruaq (Jungjuk) Port, and at the mine site... The spill scenario for this material estimates that the entire contents of a tank are released,* ***but contained with the secondary containment structure****... A release of diesel fuel to the surrounding environment in this scenario would have major impacts to subsistence resources on the Kuskokwim River or the coastal marine environment.*

There is no basis for BLM to conclude that a spill within secondary containment would have any impact on subsistence resources. This portion of the 810 analysis should be revised to say that any spill for Scenario 3 would not have an impact on subsistence resources.

ANIL 11

(23) Page 13, second bullet: Scenario 8: Mercury Release

*The effect of wind born dust from trucks on the port road, or release of mercury vapor during ore processing could have affects [sic] on fish, terrestrial wildlife and vegetation near the mine and thereby have major effects to subsistence users.*

The spill scenario as presented in the DEIS does not include wind-borne dust from the port road or the release of mercury vapor during processing. Effects from dust and gaseous emissions are evaluated elsewhere in the DEIS. BLM's 810 analysis misrepresents the information presented in the DEIS as it relates to the risk and effects of mercury. Neither the DEIS nor the 810 analysis illustrate why mercury emissions from the project, as described, would have a major effect on subsistence users. This conclusion is unsupportable.

ANIL 11

(24) Page 13, third bullet: Scenario 9: Partial Tailings Dam Failure

*In the event of a tailings dam failure, contaminated tailings and water would be released into the Crooked Creek and into the Kuskokwim River.*

This statement is unsubstantiated by the information presented in the DEIS. The failure modes investigated under the DEIS did not identify a scenario where any substantive release of tailings into the Kuskokwim River would occur. Moreover, partial tailings dam failure scenarios were derived from an early-stage Failure Modes and Effects Analysis (FMEA), which included participation by the third-party EIS contractor, the State of Alaska Department of Natural Resources (DNR), and DNR's geotechnical expert reviewers. The primary purpose of the FMEA was to guide more detailed engineering and State permitting of the tailings dam. Based on the reasonable assumption that additional mitigation will be incorporated into the final design to further minimize the potential for tailings dam failure, the partial dam failure scenarios would be extremely unlikely to occur. We suggest that BLM rely on the geotechnical expertise of the Corps (through its third-party contractor) and the DNR's Dam Safety Program to fully understand the potential for and impacts of tailings dam failure.

ANIL 11

(25)Page 13, third bullet: Scenario 9: Partial Tailings Dam Failure

*A tailings dam failure....This scenario would have major impacts to subsistence resources for the whole Kuskokwim River watershed.*

This comment is inconsistent with the findings presented in the DEIS and is unsupported. The discussion should be revised to reflect the details as presented in the DEIS. Also see the FMEA referenced above.

**Alternative 2 Findings**

ANIL 14

(26) Page 14, last paragraph:
*The evaluation concludes that Alternative 2 may result in significant restrictions to subsistence....*

The findings should be reassessed pursuant to the comments above. The data do not justify this finding.

**Alternative 3A, Findings**

ANIL 8

(27) Page 16, last paragraph:
*[T]he reduced number of barge trips in Alternative 3A would be reduced compared to Alternative 2, but the frequency of barge trips still impact subsistence fishing and use of the river, and may result in significant restrictions to subsistence uses for the Kuskokwim River communities outlined in Alternative 2.*

The findings should be reassessed pursuant to the similar comments above in regard to Alternative 2. The DEIS provides a detailed analyses supporting the conclusion of low intensity and overall minor effects on subsistence due to barging under this alternative. The 810 analysis should be revised to conform to the DEIS analysis.

**Alternative 3B, Evaluation of the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs**

ANIL 8

(28) Page 17, last paragraph:
*The number of barge trips would be reduced compared to Alternative 2, but would still involve 64 total round trips, which may result in significant reduction in subsistence uses for the communities on the Kuskokwim River as outlined in Alternative 2.*

The DEIS provides a detailed analysis supporting the conclusion of low intensity and overall minor effects on subsistence due to barging under this alternative. The 810 analysis should be revised to conform to the DEIS analysis.

ANIL 3

**Alternative 3B, Findings**

(29) Page 19, paragraph 3:

The findings should be reassessed pursuant to comment (28) and to the comments above on Alternative 2 regarding mine site and pipeline components that the two alternatives have in common.

**Alternative 4, Findings**

ANIL 3

(30) Page 21, paragraph 1:
The findings should be reassessed pursuant to the comments above on Alternative 2 regarding mine site and pipeline components that the two alternatives have in common. The 810 analysis as presented does not to conform to the DEIS analysis.

**Alternative 5A, Findings**

ANIL 3

(31) Page 22, paragraph 2:
The findings should be reassessed pursuant to the comments above on Alternative 2 regarding the mine site, barging, and pipeline components that the two alternatives have in common

**Alternative 6, Findings**

ANIL 3

(32) Page 23, paragraph 3:
The findings should be reassessed pursuant to the comments above on Alternative 2 regarding components that the two alternatives have in common.

**Cumulative Case – Evaluations and Findings**

ANIL 11

(33) Page 23, last paragraph:
*When the impacts fuel and other hazardous waste spills are taken into account, the proposed action and all action alternatives involve major impacts...*

This sentence is inappropriate because it implies that fuel and hazardous waste spills that could result in major impacts are a part of the project design or expected to regularly occur. Due to the many measures that would be taken to prevent spills, this language should be revised to reflect the impacts that would result from the proposed action, not from scenarios that are not reasonably foreseeable.

***Tier 2 Determinations***

ANIL 10

(34) As noted earlier, it is critical that BLM's findings in the 810 analysis be consistent with the DEIS. BLM has ownership over both documents, and it is unacceptable for the agency to stand behind documents that yield differing conclusions on subsistence. Donlin Gold has used great care in its design of the project and proposed mitigation measures. The Corps, BLM and other agencies will, over the remainder of the EIS process and permitting actions that follow, develop other mitigation measures that will further reduce impacts.

BLM must undertake a Tier 2 analysis of the factors under Section 810(a)(3)(A)-(C) if it concludes that there is "a significant possibility of significant restriction"[10] on subsistence uses on lands managed by BLM. In the event that BLM makes such a determination on public lands it manages, Donlin Gold presents the following observations related to the Tier 2 determinations that must be made by BLM under Section 810(a)(3).

- *Such a significant restriction of subsistence uses is necessary, and consistent with sound management principles for the utilization of the public lands*
  The natural gas pipeline is a critical component of the Donlin Gold project that is proposed to be developed on ANCSA lands. Calista Corporation and TKC selected the Donlin Gold lands specifically for their resource potential and to generate employment opportunities and long-term revenue for the corporations and their shareholders. The pipeline alternative provides superior environmental benefits compared to other alternatives, and the pipeline route itself has been designed to minimize impacts on subsistence resources. The natural gas pipeline would reduce the annual demand for diesel fuel from 120 million gallons to 40 million gallons; the pipeline would reduce project-related fuel barge traffic on the Kuskokwim River by approximately 67 percent. The natural gas pipeline and gas-fired power plant were incorporated into the project in response to comments raised by local residents about barging. Donlin Gold subsequently applied for a ROW to route the 315-mile pipeline across approximately 97 miles of BLM-managed lands. BLM regularly provides for utility and infrastructure ROWs to cross public lands pursuant to Section 28 of the Mineral Leasing Act of 1920 (30 U.S.C. 185) and 43 C.F.R. part 2880, Rights-of-Way Under the Mineral Leasing Act. Donlin Gold's ROW application is an important part of minimizing potential impacts on the Kuskokwim River, is necessary to develop the mineral resources on Calista and TKC lands and to further important goals of ANCSA, and is consistent with sound management principles for the utilization of public lands.

- *The proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of use, occupancy, or other disposition*
  Donlin Gold's pipeline ROW application reflects an effort to satisfy various regulations and requirements, including but not limited to those established under the Clean Water Act, Mineral Leasing Act, and National Historic Preservation Act, as well as pipeline safety regulations established under 49 U.S.C. Chapter 601. The ROW lease reflects the smallest practicable footprint for the pipeline ROW on federally managed lands. The majority of the pipeline route and any potential alternatives would traverse undeveloped or relatively undeveloped lands that are either subject to subsistence use or support subsistence resources, or both. The natural gas pipeline was added as a project component specifically to reduce the project's diesel fuel usage and the number of barges on the Kuskokwim River

[10] *Hanlon v. Barton*, 740 F. Supp. 1446, 1449 (D. Alaska 1988).

and the attendant potential for impact on subsistence, as compared to the project had it been designed to run on diesel generators.

- *Reasonable steps will be taken to minimize adverse effects upon subsistence uses and resources resulting from such actions*

ANIL 12

As noted above, Donlin Gold believes that BLM is misinterpreting ANILCA Section 810 by expanding the scope of the evaluation beyond federal decisions concerning the disposition or use of public lands for the project. Nevertheless, we are providing input on mitigation in response to the scope presented by BLM in the draft 810 analysis.

Donlin Gold has recognized the importance of subsistence in the region from the earliest stages of the project. Our approach to project design reflects our efforts to be proactive in regard to subsistence activities and to be a good neighbor within the watershed; to that end, design features intended to minimize subsistence impacts that have been incorporated into our project are listed below. (These measures are among those listed in Chapter 5 of the DEIS.)

- The natural gas-fired power plant and natural gas pipeline, which would reduce the volume of diesel fuel that would need to be barged to the site by 80 million gallons annually.
- A communication program to keep communities informed of the schedule and status of barging activities.
- Donlin Gold's barge operations plan based on and driven by river flow rates includes ongoing surveys of the Kuskokwim River navigation channel to identify locations that should be avoided to minimize effects on bed scour and the potential for barge groundings.
- Timing construction and maintenance activities to minimize impacts on subsistence hunting and fishing to the extent practicable.
- Implementing a no hunting/fishing policy at work sites to minimize competition from employees for local resources.
- Preferential hiring of Calista and TKC shareholders to maximize the economic benefit to local communities and minimize the risk of influx of non-local workers into nearby communities.
- Developing shift work schedules to maximize the opportunity for employees to remain active in subsistence harvest efforts in their own communities.
- Testing of borrow material at the mine site, access road, and pipeline route to ensure that acid-generating or metals-leaching materials are not used for road construction.
- Coordinating with and helping to educate people who want to travel in the area during the pipeline construction period through Donlin Gold's Public Outreach Plan

to either allow controlled access through or within construction zones or provide alternate access.

- Maintaining regular communication with local communities to provide information, answer questions, and listen to concerns.
- Designing the tailings storage facility with a liner to prevent seepage from the facility into groundwater.
- Using advanced water treatment to ensure that treated water from the mine site meets water quality standards protective of human health and the environment.

| | |
|---|---|
| **From:** | Weglinski, Gene |
| **To:** | donlingoldeis, POA |
| **Cc:** | Gordon, Keith POA; Newman, Sheila M POA; Bruno, Jeff J (DNR); lthorpe@blm.gov; Foo, Stan |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Friday, May 27, 2016 1:15:26 PM |
| **Attachments:** | image001.png<br>DG_DEIS_Final_Comment_Letter_05272016_Package.pdf |

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Please find attached Donlin Gold LLC's Draft EIS comment letter. Thank you.

**Gene Weglinski | Senior Permitting Coordinator |Donlin Gold**

4720 Business Park Blvd., Suite G-25 | Anchorage, AK, 99503

T. 907.273.0200 | M. 907.947.8174 | F. 907.273.0201

gweglinski@donlingold.com

DONLIN GOLD

May 27, 2016

Mr. Keith Gordon
Regulatory Division
US Army Corps of Engineers
CEPOA-RD-Gordon, P.O. Box 6898
Joint Base Elmendorf-Richardson, AK 99506-0898

**RE: Donlin Gold Project EIS – Draft EIS Comments**

Dear Mr. Gordon:

This letter contains comments prepared by Donlin Gold LLC (Donlin Gold) for consideration by the US Army Corps of Engineers (Corps) on the Donlin Gold Project (Project) Draft Environmental Impact Statement (DEIS).

Donlin Gold has been conducting exploration activities, collecting environmental baseline information, and engaging with local communities since 1996. Since 2004, we have continued a well-documented and thorough community engagement program in conjunction with the advancement of Project feasibility studies. We put significant effort into evaluating alternatives and designing a Project that is viable, safeguards the environment, and will enrich the lives of residents of the Yukon-Kuskokwim region, which is reflected in Alternative 2. We encourage the selection of Alternative 2 and believe that it is the most effective and efficient approach to developing the Project.

Donlin Gold appreciates the opportunity to contribute these comments.

Sincerely,

Stan Foo

Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

Enclosures:

Donlin Gold DEIS Comment Matrix
Appendix A – Shipping Container Memo
Attachment 1 – Owl Ridge Natural Resource Consultants Comments on DEIS Section 3.13

cc:
Jeff Bruno, Project Coordinator, Alaska OPMP
Laurie Thorpe, Project Manager, BLM


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

# INTRODUCTION

Our comments are provided in three forms; overarching comments that apply to the National Environmental Policy Act (NEPA) process or across more than one section of the DEIS, focused comments directed at specific sections or aspects of the DEIS, and a set of tabular comments containing line-item details on facts or issues we believe warrant further attention or clarification. In developing the Final EIS, we encourage the

NEP 7 Corps to focus on refining the discussions of impacts on key resources – subsistence, aquatic resources, water quality, air quality, and socioeconomics and avoid adding to what is already an encyclopedic volume.

# OVERARCHING COMMENTS

## PROJECT REFINEMENTS

Donlin Gold has worked with the Corps and the State of Alaska to advance the permitting process in parallel with preparation of the DEIS. Furtherance of the Clean Water Act Section 404/Rivers and Harbors Act Section 10 permit (404 permit) application, the Alaska Department of Environmental Conservation's Alaska Pollutant Discharge Elimination System and Integrated Waste Management permits resulted in minor refinements of the Project description that will need to be captured in the Final EIS. Donlin Gold will provide a summary of these refinements, reflected in the 404 permit application and updates to our management plans to the Corps in summer 2016. Copies of updated management plans will also be provided at that time.

## PUBLIC OUTREACH PROCESS

PUB 5 We commend the efforts by the Corps, AECOM, and the cooperating agencies in producing and releasing the DEIS for public comment. We believe the Corps has fulfilled its obligations under NEPA in conducting the public outreach aspects of NEPA, particularly in the way provisions of the DEIS have been communicated to Yup'ik language speakers.

PUB 5 We believe that the Corps' establishment of a 157-day public comment period (plus an extension) was appropriate, accommodates the cultural practices of the Yukon-Kuskokwim (YK) region, and affords the dispersed communities ample opportunity to participate in the public comment process. We also believe the comment period was adequate, particularly given the extensive scoping process used to identify issues of greatest interest to people in the YK region, the outreach efforts in the form of the newsletters, oral presentation of an introduction to the DEIS in Yup'ik, and various presentations given throughout the region leading up to release of the DEIS.

### HUB APPROACH

PUB 2 We support the hub community approach employed by the Corps during the DEIS public meetings and we believe the Corps' approach resulted in a reasonable method of balancing participation within the region and conducting the process within a reasonable time frame. While the Corps was responsible for planning and implementing the DEIS public meetings, Donlin Gold encouraged participation by representatives of the "spoke" communities by offering transportation to the DEIS comment meetings held in the hubs. In each case, we contacted communities within the cluster in advance of the meeting to offer free transportation to the meeting. We contacted the tribe, city, and village corporation in each village and offered at least one seat each on a charter flight for an individual selected by the tribe, city, or village corporation. If villages were accessible by ice road or snow machine trail, we offered reimbursement of their fuel expenses. More


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

than 75 people from 24 different communities attended a DEIS public meeting using transportation provided by Donlin Gold.

YUP'IK TRANSLATION

PUB 5 We support the Corps' efforts to reach to residents of the region whose first language is not English with the use of translators at the DEIS public meetings. Many of our team's attendees benefitted from the Yup'ik to English conversions that were also provided.

PUB 5 The broadcast and distribution of a Project overview in Yup'ik was above and beyond the typical level of public outreach provided under NEPA. We continue to recommend that a summary of the Final EIS and the Record of Decision be translated into Yup'ik.

## SUBSISTENCE/SOCIOECONOMICS AND PROJECT SUPPORT

DEIS MEETING COMMENTS

SUB 1 Comments during the DEIS public meetings reinforced the importance of subsistence as a way of life – as life – for the residents of the YK region. This is a message we understand and it is a foundational principle of our agreements with the Calista Corporation (Calista) and The Kuskokwim Corporation (TKC). As detailed in our scoping comments, our Project was developed with these concerns in mind.

We clearly heard residents of the region testify that the Project offers potential benefits, yet they have concerns. One commenter from Hooper Bay stated that he supports what Donlin Gold is doing but noted, "there's pros and cons about it." One Toksook Bay commenter articulated this idea as being of two minds, aware of "the dangers and the benefits." Another Toksook Bay commenter spoke about the importance of Native foods, voiced concerns about potential effects on fish from barging, and noted that there were problems with the Red Devil mine related to a spill that spread. She wondered "what would happen if there was such a spill if they do open Donlin Gold," but concluded by saying, "it's good to hear that there will be jobs. Donlin Gold will open jobs for us, especially the younger folks." A McGrath commenter voiced concerns about the pipeline route, blasting associated with material sites, and barging but noted the benefit of bringing work to people "in the poorest region of Alaska. And I think that's something that's a real positive." A Quinhagak commenter noted, "we are not really all of us against the mine, but … we worry about our children and grandchildren" and went on to say that it would be good if jobs were available, particularly if "people that were working at the mine, you know, our way of life." One Akiak commenter voiced concerns about past mining activities and about the future for young people and finished by saying, "I'm not for Donlin Creek, I'm not against Donlin Creek. I'm just neutral." The Native Village of Napaimute, which serves as a cooperating agency in the EIS process, posted DEIS comments on its website, illustrating the importance of employment in the region while identifying potential environmental concerns. People also commented on the need to have money in order to conduct subsistence activities at the same time noting the problem with unemployment throughout the region and, particularly, among young people.

LEG 1 The message we hear in these comments is that the Project needs to be done right and that all of the parties involved need to take responsibility for their part – Donlin Gold needs to ensure that our operation is conducted in a safe and sound manner and in compliance with regulatory requirements. Regulatory authorities need to ensure that permits and authorizations establish the appropriate levels of protections and provide thorough and effective oversight.

PUB 2 As the Corps reviews the DEIS comments, we stress the importance of looking specifically at the concerns and addressing them directly. Concerns voiced about spills of cyanide and mercury, about failure of the tailings dam, and about effects on subsistence resources from barging, and potential exposure to


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

PUB 2 cont. contaminants are all addressed in the DEIS. A well-designed project combined with an effective regulatory regime will ensure that the Project will be built, operated, and closed safely, protecting the environment and public health, all while providing jobs and other economic benefits in a way that is consistent with the culture and values of the YK region.

PUB 2 As the EIS is finalized, we request the Corps to continue to find ways to convey the message that the EIS has considered all these concerns and to present the results in terms that can be clearly understood by the general public and, specifically, the residents of the YK region.

Related to the uncertainty that some residents may have expressed about Project operations, we note that the agreements between Donlin Gold and Calista and TKC require the establishment of the Donlin Advisory Technical Review and Oversight Committee (DATROC), through which Donlin Gold will seek the views of its partners on items, including, but not limited to, environmental protection, reclamation, subsistence uses, impacts on communities, impacts on cultural resources, and reasonably minimizing conflict among uses. Donlin Gold's agreement with TKC includes development of a subsistence plan to provide TKC shareholders access to surface lands for subsistence uses, subject to regulatory, safety, and operational needs. The agreement also provides a role for TKC regarding the development of comprehensive response plans for possible spills or similar accidents on the middle Kuskokwim River. The spill response commitment includes a provision to provide regular training for response team members. Our scoping comments detailed the extent to which Donlin Gold has conducted and maintained a robust community outreach program focused on listening to concerns and suggestions, educating local residents about mining in general and our Project in particular and informing them of our progress. In addition to our ongoing public outreach activities, we will develop a communications protocol through which the results of permit-driven monitoring programs can be shared and Project-related issues can be identified, tracked, and resolved using the DATROC. The communications protocol would also encompass barging activities and issues or concerns that may arise from those activities.

### Economic Opportunities

Donlin Gold will provide up to 3,000 jobs during construction and approximately 900 jobs during operations. Through our agreements with Calista and TKC, we are committed to hiring qualified shareholders and their descendants. Our annual payroll during construction is anticipated to be $375 million; during the 27 years of operations, the annual payroll would be approximately $100 million with an indirect and induced payroll of approximately $60 million.

SER 11 As described in the DEIS, the Project will provide jobs and work schedules that will allow employees at the mine to sustain their subsistence activities.

## Public Easement Plan/17(b) Right-of-Way Realignments

Calista and TKC, as the landholders in the Project area, submitted the *Public Easement Plan Donlin Gold Project* to the Bureau of Land Management (BLM) on August 6, 2015. The public easement plan explained the need to relocate, terminate, or abandon on a temporary or permanent basis, various rights-of-way (ROWs) that occur or cross within the proposed disturbance footprint of the Project. Donlin Gold is working with the landowners to provide a supplement to the public easement plan that identifies potential alternatives and includes preliminary information about impacts. We have provided an outline of this supplement to the BLM. We suggest that the supplement serve as a source of information to bolster the purpose and need, alternatives description, and impacts analysis in the Final EIS to accommodate decision-making as it relates to the public easement plan.

NEP 5 We strongly encourage BLM to work cooperatively with the Corps and AECOM to achieve an agreed-upon analysis of potential Project impacts resulting from the relocation, termination, or abandonment of the ROWs in the Final EIS.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

## RANGE OF ALTERNATIVES

NEP 4 Donlin Gold believes that the range of alternatives covered in the DEIS is sufficient to address the issues as identified through public comment and to satisfy NEPA.

### ALTERNATIVE PIPELINE ALIGNMENT

During the Anchorage DEIS public meeting, the Corps heard comments requesting that an alternative location for the natural gas pipeline be considered north of the proposed alignment in the vicinity of Farewell. Locating the pipeline to the north, into the spruce forests, would involve a greater proportion of wetland impacts and permafrost, putting the alignment in an area with greater geotechnical challenges than the proposed location. We question the practicability of such an alignment. Shifting the pipeline alignment to the north would not necessarily move it out of Nicolai subsistence use areas as defined in the DEIS (see Figure 3.21-4 and supporting Alaska Department of Fish and Game subsistence division data). We believe that the DEIS accurately characterizes impacts to the area in terms of subsistence. This characterization of impacts would also be relevant for evaluating the potential impacts to commercial guided hunting. Section 3.21.6.3.3 states that "the construction period would generally be limited to a single construction season," which is true for the segment in question, and that "[s]ubsistence resources that would move away or were displaced because of construction would in all likelihood return." While the DEIS (Section 3.16.3.2.3) concludes that effects to guided hunting could be of medium intensity, it also notes that the effects would be limited to a brief winter construction period and therefore temporary. Considering the impact assessment presented in the DEIS for subsistence and recreational use (including guided hunting) of this area, we believe that detailed consideration of an alternative location for the natural gas pipeline in the vicinity of Farewell is unwarranted.

PAA 24

## CONTEXT

NEPA obligates federal decision-making agencies to "take a hard look" at the impacts of their decisions on the human and natural environments. The Council on Environmental Quality NEPA implementing regulations state that the goal of NEPA is better decisions, not better documents. In preparing the Final EIS, Donlin Gold encourages the Corps to assess potential Project impacts in the context of the existing environment and the decisions that will be made. Doing so will enable both the agencies and the public to better appreciate why a particular issue is being discussed, how it relates to key concerns identified during scoping, and why the potential impact is relevant to the agency decision to be made. The following comments focus on the treatment of the No Action alternative, the characterization of barging operations, and the consideration of spill risk.

NEP 5

### NO ACTION

PAA 31 In preparing the Final EIS, Donlin Gold urges the Corps to expand the discussion of anticipated effects of continuing the activities identified in the baseline description as part of the No Action alternative for the applicable key resources, including water quality, surface water hydrology, subsistence, socioeconomics, and health. As written, the description of the No Action alternative is simply presented in terms of the effects of the Proposed Action not occurring. We suggest revising the description of the No Action alternative for key resources, to characterize baseline considerations in terms of the mine site, transportation facilities, and natural gas pipeline components as is done for the Proposed Action and other alternatives. We believe that using this analytical structure will facilitate the agencies' and public's ability to compare the No Action alternative with the action alternatives in Chapter 3.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

**SUB 7**

For example, the No Action description (Section 2.3.1) states that the disposition of existing facilities at the mine site would be at the discretion of Calista and TKC, the landowners. The analysis should clearly state that Calista and TKC would continue to determine the extent of access for subsistence or any other uses. As such, the subsistence analysis conclusion in Section 3.21.6.2.1 that "subsistence users from Crooked Creek may reestablish their use of the area" should explicitly note that access to the site will depend on Calista's and TKC's future land use decisions, not solely on the desire of Crooked Creek subsistence users. Moreover, until recently the Project has been the site of placer mining operations. Should the Project not move forward, those operations would likely return to the Project area and hence should be considered part of the baseline for the No Action alternative.

**TRAN 5**

When considering the transportation facilities under the No Action alternative, ocean-going barge traffic would continue into Bethel and river barge traffic between Bethel and points upriver also would continue. A clear statement of this reality in Chapter 2 provides the basis for Chapter 3 to analyze the effects of the ongoing and ubiquitous waterborne traffic, which includes barges, fishing boats, and skiffs, on erosion (in addition to natural sources) of the shorelines and effects on aquatic resources and wetlands, potential introduction and spread of invasive species, and potential spills from the transportation of fuel and other materials on the river that could produce adverse effects on the watershed. A specific example from Section 3.5.3.1 is the statement that under the No Action alternative, "there would be no surface water impacts." We believe a more accurate conclusion is that "there would be no Donlin Gold-related surface water impacts," while acknowledging that the ongoing effects characterized in the baseline conditions would continue.

**SUB 8**

As another example, the description of the No Action alternative under subsistence should acknowledge the concerns voiced about increased competition for subsistence resources from both increases in local populations and pressure from guided hunting and sport hunters (e.g., in the vicinity of the Farwell airstrip) that is part of the current baseline condition.

**BARG 9**

In addition to the effects of current anthropogenic activities in the region, dynamic natural factors also affect and will continue to affect the region. Again in the context of surface water hydrology, the No Action alternative should recognize that the Kuskokwim River is a glacial river and natural turbidity levels are high. Natural erosion causes significant volumes of sediment to be contributed to and moved within the river. With or without the Project, erosion will continue to be a significant and ever-present force in the region, leading to significant naturally occurring sediment loads in the river. More fully describing these existing conditions in evaluating the No Action alternative puts the potential Project and action alternative effects into context and facilitates a reasonable comparison of the differences among the alternatives.

BARGING

**BARG 5**

Section 3.21.6.3.2 (and restated similarly in Section 3.23.2.2.2) characterizes the potential impacts of barging traffic during operations in terms of a percentage increase over current barge traffic on the river.[1] Expressing the change in traffic as a percentage sensationalizes the analysis and obscures the nature of existing traffic on the river. Donlin Gold encourages the Corps to evaluate the proposed Project barging in relation to all the current diverse uses of the river, the majority of which "involves smaller, high-speed boats that often travel closer to the river bank than slower barge traffic."[2] The potential barge-induced impacts on various resources, e.g., aquatic resources (juvenile fish strandings) and surface water hydrology (erosion)

[1] "180 percent increase over baseline" followed by a statement of "280 percent of baseline" (note that this 280 percent is based on an arithmetic error).
[2] Section 3.13.3.2.2.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

**BARG 5 cont.** should be characterized in the context of existing river traffic and natural levels of erosion. This analytical approach in the Final EIS will strengthen the analyses of Project-induced barge traffic by illustrating the Project's effects relative to those of existing river uses.

**BARG 6** The DEIS is inconsistent in how it describes and analyzes Donlin Gold's barging plan (also see the individual comment table); the lack of a clarity related to barging carried over to the DEIS public meetings as well. Donlin Gold strongly encourages the Corps to review the DEIS references AMEC 2013 and AMEC 2014, which describe river barge fleet design including cargo and fuel management. The DEIS states that 64 annual barge trips would be conducted to move cargo from Bethel to Jungjuk; the analysis conducted by AMEC indicates that the Project would require approximately 60 annual barge trips (AMEC 2014). A corresponding point not clearly disclosed in the DEIS is that the AMEC reports do not assume that the barges would be loaded to the 7.5-foot maximum draft available but rather assume loads that would generate an average draft of 4.25 feet. The report describes how the Project would employ a flow-based barge loading approach; the same approach served as the basis to model the ability to transport cargo and fuel based on Kuskokwim River flow levels measured over a 59-year period. Model results indicated that over a 110-day shipping season, cargo tows would successfully deliver the specified annual volume with a success rate of 99% and that fuel tows would experience a success rate of almost 97% (AMEC 2013; AMEC 2014). The flexibility provided by this approach minimizes the need for relaying (uncoupling) single or pairs of barges and where relaying did occur, it would occur across short river segments.

**BARG 6** While we believe that the DEIS presents a reasonable characterization of barging, it is important that the impact analyses acknowledge that meeting the Project's annual cargo shipping needs do not require exactly 64 trips or that each trip contain fully loaded barges. The Final EIS should recognize that the 64-trip annual cargo barge scenario (and similarly loaded fuel barges) is simply that – one scenario that reflects the maximum number of trips that could be handled by the 2-tug, 4-barge tow configuration over the 110-day shipping season. In years with average river flows, the number of barge trips is likely to be lower than the estimates presented in the DEIS since higher river flows would allow fewer, more heavily loaded barges than those used as the basis for the DEIS analysis. We emphasize that the flow-based loading system will provide substantial flexibility in managing cargo loads, such that the necessary volume of cargo is delivered with a minimal amount of stranding risk over the shipping season.

SPILL RISK

**FSR 6** Comments expressing concerns about spills were heard in scoping and again in the DEIS public meetings. The spill analysis as presented in the DEIS is based on a rating system of very low to very high where "very high has a probability of approaching one, very low has a probability approaching zero." Donlin Gold recommends that in the Final EIS the Corps present the spill risk in a way that is meaningful to the general public and has relevance to available performance records. For example, a review of the spill records for barging of petroleum products in Alaska from 1995-2013 documents that 94% all reported spills were less than 50 gallons, there were only four spills of greater than 1,000 gallons, and there were no spills of greater than 10,000 gallons. Based on this historical data, there is no basis for assuming a spill of 37,817 gallons of fuel from a barge supplying the Project. Additional comments on the spill risk section are found in the focused comments, below.

## WIRAC Letter

The Western Interior Alaska Subsistence Regional Advisory Council (WIRAC) submitted DEIS comments on December 8, 2015 based on information provided by a BLM wildlife biologist during a meeting on November 4, 2015. During that meeting, the biologist presented himself as BLM's representative and offered opinions


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

on the DEIS and Alaska National Interest Lands Conservation Act Section 810 analyses, including subsistence, barging operations, water treatment, and financial assurance even though many of these areas are beyond his area of expertise. Following BLM management review of the transcript of the November 4, 2015 meeting, BLM formally informed the WIRAC by letter dated December 4, 2015 that the biologist's comments on the DEIS and related potential environmental impacts from the Project were not BLM's official position. The short period of time between the release of the DEIS on November 30, 2015 and the Corps' receipt of the WIRAC letter, as well as the content of the letter itself, indicates that the WIRAC's comments were heavily influenced by the biologist's personal views as expressed to the WIRAC at its November 4, 2015 meeting. We encourage the Corps to consider these circumstances in determining what weight to place on WIRAC's comments.

# FOCUSED COMMENTS

## CHAPTER 1 PURPOSE AND NEED

**NEP 3** We reiterate our scoping comments that Chapter 1, the purpose and need statement, and the Corps' consideration of alternatives should recognize and emphasize the special land status of the Project. The proposed mine is sited on lands owned by Calista and TKC, the regional and village Alaska Native corporations owning the respective mineral and surface estates. Under the Alaska Native Claims Settlement Act (ANCSA), Alaska Natives gave up claims to aboriginal lands in exchange for rights to select land in their traditional areas. In enacting ANCSA, Congress specifically highlighted the need to "provide for the real economic and social needs of Natives … with maximum participation by Natives in decisions affecting their rights and property." Alaska Native corporations are "for profit" corporations, established by Congress, whose purpose is to provide benefits to Alaska Native shareholders. As the Ninth Circuit Court of Appeals has recognized, "Congress intended … that those Native corporations that did select land for its economic potential would be able to develop that land and to realize that potential." Congress also recognized that the benefits of resource development on ANCSA lands would provide statewide benefits. Under Section 7(i) of ANCSA, Alaska Native corporations must share revenues from resource development with other regional Alaska Native corporations. For the Project, Calista and TKC have entered into commercial arrangements with Donlin Gold that indicate their strong desire to develop these particular mineral resources for the benefit of their Alaska Native shareholders.

We provide some clarified and strengthened wording to consider for the Corps' NEPA purpose and need statement (edits to the current DEIS Section 1.3.3 text are shown in redline/strikeout below):

**NEP 3**

> The Corps' determination under NEPA of the project's ~~NEPA~~ purpose is to produce gold from ore reserves from the Donlin deposit situated on Calista and TKC ANCSA lands using mining processes, infrastructure, logistics, and an energy supply(s) that are economic and feasible for application in remote western Alaska. The need for the project is to provide economic benefits to Donlin Gold, Calista, and TKC shareholders; ~~produce gold to meet worldwide demand provide;~~ and ~~provide~~ local economic development in fulfillment of ANCSA; and produce gold to meet worldwide demand.

A central tenet of ANCSA as a settlement of Alaska Native aboriginal land claims was to convey to Native corporations lands such as the Project mine site for mineral and other development to benefit the real economic and social needs of Alaska Natives. 43 U.S.C. § 1601 *et seq.* A primary component of the purpose and need for the Project is to meet and fulfill these ANCSA economic and social requirements and objectives for Alaska Natives; Calista and TKC are active supporting participants with Donlin Gold in the


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

Project. This particular land was selected by Calista for its known mineral potential. The Alaska Native corporation land status is highly relevant to the Project, which is being proposed in this location, i.e., the Project is the culmination of many decades of work by Alaska Natives to receive title to, and develop, their aboriginal lands.

NEP 3 The Final EIS should be clarified to reference ANCSA as a primary element in the NEPA purpose and need statement and other sections of Chapter 1 (e.g., 1.10.6).

ISSUES SELECTED FOR ANALYSIS (SECTION 1.8, PAGES 1-20 TO 1-23)

CLA 29 We note that the introductory part of Section 1.8 on page 1-20 includes a sidebar short list of "Highlighted Issues." However, the list consists of only generic topics such as "Socioeconomics." The remainder of Section 1.8 contains a lengthy list and description of various issues identified for analysis from scoping. This section would be improved by moving more specific identification and descriptions of those highlighted issues up to the front of Section 1.8 in a "Key Issues" or "Highlighted Issues" subsection, and then placing the remaining identified issues in a following "Other Issues" subsection.

EXECUTIVE MEMORANDUM AND ORDERS (SECTIONS 1.10.25 TO 1.10.34)

CLA 29 Chapter 1 should provide an introductory sentence or two in the text or a footnote at the beginning of the listing and description of these executive documents, clarifying that they are direction or guidance to agency personnel, but that unlike statutes or published regulations that have gone through a public notice and comment rulemaking process, they do not generally have the force of law or bind those outside the agencies. Donlin Gold suggests the following text:

> Executive memoranda and orders provide direction and guidance to agency personnel, but unlike statutes and published regulations generally are not binding or enforceable as to persons outside the agencies.

## CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

ALTERNATIVE 2 – PROPOSED ACTION

PAA 3 Donlin Gold encourages the Corps to select Alternative 2, the Proposed Action, as the Corps' preferred alternative in the Final EIS. We believe Alterative 2 strikes the best balance in terms of reducing impacts, restricting the permanent Project footprint to the American Creek and Anaconda Creek subdrainages within the Crooked Creek watershed. The natural gas pipeline as proposed would reduce the volume of diesel needed by 80 million gallons annually, reducing fuel barge traffic by approximately two-thirds. Our barging plan reflects the flexibility necessary to transport the annual volume of cargo and fuel in all but the extreme low-flow year based on existing data reaching back nearly 60 years. Strategic materials will be stockpiled in the event that not all cargo can be delivered in a given shipping year.

ALTERNATIVE 3A – REDUCED DIESEL BARGING: LNG-POWERED HAUL TRUCKS

PAA 5 Donlin Gold acknowledges that Alternative 3A represents an alternative that could reduce greenhouse gas emissions and substantially reduce barge traffic. Mining equipment suppliers continue to advance the technology necessary to make liquefied natural gas (LNG)-powered equipment viable for the industrial market; however, the technology is not there yet. If and when this technology becomes available, Donlin Gold would carefully evaluate the use of LNG to power our mining fleet; however, at this time, we do not consider Alternative 3A practicable taking into consideration the limits of existing technology.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

ALTERNATIVE 3B – REDUCED DIESEL BARGING: DIESEL PIPELINE

**PAA 7**

A number of commenters during the DEIS public meetings voiced a preference for a diesel rather than a natural gas pipeline and in some cases suggested both. Our concerns about a diesel pipeline are threefold. First, a diesel pipeline would increase the Project capital cost by hundreds of millions of dollars in material costs, construction costs, closure costs, and wetland mitigation costs. Second, a diesel pipeline would require substantial monitoring and maintenance and attendant infrastructure and activity. The additional monitoring and maintenance needs would require access points along the pipeline for the operational life of the pipeline rather than being reclaimed following construction; it would also require the development and ongoing operation of a greater number of airstrips than proposed under Alternative 2. In addition to the monitoring and maintenance activity, the pre-positioning of spill response equipment and training sessions would result in a substantially greater level of ongoing activity along the pipeline compared to Alternative 2. Alternative 3B would extend the potential impacts on access to the area and competition for subsistence resource from non-local hunters from a single construction season to the entire Project life. Considering that increased access has been expressed as a significant concern since scoping, in our opinion, this particular aspect alone would render the alternative not in the public interest. Finally, from an environmental impact standpoint the transport, unloading, and storage of diesel fuel in Cook Inlet in an area subject to winter storms, extreme tidal fluctuation and ice floes could present a substantial threat to endangered Cook Inlet beluga whales.

ALTERNATIVE 4 – BIRCH TREE CROSSING PORT

The establishment of a port and access road at Birch Tree Crossing (BTC) would be more expensive from an operational standpoint and would have greater impacts across a broad range of resources. The DEIS discloses that the BTC alternative would impact a greater number of acres of soils, vegetation and wetlands; the wetlands impacts represent both a cost in terms of natural resources and also in mitigation costs. The DEIS also notes that the BTC mine access road would cross subsistence hunting areas for moose, caribou, and black bear as well as areas for harvesting berries for many Central Kuskokwim River communities. Subsistence users affected represent a substantially larger group than those from Crooked Creek that would be affected by the Proposed Action.

**SUB 10**

While Alternative 4 would reduce potential impacts to subsistence fishing activity in the Kuskokwim River between BTC and Jungjuk, we believe that the Proposed Action with the mitigation measures proposed to mitigate the potential for barging to impact subsistence fishing represents a more effective alternative than a 76-mile access road through areas of known subsistence use.

Alternative 4 also would require a ROW across state-selected lands managed by BLM and private inholdings within the boundaries of the US Fish and Wildlife Service-managed Yukon Flats National Wildlife Refuge.

**LAND 11**

We believe the discussion in Section 3.15.2.5 greatly oversimplifies the effect that this complex land ownership would have on the permitting of this alternative. Our opinion is that Alternative 4 is likely impracticable due to cost, land ownership, and permitting factors.

ALTERNATIVE 5A – DRY STACK TAILINGS

**PAA 46**

Donlin Gold acknowledges that dry stack tailings (DST) methodology has advantages in some cases and that evolving technology makes the approach viable in an increasing number of applications. However, the use of DST for a project of this size and in a subarctic location is not feasible at this time. Donlin Gold has modified the proposed Project to include advanced water treatment to reduce the volume of water retained behind the tailings dam during operations. Our dry closure of the tailings at the end of operations reduces or eliminates many of the concerns related to a permanent wet tailings pond. Considering the size of the


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

**PAA 46 cont.**

facility, we believe that the potential for fugitive dust emissions would be reduced under the Proposed Action compared to Alternative 5A. Ultimately we believe that the design of the Project under the Proposed Action already addresses the concerns that would be addressed with DST using a technology better suited for the application and climate.

ALTERNATIVE 6A – MODIFIED NATURAL GAS PIPELINE ALIGNMENT: DALZELL GORGE ROUTE

**IDIT 4**

The Dalzell Gorge route was preferred by Donlin Gold earlier in the permitting process, but we do not support selection of this alterative. Its proximity to the Iditarod National Historic Trail makes this route less attractive than the route as presented in the Proposed Action.

## CHAPTER 3 ENVIRONMENTAL ANALYSIS

WETLANDS (SECTION 3.11)

**WET 5**

We believe the DEIS substantially overstates the amount of wetlands that could be exposed to indirect effects from road dust. The DEIS states in Section 3.11.4.2.2 that "[d]ust deposition would be heaviest within about 33 feet (10 meters) of the most heavily trafficked road (the mine access road), but may influence vegetation and soils within about 328 feet (100 meters) (Auerbach et al. 1997; Ford and Hasselbach 2001; Hasselbach et al. 2005).... Indirect effects from the Jungjuk Road and airstrip could result in alteration or degradation of an estimated 1,734 acres of wetlands (Table 3.11-26)."

**WET 5**

The studies used to characterize the indirect effects of dust deposition on wetlands result in an overstatement of the potential effects from the Donlin Gold Jungjuk Port – Mine Access Road. The 1997 study by Auerbach et. al. was conducted on the Dalton Highway (gravel road) where the posted speed limit is 50 miles per hour (mph), although vehicles likely travel faster since other institutional controls are not in place. The highway is operated year-round with limited dust control measures. As noted below, dust deposition levels are substantially higher along the Dalton Highway compared to the proposed Jungjuk Port – Mine Access Road.

The Hasselbach and Ford and Hasselbach studies focused on the DeLong Mountain Transportation System (DMTS) a year-round-use gravel road serving the Red Dog mine. Dust control measures are implemented on the DMTS and the posted speed limit is 45 mph enforced by the operator. The 130-ton, 46-wheeled concentrate haul trucks used at Red Dog are significantly larger than the cargo trucks proposed for use by Donlin Gold. In contrast, the Donlin Gold access road will be used seasonally between the port and the mine, will employ dust control measures, and institutional controls will ensure drivers adhere to the 30-mph maximum speed limit.

Modeling by Air Sciences (2015a) estimated that over one trucking season (approximately 110 days) deposition levels at 1 meter from the Donlin Gold Jungjuk Port – Mine Access Road at 16.42 grams per square meter ($g/m^2$) and 9.98 $g/m^2$ at 10 meters from the access road. Data available for the Dalton Highway showed that annual average dust deposition rates over a similar time frame (110-day season) would be 264 $g/m^2$ within 10 meters of the road (Walker and Everett 1987). The data show deposition rates within 10 meters of the road (the highest deposition area) is more than 25 times greater for the Dalton Highway than the estimate for the Jungjuk Port – Mine Access Road. Restated, the first 10 meters of vegetation along the Dalton Highway roadside would receive nearly as much deposition in one year that the first 10 meters of vegetation along the Jungjuk Port – Mine Access Road would receive over the entire life of the Project.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

Further, the nature of the "dust" studied by Hasselbach and Ford and Hasselbach studies was primarily lead and zinc concentrate blown from insufficiently covered haul trucks rather than simply from road dust. Ford and Hasselbach (2001) state "much of the source material for dust probably derives from ore concentrate." In the case of the DMTS, lead and zinc toxicity effects on vegetation make it difficult or impossible to separate those effects from effects due solely to deposition. As Donlin Gold will not be transporting ore concentrates along the access road, the DEIS reliance on the Hasselbach and Ford and Hasselbach studies to evaluate impacts along the Jungjuk Port – Mine Access Road is not an appropriate basis for comparison.

**CLA 12**

Based on the modelling work prepared by Air Sciences, dust deposition would be less than 10 g/m$^2$ at a distance of 10 meters from the edge of the road. Assuming that this area represents the area of potential impacts to wetlands from road dust and that the entire area is wetlands, then the total potentially affected wetlands would be less than 200 acres. The Final EIS should place greater emphasis on the Project-specific and site-specific work conducted by Air Sciences over literature from other sites that are not directly comparable.

**AIQ 7**

FISH AND AQUATIC RESOURCES (SECTION 3.11)

**FISH 2**

Donlin Gold requested that our Owl Ridge Natural Resource Consultants aquatic resources consultant review DEIS Section 3.11 on our behalf. Their comments are included as Attachment 1.

SOCIOECONOMICS (SECTION 3.18)

Through our discussions with Calista, TKC, and the many villages in the region we understand the importance of the socioeconomic aspects of our activities and have responded accordingly with local hire programs and workforce development activities. Socioeconomics is a critical piece of the NEPA analysis as well as the "public interest" aspects of Clean Water Act Section 404 permitting. Donlin Gold supports the socioeconomic analysis presented in Section 3.18 noting that it captures the complexities of the subsistence economy, the concerns about outward migration, the ANCSA-driven economics applicable to Calista, TKC and the other ANCSA corporations, and the broader economic conditions, including the potential for increased revenues at the state level.

**CWA 2**

**SER 27**

Donlin Gold highlights the value of our past and present efforts to work with TKC and Calista to encourage participation in workforce development within the region through training and local hire programs. We are proud of our success during exploration activities in terms of the high level of local hire and our standard for excellence and safety in the workplace. We expect to continue and to build on our local hire commitments as the Project advances toward construction and operations.

Donlin Gold recognizes and respects the cultural and social importance of the subsistence way of life, as well as the critical role it plays in the health and well-being of the region's residents. Because of this, we have structured our work rotations to ensure that employees have time off for subsistence activities. We stress the importance – echoed by commenters during the DEIS public meetings – of providing a source of cash to enhance the residents' ability to maintain a subsistence and village-based lifestyle. The income associated with regular employment allows subsistence activities to occur with more certainty and efficiency in that employees and their families can afford the needed equipment and supplies, e.g., fuel, nets, boats, snow machines. As the Project moves forward, we are committed to continue working with the communities to further increase local employment and related socioeconomic benefits.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

SUBSISTENCE (SECTION 3.21)

Donlin Gold is keenly aware of the importance of subsistence within the region and that subsistence activities and resources continue to be one of the key analyses presented in the DEIS. We believe the DEIS presents an accurate characterization of both the baseline conditions of subsistence activity and the potential impacts associated with mining activities. The linkage between subsistence activities and socioeconomics is a key element of the analysis as witnessed by a number of commenters during the DEIS public meetings. The economic security established with steady employment would certainly contribute to the food security that is a fundamental part of subsistence. The ability to live a sustainable subsistence lifestyle in turn supports the maintenance and strengthening of the Yup'ik culture, health, and well-being. We encourage the Corps to retain this analysis and to consider the positive linkage between employment and subsistence while developing the Final EIS.

**SUB 18**

HUMAN HEALTH (SECTION 3.22)

**PHL 3**

We concur with the important finding that the socioeconomic benefits associated with the Project will lead to beneficial health effects throughout the region. However, we find the section lacking in data to support the conclusions regarding adverse effects associated with increased suicide rates, alcohol and drug use, infectious diseases, and accidents. Our belief is that the psychological and behavioral benefits of having good, productive careers in the region in a safe, drug-free workplace will greatly outweigh the adverse effects.

**SUB 18**

For many residents, the Project is one of the only foreseeable opportunities to pursue career goals and remain in the region to practice a traditional lifestyle, including subsistence. We encourage the Corps to emphasize the directly relevant experience from the past decades of exploration at Donlin Gold as well as the pertinent examples from other Alaska natural resource projects such as the Red Dog mine. We also encourage the Corps to review applicable comment letters from Y-K community leaders like the one submitted by Willie Kasayulie on April 1, 2016 as well as oral and written comments made by former Donlin Gold employees who have direct experience working and subsisting in the region.

HUMAN HEALTH REGULATORY ENVIRONMENT (SECTION 3.33.1)

**PHL 2**

The regulatory environment discussion presents a discourse on entities and processes that have no regulatory authority associated with the permitting process. The Final EIS should describe that assessing human health is an aspect of NEPA and that there are laws and regulations, including the Clean Water Act (CWA), Clean Air Act (CAA), and various Alaska statutes that have been enacted with the specific purpose of protecting human health and, specifically, as it pertains to activities surrounding development projects.

NO ACTION ALTERNATIVE (SECTION 3.22.4.1)

**PHL 15**

The DEIS uses Health Effects Categories (HECs) to assess the levels of human health effects that could result from each of the action alternatives; however, there is no corresponding analysis for the No Action alternative. In preparing the Final EIS, Donlin Gold urges the Corps to describe in greater detail the anticipated health effects of continuing baseline activities, rather than saying that with the No Action alternative "the effects of the proposed action would not occur." An analogy for the human health No Action alternative would be the existing traffic conditions in relation to a proposed highway improvement project. In that case, the No Action alternative would not be zero traffic; rather, the No Action alternative would represent the *existing* level of traffic.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

PHL 15

Donlin Gold contends that using the HECs to characterize the No Action alternative will show few detectable differences in adverse impacts between the action alternatives and the No Action alternative. Donlin Gold believes that the economic security offered by steady employment and associated benefits would certainly contribute to improved access to health care, better health practices, lower drug and alcohol dependence, and therefore better health outcomes in the region. In conducting the analysis, we believe it would be appropriate for all HECs for the No Action alternative to use impact scoring of 3 - Very High for Duration because the No Action condition would last more than six years and 3 - Very High for Extent since the effects of the No Action alternative would be regional.

HIA METHODOLOGY INCOMPATIBLE WITH NEPA

PHL 2

The Health Impact Assessment (HIA) methodology uses terminology that is inconsistent with the effects analysis presented in the DEIS. In one example, Section 3.22.4.2.3 notes that for air quality "[a]ll pollutants were found to be well below the air quality standards and threshold values that would trigger permitting requirements. Permitting requirements typically take human health into consideration along with other factors." The HIA analysis goes on to conclude that "[h]ealth effects related to air quality during the construction phase are considered to be medium (no intervention required)." Donlin Gold concurs with the conclusion that no intervention is required because air quality standards will be met throughout the Project life. However, we recommend not characterizing the human health effects as "medium" because the Project will comply with applicable regulations. Donlin Gold understands that this is an artifact of the HIA methodology; however, our position is that the HIA terminology is inconsistent with the Corps' NEPA analysis. Donlin Gold encourages the Corps to carefully revisit Section 3.22.4 to ensure the terminology used is consistent with the NEPA analytical framework.

PHL 9

Section 3.22.4.2.2 discusses accidents and injuries but doesn't acknowledge Donlin Gold's requirement to comply with the Mine Safety and Health Act (MSHA) and the Occupational Safety and Health Act (OSHA). Likewise, Section 3.22.4.2.5 discusses foodborne illnesses without acknowledging that regulations at 18 AAC 31 address food services with the intent of avoiding problems like foodborne illnesses.

PHL 2

Section 3.22.4 should be reviewed with the specific purpose of clarifying potential direct impacts associated with particular exposure pathways from more distal, indirect effects that cannot be evaluated quantitatively or even qualitatively in the Final EIS. We made a similar request during scoping specifically because of the difficulty of assessing dissimilar health effects resulting from similar exposures, particularly in combination with the multitude of lifestyle factors and personal choices that can impact health. In making its decisions based on the NEPA analysis, including any consideration of mitigation, the Corps should be cautious in evaluating distal health effects that cannot be directly tied to the Project and those that are not meaningful for the evaluation of alternatives.

SPILL RISK (SECTION 3.24)

FSR 7

Spill risk is not typically a stand-alone section in an EIS chapter; spills are normally addressed as an aspect of each resource evaluated. As indicated in our general comments, Donlin Gold believes that a number of spill scenarios evaluated are in fact worst-case conditions and outside the scope of NEPA. This is largely because the Corps presents no recent precedent for their occurrence based on shipping activities in Alaska (or elsewhere). The potential for occurrence is further reduced by the state-of-the-industry safeguards that will be implemented by Donlin Gold. As a result, the likelihoods as expressed throughout Section 3.24 significantly overestimate potential occurrence.

FSR 8

The Final EIS should re-evaluate the overall spill impact ratings taking into account not only potential resource effects, but also the probability of occurrence in a



Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
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**FSR 8 cont.** manner to which the public can relate. The Final EIS should dismiss many of the discussions of spills with either no or extremely limited environmental effects and then drop them from further discussion.

The attached container losses memo (Appendix A) presents the math that shows the estimated probability of container loss from the Project as 2 of the 140,000 containers shipped during the 28-year mine life. The numbers for the potential loss of cyanide and mercury containers are also provided. We note that the container loss calculations assume the random probability of losing a container where no special accommodations for handling or transport are made (e.g., the container being placed in a lower to middle portion of an interior stack). Recognizing the concern for a loss of hazardous materials, Donlin Gold is committed to working with our shippers to ensure that hazardous materials are transported in as safe a manner as practicable, further reducing the likelihood of a loss.

**FSR 7** Based on the information provided, we request that the Corps revisit the treatment of the overboard loss of a container of cyanide or mercury (sections 3.24.5.7.1 and 3.24.5.8.1, respectively). These scenarios represent worst-case scenarios. They are not "reasonably foreseeable" low-probability, high-consequence events that require NEPA analysis, but are more accurately characterized as highly improbable, remote, and highly speculative events, which according to Council on Environmental Quality's Forty Most Asked Question, agencies are not required to be considered in an EIS.

**FSR 7** A review of cyanide-related spills around the world indicates that very few spills occur during transportation. The EIS[3] completed for mercury storage noted that a 1-ton container of mercury has never been lost or spilled during transport. While these materials are of concern to residents of the region and beyond, the fact is that transporting them is inherently safe, and that the inclusion of an event that has never occurred (i.e., a lost container of cyanide or mercury) indicates that this scenario is remote and speculative and should not be included in the analysis of environmental effects in this EIS.

**FSR 8** Finally, NEPA analyses are intended to focus on key issues and not be encyclopedic. The spill risk section should be revised to explain that scenarios 3, 6, 7, and 8 are not considered in detail and then reorganized so that the Final EIS considers only the effects of the reasonably foreseeable spill scenarios. This analysis should be limited to those resources that may be affected by the spill scenario, i.e., there may be no need to discuss visual resources, noise and vibration, socioeconomics, or environmental justice.

## CHAPTER 5 MITIGATION MEASURES

**MIT 6** Donlin Gold believes that Sections 5.1 and 5.6 do not accurately describe BLM's authority in regard to mitigation. Table 5.1-1 explains and compares terminology regarding various mitigation requirements among the federal agencies. With respect to the BLM, Table 5.1-1 asserts that "The BLM may also require compensatory mitigation under Secretarial Order 3330, FLPMA, and BLM Regional Mitigation Manual MS-1794." Donlin Gold disagrees with the statement that these three sources provide legal authority for BLM to require compensatory mitigation.

Secretarial Order 3330, similar to other recently issued policy and guidance documents, by its own terms does not create legal obligations. Also, the order expressly states that where there is an inconsistency between the provisions of the order and any federal laws or regulations, the laws or regulations will control. Donlin Gold filed its ROW application under Section 28 of the Mineral Leasing Act (MLA), thus the BLM's

[3] US Dep't of Energy, DOE/EIS-0423-S1, Long-Term Management and Storage of Elemental Mercury (Sept. 2013), http://energy.gov/sites/prod/files/2013/09/f3/EIS-0423-S1-FEIS-2013.pdf.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

authority is established by that act. Neither the MLA nor its implementing regulations mandate that an applicant compensate for unavoidable impacts or that grants may only be issued where there is "no net loss."

**LAND 10** The citation of the Federal Land Policy and Management Act (FLPMA) (1976) as a basis for BLM authority is incorrect as FLPMA does not apply to the Project. As noted, Donlin Gold filed its right of way application under Section 28 of the MLA. All references to FLPMA as authority for BLM requiring mitigation under the Final EIS should be deleted.

**MIT 6** BLM Regional Mitigation Manual MS-1794 is in draft form and cannot be considered final agency policy and should not be used as a basis to require compensatory mitigation.

**MIT 6** For these reasons Donlin Gold believes that the following statement is not accurate and should be deleted from Table 5.1-1 in the Final EIS: "The BLM may also require compensatory mitigation under Secretarial Order 3330, FLPMA, and BLM Regional Mitigation Manual MS-1794."

**MIT 6** Similarly, the following statement in Section 5.6 along with the related citations of authority should be deleted: "The BLM may also require compensatory mitigation for impacts that cannot be avoided or minimized."

**MIT 6** The following reference in Section 5.5, while accurate as to the Corps, should be revised as follows to remove the unsupported statement that BLM possesses authority to require compensatory mitigation in issuing a ROW under the MLA:

> During the NEPA process it is important to note that the mitigation identified in the EIS may not be required by the Corps in its ROD. For example, there may be some mitigation identified in the EIS that is not within the Corps' authority to require as a stipulation to a permit.

**MIT 6** Table 5.5-1 identifies mitigation measures being considered by the Corps related to the construction and operation of the pipeline, identifying either BLM or the Alaska Department of Environmental Conservation as the permitting authority, and noting that some of the actions may be voluntary or may be required as a condition of issuing the relevant permit. This approach is consistent with previous BLM policy directives indicating that compensatory mitigation should be entirely voluntary. All other references in the DEIS to BLM's authority or intent to "require" compensatory mitigation should be deleted prior to publication of the Final EIS.


Donlin Gold, 4720 Business Park Blvd., Suite G-25, Anchorage, AK 99503
Tel (907) 273-0200 Fax (907) 273-0201 www.DonlinGold.com

# Comment Matrix

## Donlin Gold LLC Draft EIS Comments

# Donlin Gold Draft EIS Review Comments

| | Section Number | Page | Original Language | Proposed Language or Comment |
|---|---|---|---|---|
| | | | | |
| WAQ 29 | ES 2.2.1.2 | ES-10 | Pit Dewatering Wells – These wells would be installed around the perimeter of the pit to stabilize walls in accordance with safety requirements. | Pit Dewatering Wells – These wells would be installed within and around the perimeter of the pit and would reduce water levels and pressures to stabilize pit walls in accordance with safety requirements. |
| EDIT 2 | ES 2.2.1.5 | Table ES-5, page ES-12 | 1 Generator | 2 black-start generators (power plant) and 4 generators (camp) |
| EDIT 2 | ES 2.2.3.6 | ES-22 | Double-jointed, pre-welded straight sections of pipe would be temporarily placed along the excavated pipeline trench, bent as necessary to follow the natural grade and direction changes of the ROW. | Pre-welded straight sections of pipe would be temporarily placed along the excavated pipeline trench, bent as necessary to follow the natural grade and direction changes of the ROW.<br><br>**Comment:** Most pipe would be delivered to PSYs as triple jointed (Page 8-8 or Natural Gas Pipeline PoD), keep discussion general. |
| NEP 7 | ES 3.0 | ES -31-ES-93 | General comment regarding characterization of impacts | In a number of the sections of the Executive Summary, resource impacts are characterized as moderate. This term is vague and, in a number of places, without context. Where "moderate" refers to a specific subset of the impacts to a much a broader resource area, the context should be provided. Specific examples are provided below. |
| EDIT 2 | ES 3.1 | ES-31 | Flow reductions in Crooked Creek adjacent to the mine site could range from 20 to 100 percent in winter, depending on bedrock and precipitation conditions. Flow in Crooked Creek below the mine site near<br>Crevice Creek would be reduced by 20 percent in winter and 26 percent in dry conditions in later mine life. | Suggest adding a sentence that the effects of flow reductions would be substantially less in Lower Crooked Creek, which has much higher levels of aquatic life use. |
| HYD 1 | ES 3.1 | ES-31 | to medium intensity for riverbed scour effects. | Suggest adding a sentence clarifying that this would only occur in very limited, shallow areas of the river |
| WAQ 19 | ES 3.1 | ES-32 | Groundwater wells are an important source of drinking water for communities in the Project Area along the Kuskokwim River. | Suggest clarifying that the project is not projected to affect any drinking water wells. |

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| **GRD 6** | ES 3.2 | ES-33 | This level would be permanently managed by pumping to maintain hydraulic containment of contact water in the pit lake. | The water level would be permanently managed to prevent untreated water from leaving the pit lake. This level would be maintained by pumping from the pit lake, treating the pumped water to meet water quality standards, and discharging it to Crooked Creek. |
| **EDIT 5** | ES 3.1 | ES-33 | The proposed mine would lower the water table in the area around the proposed pit in order to establish stable pit walls and dry working conditions. | The proposed mine would lower the water table in the immediate area around the proposed pit in order to establish stable pit walls and dry working conditions. |
| **EDIT 2** | ES 3.1 | ES-33 | However, impacts could be moderate due to substantial uncertainties inherent in estimating bedrock conditions and modelling groundwater flow. | However, impacts could be moderate in the immediate vicinity of the mine site due to substantial uncertainties inherent in estimating bedrock conditions and modelling groundwater flow. |
| **WAQ 23** | ES 3.1 | ES-34 | Sediment sampling along the Kuskokwim River between Crooked Creek and Bethel showed elevated metal levels, including arsenic and mercury, at all sampling sites. | Suggest clarifying what "elevated" means, i.e., in relation to what and given that there are no standards that directly apply to sediment. |
| **GRD 8** | ES 3.2 | ES-34 | A complete failure of the TSF SRS could lead to release of untreated water in a matter of weeks. | This is presented without context. The water management systems at the mine site will be actively operated and monitored through the closure period, including ongoing maintenance to minimize the likelihood of "complete failure." In the unlikely event of such a failure, it would be quickly detected. Suggesting that a failure would not be addressed for weeks is implausible and therefore represents a worst-case condition and should not be included in the NEPA analysis. At a minimum, the text should note the very low likelihood of such an event occurring. |
| **NEP 7** | ES 3.1 | ES-34 | Therefore, summary impacts on water quality are expected to be minor to moderate. | Therefore, summary impacts on water quality are generally expected to be minor with moderate impacts in very localized areas around the mine site. |
| **EDIT 2** | ES 3.1 | ES-36 | Ambient mercury modeling (shows… | Ambient mercury modeling shows… |
| **FISH 2** | ES 3.1 | ES-39 | Impacts of the mine site are expected to be moderate. | Suggest inserting language clarifying that impacts are expected to be negligible to minor in the lower reaches of Crooked Creek where most fish are found. |

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| **FISH 2** | ES 3.1 | ES-39 | Depending on water conditions, barge/tug wakes and propeller wash along the Kuskokwim River may accelerate bank erosion and create riverbed scour, degrading habitat and disturbing fish eggs, larvae, or juveniles. Along the proposed access road and at the port site, development would temporarily degrade water quality and could create long-term barriers to fish passage. Impacts of transportation facilities would be moderate. | The energy associated with barge wakes and the extent for their potential to increase erosion needs to be revisited based on the revised wake height information provided in BGC 2015m. Depending on location, the wave energy from barge wakes over an annual basis would add between 0.4 and 2.7 percent to the natural tractive energy of the river (BGC 2016 – to be provided). This amount would be difficult to distinguish from natural variability. Given the public interest in these topics, we suggest that it is important to provide more detail and context to these "moderate" impacts, i.e., they are generally localized to specific areas and individual fish species. In addition, assuming compliance with of Alaska Department of Fish and Game (ADF&G) permit requirements, it is unclear how "development" along the access road and port site would create long-term barriers to fish passage. This is an unsubstantiated overstatement of impact levels since it reflects a condition that would be in direct violation of ADF&G requirements. |
| **NEP 7** | ES 3.1 | ES-39 | Impacts would be minor to moderate (for the pipeline under Alternative 2). | This is another area where, given the length of the pipeline, it would be helpful to clarify what and where "moderate" impacts are projected. With the proposed BMPs and permit requirements, only minor effects are reasonable to project across the entire pipeline area. |
| **SER 27** | ES 3.1 | ES-41 | The summary impact for Alternative 2 would be moderate and beneficial. | The summary impact for Alternative 2 would be moderate and beneficial for Alaska and major and beneficial for the Y-K region. *Note this is consistent with Table ES-13.* |
| **SUB 19** | ES 3.1 | ES-42 | Subsistence resources that had been displaced during the exploration | The limited subsistence resources that had been displaced during the exploration |
| **SUB 19** | ES 3.1 | ES-43 | …except that waterfowl users on the Bering Sea coast may fear that the tailings pond and the pit lake (after mine closure) would contaminate the waterfowl they hunt. | Suggest noting that the risk evaluation shows that there is no actual risk. |
| **SUB 19** | ES 3.1 | ES-43 | …historical patterns of competition in the Kuskokwim River drainage over moose and Chinook salmon may increase due to new incomes and increased subsistence activity. | …based on historical patterns, competition in the Kuskokwim River drainage over moose and Chinook salmon may increase due to new incomes and increased subsistence activity. |

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| **SUB 19** | ES 3.1 | ES-43 | The summary impacts for transportation facilities would be minor, except for moderate disturbance to subsistence fishing in narrow reaches of the Kuskokwim River. | The summary impacts for transportation facilities would be minor, except for localized moderate disturbance to subsistence fishing in the limited narrow reaches of the Kuskokwim River. |
| **SUB 8** | ES 3.1 | ES-43 | However, increased activity at the Farewell airstrip would be moderate in intensity due to increase in competition | It is important to recognize that this airstrip is already open to public access – the basis for the contention that the project would contribute to further increase use in the area is unclear. Therefore, at a minimum, the language should be changed to say impacts may be moderate due to the potential for increased competition. This also applies to the comparable language in Sections 3.19 and 3.21 and in Table ES-13. |
| **FSR 7** | ES 3.1 | ES-44 | …do not represent "worst case" possibilities. Instead, the focus is on high consequence, low probability occurrences… | …do not represent "worst case" possibilities. Instead, the focus is on high consequence, very low probability occurrences…<br><br>*We contend that, for ocean and river barge ruptures, the scenarios **do** represent worst-case conditions since there is no precedent for spills of the given sizes in Alaska waters (from barges) especially given the safeguards Donlin Gold will follow.* |
| **FSR 15** | ES 3.1 | ES-44 | to comply with regulations regarding spill preparedness | to comply with regulations regarding spill prevention, containment, preparedness, and response |
| **HMZ 15** | ES 3.1 | ES-44 | The likelihood of a very large cyanide spill is very low | See our comment letter. The likelihood of a very large cyanide spill is minimal (or extremely) low. From our perspective, "very low" does not fully describe the fact that such a spill cannot reasonably be expected. Our suggested language is appropriate given the lack of any precedent for a large spill with the specific control measures proposed by Donlin Gold. This comment also applies to mercury. |
| **EDIT 2** | ES 3.1 | ES-45 | A hazardous substance spill would impact multiple resources to differing extents. The impact would range from minor to major depending on the size, extent, and type of spill. | Since this is the overall finding for this section, we suggest re-emphasizing the very/extremely low probability of the cited spills actually occurring. |

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| **CLA 32** | ES 4 | ES-45-48 | Cumulative Effects – General Comment | Like Section 4 of the DEIS, suggest that the cumulative effects section should describe the *combined* effects of the Donlin Gold Project and other reasonably foreseeable activities not just the individual contribution of the Donlin Gold Project. Further, again throughout this section, moderate effects are identified without context. In many cases, the limited and localized areas of these effects should be noted especially as they relate to broader area-wide cumulative impacts. |
| **EDIT 2** | ES 4.1.2 | ES-46 | … in the event of widespread… | … in the unlikely event of widespread… |
| **WILD 6** | ES 4.1.2 | ES-47 | … except if a right whale or Cook Inlet beluga whale is injured or killed | …except if, in the unlikely event, a right whale or Cook Inlet beluga whale is injured or killed. *This also applies to the comparable language in Table ES-13.* |
| **EDIT 2** | ES 5.6 | ES-49 | The Corps will require that Donlin Gold prepare a monitoring and adaptive management plan to monitor success of mitigation efforts, | The Corps will require that Donlin Gold prepare a monitoring plan to assess the success of mitigation efforts, |
| **SOL 5** | Table ES-13 | ES-56 | Soil quality impacts (contaminated sites) would be low to medium | For purposes of mitigation and avoidance, the text should be specific as to where medium impacts would occur to contaminated sites. Also the context of the medium intensity pipeline impacts to contaminated sites should be explained as limited.<br><br>*Note that all comments related to Table ES-13 also apply as appropriate to Table 2.3-44.* |
| **GEO 11** | Table ES-13 | ES-56 | Other geohazards (dam seepage) impacts would be medium in intensity (TSF dam, water dams), long-term to permanent induration, local in extent, and common to important in context. **Summary impacts would be minor to moderate (with a low probability of specific major impacts).** | Suggest explaining that the major impacts can be addressed as needed through appropriate mitigation in final design. We also contend that impacts that are addressed/mitigated for are not actually environmental effects and should not be considered "medium" intensity impacts. This comment applies to a number of other resources also. |
| **NEP 7** | Table ES-13 | ES-58 | **Summary impacts would be minor to moderate.** (Section 3.3) | Please clarify what are "moderate" environmental effects. Same comment also applies to the summary impact for the pipeline in this section. |
| **NEP 7** | Table ES-13 | ES-58 | local to regional in extent | Suggest clarifying what is meant by "regional" here |

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| **GRD 13** | Table ES-13 | ES-60 | Change in groundwater use impact intensity would be low | There would be no (or negligible) impacts to ground water use. |
| **GRD 13** | Table ES-13 | ES-60 | Summary impacts would be minor. | Summary impacts would be negligible. There are essentially no impacts on existing and potential ground water uses. |
| **WAQ 8** | Table ES-13 | ES-62 | Surface water quality impacts intensity would be low to high | Suggest clarifying that the only "high" intensity impacts would be in the immediate vicinity of the mine site, generally within the mine facilities area. Also note that all discharges would meet applicable water quality standards. This also applies to the overall "moderate" impact characterization. |
| **VEG 4** | Table ES-13 | ES-66 | Fugitive dust could cause physiological changes to vegetation pending exposure length or level. | Fugitive dust could cause localized physiological changes to vegetation pending exposure length or level. |
| **WET 1** | Table ES-13 | ES-68 | Direct wetland impacts would affect 5% to more than 25% | The reason for this range should be clarified. |
| **WET 6** | Table ES-13 | ES-68 | Direct wetland impacts would be a 1% reduction in wetland abundance from construction and operations, and potential indirect impacts to 7-14% of high functioning wetlands. | This is another area where context would be helpful – these percentages should be balanced with the overall abundance of comparable wetlands throughout the watershed and the region. |
| **WET 1** | Table ES-13 | ES-68 | Shoreline wetlands may be important in supporting anadromous fish streams and subsistence resources. | This should be placed into context by citing the low level of potential disturbance to the shoreline and the fact that natural forces have much greater impacts on shoreline erosion. In addition, effects of existing boat traffic should be noted. |
| **WILD 6** | Table ES-13 | ES-70 | Environmental contamination impacts (from tailings pond, contact water pond, and pit lake) would be permanent. | Suggest rewording to not use the word "contamination" since the reference is to process water ponds and noting that there is not risk to wildlife (as indicated in the DEIS). |
| **FISH 2** | Table ES-13 | ES-72 | Reduced groundwater inflows to Crooked Creek would impact stream temperature during operations. | This should be tied to impacts to fish - which does not appear to be an issue. |
| **VIS 3** | Table ES-13 | ES-80 | Summary impacts would be moderate | Summary impacts would be moderate to the very limited number of viewers around the mine site. |

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| **EJ 9** | Table ES-13 | ES-84 | While socioeconomic impacts and some health impacts would be beneficial and predominantly affect minority and low income **communities, adverse impacts would be disproportionate to low-income and minority communities.** | **While socioeconomic impacts and some health impacts would be beneficial and predominantly affect minority and low income communities, adverse impacts would be disproportionate to low-income and minority communities.**<br><br>*Given the fact that the reader will naturally tend to focus on the bolded text, we think it is important to highlight the **full** summary of effects.* |
| **CUL 3** | Table ES-13 | ES-84 | **Summary impacts would be moderate** | **Summary impacts would be moderate to the limited number of sites that would be affected.** |
| **SUB 19** | Table ES-13 | ES-86 | Low to moderate impacts from barging activity. | Delete item. Impacts from barging activity should not be included in the summary of mine site impacts. |
| **SUB 19** | Table ES-13 | ES-86 | Competition impacts would affect scarce resources that are important in context. | Suggest clarifying what competition and scare resources are associated with the mine site. We do not agree with the phrasing "scarce." |
| **PHL 2** | Table ES-13 | 88 | **Section 3.22: Human Health** | Please see our detailed comments on the Human Health impact analysis. Overall, our belief is the project would have significant beneficial impacts to human health in the region that would greatly outweigh any adverse effects. |
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| **EDIT 3** | 1.1.2 | 1-4 | Donlin Gold also intends to file an application with the PHMSA for a Special Permit to allow use of a strain based design (SBD) for all or parts of the pipeline instead of building the pipeline to existing federal code. | As written, the statement sounds like Donlin Gold is requesting permission to build a sub-standard or non-compliant pipeline. Suggest rewording to clarify the special use permit objective. Suggest:<br><br>Donlin Gold also intends to file an application with the PHMSA for a Special Permit to allow use of a strain based design (SBD) for all or parts of the pipeline. The Special Permit establishes additional requirements for the design, construction, and operation of the pipeline in permafrost areas where there is potential for significant thaw settlement of the pipeline. |
| **NEP 4** | 1.9.3 | 1-24 | 1.9.3 SOURCE OF AND METHOD OF PRODUCTION FOR NATURAL GAS USED BY THE PROJECT | We concur with the Corps finding that consideration of the gas source is outside the scope of the EIS. |

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| LAND 8 | 1.10.8 | 1-29 | The Donlin Gold Project would occupy BLM lands managed under FLPMA. | Please remove the references to FLPMA. BLM will need to make two decisions for the Donlin Gold Project, neither of which involves FLPMA. Leasing of the right-of-way would be done under the authority of the Mineral Leasing Act of 1920 and the 17(b) easement decisions will be conducted under ANCSA. |
| LEG 4 | 1.10.32 | 1-34 | EXECUTIVE ORDER 13045 – PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS<br>The order applies to economically significant rules under Executive Order (E.O.) 12866<br>(Regulatory Planning and Review) that concern an environmental health or safety risk that EPA<br>has reason to believe may disproportionately affect children. This EIS analyzes potential impacts to human health, including children. | This executive order as explained applies to rule-making. There needs to be further explanation as to why it's relevant in consideration of a permitting action. |
| EDIT 3 | Table 1.10-2 | 1-37 | · PHMSA approvals | Special permit approvals |
| CLA 29 | Table 1.10-2 | 1-43 | Alaska Division of Homeland Security & Emergency Management (DHS&EM) | "Role" not identified |
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| PAA 18 | 2.3.1 | 2-6 | The No Action would also result if Donlin Gold chooses not to pursue the project. | Strike this sentence as a mischaracterization of the NEPA process and the no action alternative. The no action alternative is a requirement of NEPA and therefore of the federal agencies. An agency could select a no action alternative as part of the NEPA process; however, if the proponent determines not to pursue a project, the NEPA process would simply end. |
| CLA 30 | 2.3.2 | 2-6 | | Revise Plan of Operations bullets to be consistent with structure and dates of SRK 2016 revisions (Updated plans and summary to be provided) |

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| **WAQ 29** | 2.3.2.1 | 2-9 | • At the ACMA and Lewis open pits, there would be up to 35 pit perimeter wells and 80 in-pit dewatering wells. | • At the ACMA and Lewis open pits, there would be approximately 35 pit perimeter wells and 80 in-pit dewatering wells over the life of the mine. |
| **CLA 30** | 2.3.2.1.4 | 2-17 | Auxiliary fleet vehicles… | This paragraph is out of place with the discussion of flotation. |
| **WAQ 29** | 2.3.2.1.6 | Table 2.3-3, page 2-24 | | The following annual volume of reagents will be needed for water treatment (based on a 214-day per year operating timeframe):<br>ferric sulfate, 454 tons<br>sulfuric acid, 19 tons<br>antiscalant, 18 tons<br>sodium hydroxide, 14 tons<br>potassium permanganate, 13 tons<br>sodium metabisulfide, 7 tons<br>microsand, 8 tons<br>polymer, 2 tons<br>CIP (HCl, NaOH) 0.125 tons |
| **WAQ 29** | 2.3.2.1.7 | 2-28 | Untreated sewage effluent would be piped or trucked to the STPs, and treated sewage effluent from the STPs would report to the TSF. | Untreated sewage effluent would be piped or trucked to the STPs. Treated sewage effluent from the STPs would discharge to Crooked Creek prior to completion of the TSF and thereafter report to the TSF. |
| **FSR 15** | 2.3.2.1.10 | 2-35 | A Facility Response Plan (FRP), Spill Prevention, Control, and Countermeasure Plan (SPCC), and Oil Discharge Prevention and Contingency Plan would be developed and available onsite, as required by state and federal requirements. | A Facility Response Plan (FRP), Spill Prevention, Control, and Countermeasure Plan (SPCC), and Oil Discharge Prevention and Contingency Plan would be developed and the applicable measures would be implemented. These plans would be available onsite, in accordance with state and federal requirements. |
| **BARG 6** | 2.3 | Figure 2.3-9 | | Show direction of barge tow travel on the Figure |
| **EDIT 4** | 2.3 | Figure 2.3-31 | Typical HDD Crossing | The figure is an illustration of tunnel boring rather than horizontal directional drilling. Suggest using the figure “ES-8 Typical HDD Crossing Cross Section” included in the Fisheries DEIS Public Meeting poster as it is more representative. |
| **CLA 30** | 2.3 | Figure 2.3-32 | DISILTER | DESILTER |

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| **WAQ 29** | 2.3.2.3.7 | 2-132 | The monitoring frequency for treated water from the pit dewatering wells would vary depending on APDES permit requirements for discharge to Crooked Creek. | The monitoring frequency for the WTP discharge from treatment of pit dewatering well water and other excess water would vary depending on APDES permit requirements for discharge to Crooked Creek. |
| **WAQ 29** | 2.3.2.3.7 | 132 | The monitoring frequency for treated water from the pit dewatering wells would vary depending on APDES permit requirements for discharge to Crooked Creek. | The monitoring frequency for treated water would vary depending on APDES permit requirements for discharge to Crooked Creek. |
| **WAQ 29** | 2.3.2.3.7 | Table 2.3-33, page 133 | Pit dewatering, (Water Treatment Plant - 1 prior to discharge into Crooked Creek) | This is not really ground water after pumping and treatment, suggest calling it surface water discharge, same comment applies to the characterization of the Water Treatment Plant 1 discharge on page 2-137. |
| **EDIT 4** | 2.3.2.3.7 | Table 2.3-33, page 133 | Lower CWD | Lower and Upper CWD |
| **EDIT 4** | 2.3.2.3.7 | Table 2.3-33, page 134 | TSF (seepage recovery system), groundwater (interceptor wells) | The drain below the TSF carries both ground water and surface water, *this also applies to the operation and maintenance TSF monitoring on page 2-136* |
| **WAQ 29** | 2.3.2.3.7 | Table 2.3-33, page 134 | Per APDES permit | Per ADEC discharge permit<br><br>*Note that these may not be covered by an APDES permit, this comment also applies to the STP discharges during operations (page 2-137)* |
| **EDIT 4** | 2.3.2.3.7 | Table 2.3-33, page 134 | Solid waste landfill (Mine Site and Angyaruaq (Jungjuk) Port) | Solid waste landfill (Mine Site) and Angyaruaq (Jungjuk Port) |
| **CLA 30** | 2.3.2.3.7 | Table 2.3-33, page 136 | mass stability, static, geochemical characterization, volume placed (monthly) | Suggest clarifying the reference to “static” |
| **EDIT 4** | 2.3.2.3.7 | Table 2.3-33, page 137 | Water quality (long List[1]), pumped volume | Water quality (long List[1]), pumped volume (if needed)<br>*Suggest clarifying that these wells would not normally require pumping/recovery, this comment also applies to the line under Closure/Post-Closure* |

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| **CLA 30** | 2.3.2.3.7 | Table 2.3-33, pages 138-139 | Various, *under three natural gas pipeline items* | Suggest clarifying what this refers to. |
| **EDIT 4** | 2.3.2.3.7 | Table 2.3-33, page139 | Surface water and groundwater (sample site<br>Crooked Creek below Crevice Creek) | Surface water (sample site - Crooked Creek below Crevice Creek) and groundwater |
| **PAA 9** | 2.3.2.3.7 | Table 2.3-33, page139 | Tailings Storage Facility Cover | Suggest clarifying that this is the collection pond, if appropriate |
| **BARG 6** | | Figure 2.3-41 | | The fuel barges would be unloaded in the slip and not in the main channel. The pre-deployed boom would be across the opening to the slip. |
| **LAND 10** | 2.3.5.2 | 2-154 | It would cross lands owned by TKC. | This statement misrepresents the land ownership. Per DEIS Section 3.15.3.5, lands that would be crossed by Alternative 4 are managed by or belong to the State of Alaska, BLM, and TKC with Calista owning the subsurface rights to TKC lands. |
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| **FISH 7** | 3.0.3 | 3 | It is anticipated that additional field work on rainbow smelt spawning and out-migrating juvenile salmon habitat use will be conducted in 2015. | Additional field work on rainbow smelt spawning and out-migrating juvenile salmon habitat use was conducted in 2015. |
| **GEO 4** | 3.1.1.2 | 3 | Federal and state laws | The description of applicability of regulations covering paleontological resources should be clear about how they apply to private land (e.g., the mine site and most of the transportation facilities). |
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| **EDIT 5** | 3.1.1.1 | 3.1-3 | An Alaska Pollutant Discharge Elimination System (APDES) Multi-Sector General Permit may be required, as well as Excavation Dewatering General Permit. These would both be administered by the Alaska Department of Environmental Conservation (ADEC). | Coverage under the Alaska Pollutant Discharge Elimination System (APDES) Multi-Sector General Permit may be required, as well as Excavation Dewatering General Permit. These general permits are administered by the Alaska Department of Environmental Conservation (ADEC). |

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| GEO 11 | 3.1.3.2.2 | 3.1-40 | These ground disturbance activities could potentially expose unconsolidated material to erosion, unless mitigated by utilizing BMPs under a Multi-Sector General Permit (MSGP) for storm water discharges (discussed in Section 3.2, Soils). | These ground disturbance activities could potentially expose unconsolidated material to erosion, which would be mitigated using BMPs specified in the facility Storm Water Pollution Prevention Plan (SWPPP), as required for coverage under the Multi-Sector General Permit (MSGP) for storm water discharges (discussed in Section 3.2, Soils). |
| GEO 5 | 3.1.3.2.2 | 41 | These effects would be long-term (extending through the life of the project) to permanent, cover local extents, and affect resources considered common to important in context. | Like in the summary on the following page, the characterization of important is highly questionable since there are minimal opportunities for other uses. At a minimum, throughout the sections for all three project components, references to importance should be caveated by the fact that potential uses are extremely limited. |
| GEO 1 | 3.1.3.2.3 | 47 | Intermittent increased shoreline activities at these locations could contribute to localized bank/bluff erosion and increased access for unauthorized fossil collection. | This is an example of a highly speculative potential impact which is extremely unlikely to occur, i.e., if barges need to be relayed (expected to be rare), and significant erosion occurs (unsubstantiated), and then the limited workers undertake unauthorized fossil collection (at a meaningful level). It is not reasonable to characterize this as a high intensity impact. |
| SOL 5 | 3.2 | 1 | arsenic-bearing dust deposition resulting in measurable increases above baseline (medium) | It is unclear why any measurable increase in arsenic constitutes a "medium" level effect. In this case, there would essentially be no "low" intensity. The intensity rating should be tied to some degree of environmental impact/risk associated with the increase. This language also tends to contradict the statement on page 3-64 which ties low intensity effects to levels below regulatory limits. |
| SOL 1 | 3.2 | 1 | The context of soil and permafrost effects would range from common, based on their regional distribution, to important, for those effects that are governed by regulation (e.g., erosion). | Erosion itself is not governed by regulation. It would only be if it relates to some tangible impact on waters of the U.S. This comment applies to a number of other places in the section. Specifically on page 3.2-5, erosion itself is not regulated under the APDES program but rather discharges that are affected by erosion. Also, ADEC implements, not regulates, the APDES permitting program. This is similarly confusing in the related language on page 3.2-93. Suggest providing a more clear definition throughout on when soil impacts are considered important or common. Examples might also be helpful. |

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| **SOL 13** | 3.2 Synopsis | 2 | … although ORV use could extend beyond the immediate vicinity of the mine access road. | The mine access road (including the one proposed for BTC) would be a private industrial road and unauthorized access (e.g. private ORV use) would be trespass. Since this condition would be an illegal activity and reflect non-compliance with our operational plans, it is not appropriate for consideration in the NEPA analysis. Applies throughout this section.<br><br>References to ORV use of the mine access road should be eliminated from the Final EIS. The assumption of random non-compliance with operational controls in any setting results in an analysis of arbitrary and capricious events, rather than one focused on significant issues. |
| **CLA 17** | 3.2.2.3.2 | 3.2-50 | Second paragraph:<br>There are about 258 mapped transitions between thaw-unstable soils and either thaw-stable or non-permafrost soils, where differential thaw settlement is more likely to occur. | Verify number of mapped transitions, on page 3.2-85 it says 316. |
| **WAQ 29** | 3.2.3.2.3 | 93 | Contact runoff from the ore stockpile thereafter would report to the American Creek Magnetic Anomaly (ACMA) Pit once progressive pit expansion intersects American. | Contact runoff from the ore stockpile thereafter would report to the American Creek Magnetic Anomaly (ACMA) Pit once progressive pit expansion intersects American Creek. |
| **GEO 11** | 3.2.3.2.3 | 111 | …isolated spots of occasional temporary high intensity effects that require increased monitoring frequency and maintenance attention to reduce effects to medium intensity levels. | …isolated spots of occasional temporary high intensity effects that require increased monitoring frequency and maintenance attention to reduce effects to low to medium intensity levels. |
| **SOL 6** | 3.2.3.2.3 | 111 | …adverse effects are primarily addressed through existing soil resource criteria that include soil disturbances and productivity losses | Suggest clarifying the meaning of this language |

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| SOL 13 | 3.2.3.2.3 | 112 | It is likely that snow machine-induced erosion along the ROW would occur along the portion of the pipeline in the Matanuska-Susitna (Mat-Su) Borough from regular winter use in areas of wet organic soils on shoulder seasons or periods of thin snow. | Suggest defining how much existing snow machine travel there is in these areas during the subject seasons/periods. We believe the impacts would be very limited and localized – suggest providing context and justification. |
| SOL 5 | 3.2.3.2.3 | 113 | Erosion during construction would likely be reduced to medium intensity within a short period of time due to planned redundancies in ESC measures, | Erosion during construction would likely be reduced to low to medium intensity within a short period of time due to planned redundancies in ESC measures, |
| SOL 3 | 3.2.3.2.4 | 115 | While not currently applicable to the mine site, the ADEC levels were used to identify… | While not applicable to the mine site, the ADEC levels were used to identify…<br><br>*The existing language implies potential future applicability, i.e., that the mine would become a contaminated site which is not a reasonable assumption. Suggest adding a footnote to Table 3.2-12 noting that the listed clean-up levels have no direct applicability to the mine sources.* |
| SOL 11 | 3.2.3.2.4 | 130 | …due to the combination of conditions that would have to be satisfied to have an appreciable impact, the likelihood and intensity of potential effects is considered extremely low. | There is no evidence that any of the sites would be impacted by the limited, wake-induced erosion. Note that we are not aware of any case where the acknowledged, much greater erosion caused by natural forces has impacted contaminated sites. |
| SOL 5 | 3.2.3.2.6 | 137 | Direct impacts to soils from ground disturbances, permafrost degradation, erosion, and fugitive dust at the mine site under Alternative 2, as well as impacts from permafrost hazards on manmade structures, would range from low to high intensity, although the intensity for most effects would be reduced to medium through reclamation or additional mitigation. | Direct impacts to soils from ground disturbances, permafrost degradation, erosion, and fugitive dust at the mine site under Alternative 2, as well as impacts from permafrost hazards on manmade structures, would range from low to high intensity, although the intensity for most effects would be reduced to low to medium through reclamation or additional mitigation. |

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| **MIT 17** | 3.2.3.2.7 | 139 | Additional investigation should be considered prior to pipeline construction to map the specific location of potential contaminated soils at the Farewell airstrip (all alternatives), North Foreland barge landing Alternative 3B only), Tyonek-Beluga pipeline trench segment (Alternative 3B only), and Puntilla airstrip (Alternative 3B only) compared to final grading plans, so that disturbance of these soils can be avoided if possible, and the level of effects reduced to low likelihood and intensity; | Any activity that could disturb/impact a contaminated site must be reviewed and generally approved by ADEC's Contaminated Sites program. Given this requirement and ADEC's program knowledge and experience, this type of mitigation should be the State's responsibility not the Corps'. |
| **GEO 11** | 3.3.3 | Table 3.3-1 | Design is adequate for expected range of geohazard conditions. | It is unclear how a design that is adequate for the range of geohazard conditions can represent a medium intensity effect. The intensity should be related to an actual impact not a potential for hazard that is prevented by the design. |
| **NSB 1** | 3.3.3.2.1 | 41 | *Summary of TSF Dam Seismic Stability* | This section is noteworthy in that it recognizes that key, state-of-the-industry design features of the Donlin Gold TSF dam will ensure its stability under the highest potential earthquake conditions. |
| **GEO 11** | 3.3.3.2.2 | 56 | The results indicate FOS' of 2.65 to 3.55 which are well above design criteria (FOS of 1.0 to 1.2) (BGC 2014j), indicating that large-scale slope failure in this part of the pit is unlikely in post-closure. | The results indicate FOS' of 2.65 to 3.55 which are well above design criteria (FOS of 1.0 to 1.2) (BGC 2014j), indicating that large-scale slope failure in this part of the pit is extremely unlikely in post-closure. |
| **WAQ 10** | 3.3.3.2.3 | 3.3-63 | Treatment and release of pit dewatering water provides an important mechanism to reduce pond storage volumes at the TSF. Without this discharge, pond volumes would be more than twice that predicted with dewatering discharge (BGC 2014b). | Treatment and release of some pit dewatering water, CWD water, SRS water, and excess precipitation water in the TSF provides an important mechanism to reduce pond storage volumes at the TSF. Without this discharge, pond volumes would be more than twice that predicted with the discharge (BGC 2015).<br><br>Add reference: BGC, 2015. Water Resources Management Plan: Advanced Water Treatment – Rev 1, Reference Number EN-0011186.0064, Sept. 10, 2015. |

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| **GEO 6** | 3.3.3.2.2 | 73 | Further analysis using a higher level seismic event, and/or discussion with permitting agencies as to acceptable level of risk for the post-closure pit, should be considered in final design. In addition, important experience would be gained during operations as to performance and deformation of the pit walls, and modifying the location of the waste rock backfill accordingly (as a buttressing effect) could increase the post-closure stability of the pit (BGC 2014j); | At least every five years, Donlin Gold will be required to update the Reclamation Plan. As indicated in this text, important information will be gained during operations regarding pit wall stability. This information will be considered in the Plan updates which will subject to ADNR review and approval. Therefore, consideration of this mitigation should be the responsibility of the State not the Corps. |
| **HYD 6** | 3.5.3.2 | | | Revise Section to correspond to updated information presented in the 2016 Water Resources Management Plan (SRK 2016 – to be provided) |
| **HYD 6** | 3.5-34 | Figure 3.5-18 | | Update with Figure from 2016 Plan of Operations Water Resources Management Plan |
| **HYD 6** | 3.5-36 | Figure 3.5-19 | | Update with Figure from 2016 Plan of Operations Water Resources Management Plan |
| **BARG 9** | 3.5.2.2.3 | 3.5-46 | Bank Erosion/Scour | Bank erosion/scour is one of the major concerns identified in the EIS yet this discussion provides a minimal characterization and quantification of the erosive baseline conditions, including a figure at an unusable scale. The Final EIS should include a more robust description of baseline erosional conditions, including natural versus vessel-related against which the effects of barge traffic under all alternatives can be compared. |

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| **BARG 17** | 3.5.3.1 | 3.5-60 | ALTERNATIVE 1 – NO ACTION<br>Under the No Action Alternative, the proposed Donlin Gold Project would not be constructed, and there would be no surface water impacts. | This assessment is inadequate. Considering the level of interest surrounding barging the lack of a description of the existing level of barging activity on the Kuskokwim River up- and downstream from Bethel is a glaring absence. The lack of a discussion of existing barge effects under the No Action Alternative precludes a direct comparison of effects between the current level of barge activity and the effects under the action alternatives. The analysis would allow a more reasonable comparison of effects if the level of wave-induced bank erosion from existing barge traffic was presented or developed. Similarly for the existing level of scour effects. This information should be identified based on information available and included in the Final EIS so that valid comparisons can be made. |
| **EDIT 5** | | 3.5-69 | FWDDS | FWDDs |
| **WAQ 29** | | 3.5-70 - 71 | Untreated sanitary effluent from each building would be pumped via pipelines to the sanitary treatment plant, and treated effluent would be pumped to the Lower CWD during construction (SRK 2012c). | Wastewater from the construction camp will be treated in a conventional sanitary wastewater treatment system and discharged under an APDES general permit (SRK 2016). |
| **EDIT 5** | 3.5.3.2.2 | 73 | Results are depicted on for a stationary tug after 1 minute as a conservative estimate of the effects | Results are depicted for a stationary tug after 1 minute as a conservative estimate of the effects |
| **EDIT 5** | 3.5.3.2.2 | 73 | The results in show a clear decrease in the depth of erosion with water depth. | The results show a clear decrease in the depth of erosion with water depth. |
| **HYD 1** | | 3.5-73 (bullet) | Runoff and drainage collected by the TSF SRS would be treated and discharged to Crooked Creek; Contact water impounded in the Lower and Upper CWDs would be treated and discharged to Crooked Creek at a maximum rate of 1,101 gpm; | Runoff and drainage collected by the TSF SRS in excess of amounts required for mill operation would be treated and discharged to Crooked Creek; Contact water impounded in the Upper CWD, and if water quality allowed from the Lower CWD, would be treated and discharged to Crooked Creek at a maximum rate of 1,101 gpm; |
| **HYD 6** | | Figures 3.5-21 - 23 | | Update with Figures from 2016 Plan of Operations Water Resources Management Plan |
| **EDIT 5** | | Figure 3.5-24 | | Incorrect Pit spillway invert elevation, should be 109.5 masl, 360 ftasl |

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| CLA 17 | 3.5.3.2.2 | 3.5-102 | From Bethel, both cargo and fuel would be transported upriver approximately 168 river miles to Angyaruaq… extending for 199 river miles between Bethel and Angyaruaq | The distance in river miles between Bethel and Angyaruaq is 199 river miles. This number should be checked throughout the document. |
| BARG 12 | 3.5.3.2.2 | 3.5-102 | There are a total of eight critical sections along the river | Briefly note why these sections are critical so that the discussion more readily relates to the rest of the analysis. |
| BARG 17 | 3.5.3.2.2 | 3.5-102 | Under Alternative 2, general cargo and fuel would be transported up the Kuskokwim River to Bethel on ocean barges (Section 2.3.2.2). From Bethel, both cargo and fuel would be transported… | Section 3.5.3 should be revised to describe what happens under the No Action Alternative for cargo and fuel shipments, including the source(s) of fuel and cargo, the frequency of marine and river barge traffic, and a similar level of detail on cargo handling. Without this information, a reader cannot compare the proposed action (or any of the action alternatives) with the No Action alternative. These details are not provided in the transportation section. |
| BARG 9 | 3.5.3.2.2 | 3.5-103 | Although barge-induced bank erosion could increase bank erosion above natural erosion rates… the increase due to project barge traffic is likely to be small. | A better characterization needs to be provided for “small.” The analysis should provide some assessment of the material natural erosion removes (e.g., tens of feet of riverbank on annually) versus the amount estimated for barge traffic over a similar amount of shoreline. The analysis would be enhanced by considering the wake characteristics of existing small boat traffic and their effect on erosional patterns; this would be particularly in valuable in putting the effects of barge wakes into context. The analysis should disclose the anticipated effects of barge traffic based on the level of activity proposed under each alternative – including the No Action. |

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| **BARG 11** | 3.5.3.2.2 | 3-103 | As a percentage of river tractive energy, barge-generated wave energy would vary between 3 and 12 percent. | The source of these percentages is not cited and appears to be based on outdated information. If the wave energy numbers were presented from BGC 2007c, they need to be revised since they do not take into consideration the reduction wake heights calculated in BGC 2015m. Wave energy numbers are presented in BGC's Update to Potential Barge Induced Bank Erosion – Kuskokwim River, Rev 2 (BGC 2016 – provided to Corps), which calculates, the total annual barge-generated wave energy compared to the Kuskokwim River's annual tractive energy. In terms of percentage, **the tractive energy of annual barge traffic would range from 0.4 to 2.7 percent of the river's annual tractive energy, depending on specific location**. The results indicate that barge wakes would contribute minimally to erosion rates when considered in the context of the river's natural flow rates. |
| **BARG 8** | 3.5.3.2.2 | 3.5-110 | Similarly bank erosion caused by a tug would be expected to be erased by the river with time… may take much longer than a year. | The basis for the statement that tug-induced bank erosion may take much longer than a year to be erased by natural processes should be provided in the Final EIS. |
| **HYD 10** | | | If ice dams or aufeis form in the channels as a result of cold pipe sections, the impact on surface water resources could be medium, in that they could alter drainage patterns, and could last for several years beyond the life of the project. | The DEIS is unclear as to what conditions may cause ice dams or aufeis, the likelihood of that occurring, or any design features or other mitigation measures that might be implemented to reduce impacts. Without additional detail is unclear that a medium level of effect is warranted since a medium intensity impact requires "likely" changes in flow. The Final EIS should disclose whether these effects likely or whether they are just possible. |

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| **HYD 5** | 3.5.3.2.3 | 3.5-125 | The magnitude of the impacts to surface water resources during pipeline operations and maintenance is expected to be low to medium.<br><br>The magnitude of the impacts of abandonment and reclamation on surface water resources would range from low to medium. | The discussion of both items needs more detail to justify a medium magnitude of effect; there is no basis for a determination for this impact level. Further, the Final EIS should also disclose whether the likelihood of impact is the same for the entire length of pipeline or just in particular segments. The text should be made clear as to what effects are likely to happen over a given geographic extent.<br><br>From the existing text:<br>Negligible to Low: Surface water flow systems are maintained. Changes in water quantity are likely to be within the limits of historic seasonal variation.<br>Medium: Changes in the surface water flow system are likely to result in changes to flow quantity that exceed historic seasonal variation, and/or the historic location of the flow. |
| **HYD 1** | 3.5 | 3.5-115 | Implementation of erosion and runoff control BMPs such as silt fences (Section 3.2, Soils) would help prevent erosion and minimize impacts during road closure. | Implementation of erosion and runoff control BMPs such as waddles (Section 3.2, Soils) would help prevent erosion and minimize impacts during road closure.<br><br>Silt fence requires significant maintenance, waddles are more appropriate for a closed road. |

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| **GRD 8** | 3.6.2.2.1 | 3.6-33 | Calculations suggest that if the SRS pumping system were to go completely off-line, the SRS would likely fill to overflowing and/or lose hydraulic containment with respect to groundwater in approximately two weeks, although there are many variables such as time of year and amount of drawdown at the start of the failure that could affect this calculation. Still, considering these variables, this is a very short timeframe in which to identify a problem, diagnose the cause, acquire any necessary components, and effect repairs, especially if it occurs during winter conditions during closure or post-closure when staffing levels are lower than during operations. | Donlin Gold disagrees that this is a realistic scenario. In fact, this situation represents a "worst-case" scenario outside the scope of the EIS. In part because any SRS system failure could lead to non-compliance with State permit requirements, we would ensure regular inspections and maintenance of the SRS system. Like all water management systems at the mine, we would have specific contingency/back-up plans in place if such a failure were to occur. Due to real-time flow monitoring, any such failure would become immediately apparent and response actions would begin immediately. At a minimum, the probability of this occurring should be changed to "very" or "extremely" low. |
| **GRD 10** | 3.6.1.2.1 | 3.6-4 - 5 | | Review the monitoring summary information against the 2016 Water Resources Management Plan and revise as necessary. (Revised plan to be provided [SRK 2016]) |
| **EDIT 5** | | Figure 3.6-2 | Title and legend: POTENTIOMETRIC GROUNDWATER SURFACE<br><br>WASTE TREATMENT/TAILINGS STORAGE FACILITY | The term "Waste Treatment" should be removed from the figure. "Waste treatment facility" has specific regulatory connotations that do not apply in this case so the term is misleading. |
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| **GRD 10** | | 3.6-34 | The fate and transport of this groundwater is uncertain; however, the impacts on Crooked Creek may be minimal or nonexistent as a result of natural attenuation processes such as sorption, dilution, and dispersion. | The fate and transport of contaminants in this groundwater is uncertain; however, the impacts on Crooked Creek may be minimal or nonexistent as a result of reactions between dissolved constituents and the aquifer material leading to precipitation, or natural attenuation processes such as sorption, dilution, and dispersion. |

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| **GRD 10** | 3.6.2.2.3 | 3.6-41 | At 70 gallons per day (gpd)/person, this is 45,500 gpd or 32 gpm, spread across several camp locations. | At 55 gallons per day (gpd)/person, this is 35,750 gpd or 25 gpm, spread across several camp locations.<br><br>(Water use per person of 55 gallons is more representative of Alaska projects, e.g. Red Dog) |
| **EDIT 5** | 3.6.2.2.6 | 3.6-45 | Based on performance of the Seepage Recovery System in operations, consider an additional well field and/or pond that acts as a secondary containment system to the SRS downgradient of the SRS. | Based on the performance of the Seepage Recovery System in operations, consider an additional well field and/or pond that acts as a supplemental storage for the SRS pond downgradient of the SRS. |
| **WAQ 4** | 3.7 | 3.7-1 | While there are no regulations in force for chemical concentrations in sediment, the sediment quality guidelines recommended by ADEC to establish clean-up levels at contaminated sites are used as a basis for evaluation of impacts to sediment quality. | As noted above under soils, these guidelines are only used as a guide to suggest where there could be risk. In fact, they are not generally used to establish clean-up levels, which are typically determined based on site-specific risk factors and conditions. |
| **WAQ 29** | 3.7.1.2.1 | 3.7-6 | The hardness-dependent numeric water quality criteria used as a basis for comparison to predicted concentrations of constituents in mine water treatment facilities, such as the TSF and pit lake, were calculated based on predicted hardness values for each mine water treatment facility. | The hardness-dependent numeric water quality criteria used as a basis for comparison to predicted concentrations of constituents in mine water management facilities, such as the TSF and pit lake, were calculated based on predicted hardness values for each facility. |
| **EDIT 5** | | Table 3.7-1 | Lower Crevice Creek above confluence with Crooked Creek, CRDN, Category 3 | Lower Crevice Creek above confluence with Crooked Creek, CRDN, Category 1 |
| **EDIT 5** | | Table 3.7-2 | | Should include CRDN |
| **EDIT 5** | | Table 3.7-4 | | Should not include CRDN |
| **WAQ 23** | 3.7.3 | Table 3.7-30 | **Low:** Effects are below water quality regulatory<br>limits or sediment quality guidelines. | As indicated in an earlier comment, sediment quality guidelines are not standards. Exceedance of these guidelines does not alone indicate site-specific risk. As such, such exceedances should not automatically be characterized as having high intensity impacts. |

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| **WAQ 6** | | Tables 3.7-31, 32 | | Review Water Treatment Design Basis against updated source water predictions from the Donlin Gold Project Plan of Operations Water Resources Management Plan (SRK 2016) |
| **WAQ 4** | | Table 3.7-39 | Because the measured or predicted temperature and pH of the water may vary over a wide range of values depending on time of year, sample location, and other factors, the most conservative possible numeric standard for ammonia in freshwater (0.179 mg/L; ADEC 2008a) is used as a basis for comparison for all of the waters considered in this section. | Donlin Gold understands the intent to provide a conservative characterization of impacts; however, in this case the approach is to identifying the ammonia standard is inappropriate and unrepresentative of actual permitting conditions. The proposed water treatment plant discharge is at station CCBO on Crooked Creek. In developing the discharge permit, ADEC will apply Alaska Water Quality Standards at this point. Consequently, the ammonia water quality standard applicable to this location should be used (2.99 mg/l – see SRK 2016 – Donlin Gold Project Plan of Operations Water Resources Management Plan). To present information otherwise is misleading to the readers. |
| **WAQ 6** | | Figure 3.7-24 | | Update to flow chart from March 2016 Segregated Flow Advanced Water Treatment report (to be provided) |

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| **WAQ 12** | 3.7.3.2.1 | 3.7-114<br>3.7-115<br>3.7-119<br>3.7-120 | Order-of magnitude estimates of the water quality of the lower CWD under different input water assumptions are given in Table 3.7-31… | The water quality calculations in this subsection based insufficient mixing of potentially acid-generating (PAG) and non-potentially acid-generating (NAG) are not appropriate for inclusion in the EIS since they are based on assumptions inconsistent with Donlin Gold's Waste Rock Management Plan (WRMP). The report cited in the DEIS text (SRK 2007) was used in part in developing the WRMP. The WRMP calls for PAG material to be mixed with NAG material with the specific intent of mitigating the potential to form acid drainage. The WRMP has been submitted to ADEC as part of Donlin's Integrated Waste Management Permit Application.<br><br>More than adequate NAG is available (less than 7 percent of waste rock is considered PAG) to counter the acid-generating capacity of the PAG material and careful operational controls will be used during mixing. The analysis using "different input water assumptions" provides no basis for assuming that Donlin would inadequately implement its WRMP. A key point here is that if Donlin Gold were to ignore any of its operating/management plans, the project would be at risk of any number of non-compliance issues or otherwise undesirable conditions. A NEPA analysis is not intended to be conducted under the assumption that an operation would act outside its permits or operational plans – to do so would be to develop scenarios that are speculative, such as the one presented here.<br><br>The discussions of alternative water quality inputs including portions of tables 3.7-31 and 3.7-32 are inappropriate for a NEPA analysis and should be deleted from the Final EIS. |

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| **WAQ 29** | 3.7.3.2.2 | 143 | The water quality of the dewatering well water is estimated to be substantially better than SRS, CWD, or TSF pond water, so it is assumed that 90 percent of the dewatering well water can bypass the RO (BGC 2015f), producing only about 2.5 percent brine solution during construction. | The water quality of the dewatering well water is estimated to be substantially better than SRS, CWD, or TSF pond water, so it is assumed that 90 percent of the dewatering well water would not require RO treatment to comply with discharge standards (BGC 2015f). The RO treatment would produce only about 2.5 percent brine solution during construction.<br><br>*The term bypass has a regulatory connotation that is not applicable to the proposed treatment system.* |
| **WAQ 24** | 3.7.3.2.2 | 145 | The greatest potential impacts to surface water quality at the mine site during construction would likely result from suspension of sediment caused by in-stream construction and erosion of cleared stream banks in the American Creek and Anaconda Creek watersheds…. | This is not an accurate assessment of impacts from in-stream construction and erosion of cleared stream banks since downstream protection against sediment release (e.g., berms, silt fences, upstream flow diversion) would be established *before* construction in the stream channel began. |
| **WAQ 10** | | 3.7-146 | In order to manage impacts to surface water resources and to minimize build-up of water in the TSF, pit dewatering groundwater and TSF SRS runoff will be treated and discharged to Crooked Creek. | In order to manage impacts to surface water resources and to minimize build-up of water in the TSF, pit dewatering groundwater, contact water pond water and SRS water and limited amounts of TSF water, when surpluses are available, will be treated and discharged to Crooked Creek. |
| **EDIT 5** | | 3.7-155 (bullet) | In-pit dewatering well and horizontal drains from the open pit; | Horizontal drains from the open pit; |
| **WAQ 11** | | Table 3.7-42 | | Update to Lorax, 2015 values.<br><br>DEIS reference Lorax, 2015. Pit Lake Modeling of Revised Water Management Advanced Water Treatment Option for Donlin Gold. August 18. |

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| **WAQ 7** | | 3.7-160 | Surface water in the American and Anaconda Creek watersheds would be influenced … could result in the event of SRS pump failure and overflow in post-closure. | See previous comments on SRS pump failure. Surface water in the American and Anaconda Creek watersheds would be influenced by the creation and perpetual maintenance of the pit lake and TSF impoundment; however, due to planned water treatment and water management practices, untreated water from the TSF and pit lake would not leave these watersheds, and impacts would be restricted to facilities within discrete portions of the project area. Effects from pit dewatering discharge to Crooked Creek during construction - from pit dewatering, CWD water, and TSF pond water during operations; and from the pit lake and SRS discharge during post-closure - would be of low intensity, as all water would be treated to meet the most stringent AWQC prior to discharge. There is a low risk that high intensity impacts to Anaconda and Crooked creeks as a result of SRS pump failure and SRS pond overflow during the period of time the tailings are consolidating in post-closure. |
| **EDIT 5** | 3.7.3.2.3 | 3.7-167 | Groundwater flow model analysis indicates that the period during which contaminated groundwater flows… | Groundwater flow model analysis indicates that the period during which contaminated water flows … |
| **WAQ 29** | 3.7.3.2.6 | 176 | Although potential impacts may increase with increased rock disturbance, real impacts to downgradient water quality may be reduced by mitigation efforts and material handling. | Although potential impacts may increase with increased rock disturbance, impacts to downgradient water quality would be limited by mitigation efforts and material handling. |
| **NEP 7** | 3.7.3.2.6 | 177 | There is a low risk that high intensity impacts to surface and/or groundwater could result in the event of SRS pump failure in post-closure | See the applicable comments above for this scenario under groundwater hydrology. With the proposed dry closure plan for the TSF, SRS water is anticipated to improve over time. This further supports the conclusion that high intensity impacts on water quality are extremely unlikely. |

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| **AIQ 7** | 3.7.3.6.2 | 195 | The amount of dust generated from the dry stack under Alternative 5A relative to the tailings beach under Alternative 2 may be higher than a simple surface area correlation would suggest, however, due to lower moisture content, increased heavy equipment use, and higher elevation of exposed tailings (greater wind exposure) at the dry stack. The increase in fugitive dust emissions resulting from exposure of the dry stack surface would be largely offset by the elimination of fugitive dust emissions from the TSF beach area under Alternative 2. | This analysis makes no sense. The higher moisture content, lack of heavy equipment use, and lower elevation of the tailings beach under Alternative 2 would make the emissions from the beach less per similar area than from the dry stack as stated in the first sentence. The additional emissions from the dry stack would not be offset by the absence of emissions from the tailings beach. |
| **EDIT 5** | | 3.7-198 | | Last sentence of second full paragraph: BGC 2014a reference should change to SRK 2016 (Water Resources Management Plan – to be provided). |
| **EDIT 5** | 3.7.3.6.4 | 3.7-201 | BMPs and mitigation measures would be used<br>… from the tailings stack under Alternative 5A. | BMPs and mitigation measures would be used … from the tailings dry stack under Alternative 5A. |
| **WAQ 22** | 3.7.3.7.2 | Table 3.7-47 | Atmospheric deposition of mercury would create high<br>intensity impacts in some cases, depending on watershed location and existing baseline concentrations. | Suggest adding further context to this conclusion in that the potential for high intensity effects is limited to a relatively small part of the Crooked Creek watershed. |
| **AIQ 7** | 3.8 | Global | Air Sciences Inc. references 2014a and 2015b | Consolidate and update to Air Sciences Inc. 2016 (Air Sciences Inc. 2016. Air Quality Impact Analysis Report, Donlin Gold Project, Alaska. Prepared for: Donlin Gold LLC. Project No. 281-16-2, 72 p. February 2016.) |
| **AIQ 7** | 3.8 | Table 1 | | Update for the construction and operation emissions. |
| **AIQ 7** | 3.8 | 3 | Mine Site: Air quality modeling for the mine site was performed using a conservative, worst case fuel scenario. | Mine Site: Air quality modeling for the mine site was performed assuming that the generators would be fired with diesel fuel which is a conservative scenario. |

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| AIQ 7 | 3.8 | Page 3.8-3 | | Paragraph 1, add PM and ozone to PSD review applicability.<br><br>Update impacts percentages of increments and AAQS. |
| EDIT 5 | 3.8 | 4 | Alternative 3B (Diesel Pipeline) would result in dual-fuel equipment at the mine site being run on diesel, the basis for the worst-case numbers modeled for Alternative 2. | Alternative 3B (Diesel Pipeline) would result in dual-fuel equipment at the mine site being run on diesel, the basis for the conservative numbers modeled for Alternative 2. |
| AIQ 7 | 3.8.1.3.5 | | | Update this section per changes to Table 1 in Appendix I. |
| AIQ 7 | 3.8.1.3.6 | | | Update this section per changes to Table 1 in Appendix I. |
| AIQ 7 | 3.8.2.1 | | | Paragraph 1, update the PM monitoring dates at the New Air Station to 07/2006 to 06/2008.<br><br>Refer to data summary table (after Air Sciences 2014) for specifics. |
| AIQ 7 | | Table 3.8-5 | | New Air Station and Camp Station Measurement Methods. Correct CO Method to "EPA Reference Method Designation RFCA-1093-093."<br>O3 equivalent Method EQOA 0881-052 is not correct. The one listed for CO is an ozone method. |
| AIQ 7 | | Table 3.8-6 | | Baseline Air Quality Data Collected at New Air Station and Camp Monitoring Station: Update monitored values and corresponding AAQS percentages.<br><br>Correct last monitoring period for NO2 annual.<br><br>Monitoring dates must be verified. Is there any need to specify monitoring periods that are either not approved or not used in modeling analysis? For example, PM2.5 data from 07/2006 to 12/2007.<br><br>Refer to data summary table (after Air Sciences 2014) for specifics |
| AIQ 7 | 3.8.2.1.2 | | | Paragraph 2, the reference Air Sciences Inc. 2015b is not correct. |
| AIQ 7 | 3.8.2.1.4 | | | Add the visibility analysis provided in Air Sciences Inc. 2016 (also in Sections 3.8.2.2.4., 3.8.2.3.4.) |

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| **AIQ 7** | | Table 3.8-15 | | PM is not shown, however, there is a major source threshold and a significant emission rate for PM.<br><br>There is no PSD major source threshold for HAPs, 250 ton/yr is incorrect. Minor permit threshold for PM2.5 is incorrect.<br><br>Footnote b is not defined. |
| **AIQ 7** | 3.8.3.1 | 3.8-35 | | Paragraph 2, Bullet #2, NG S content of 15 ppm is not correct. |
| **AIQ 9** | 3.8.3.1 | Table 3.8-14 | **Low:** Emissions are below air quality permit thresholds, or impacts meet regulatory standards.<br><br>**High:** Regulatory standards; mitigation measures are not effective. | **Low:** Impacts meet regulatory standards. *The separation between high and low impacts is based only on compliance with standards.*<br><br>**High:** Impacts do not meet regulatory standards; mitigation measures are not effective. |
| **AIQ 7** | 3.8.3.3.1 | 3.8-36 | …lease area boundary | Lease area boundary should be changed to "core operating area boundary"<br><br>*Core Operating Area has been defined within the lease footprint, see Air Sciences, 2016 for clarification.* |
| **AIQ 7** | | Table 3.8-16 | | Control discussion in footnote a is not correct. 90% control was used for both hauling and wind erosion emissions estimates. |
| **AIQ 7** | | Table 3.8-17 | | Table title is not accurate, it only shows fuel combustion stationary units, not all stationary units.<br><br>Air handlers list is incorrect.<br><br>O2 plant boiler ID is incorrect, its 33-BLR-001.<br><br>Footnote b is incorrect, CO and PM2.5 emissions are worse with NG combustion, and remaining pollutants with ULSD combustion for the dual-fuel boilers.<br><br>*Revise with information from Air Sciences 2016 main report and emissions inventory appendix (includes power plant operation on natural gas)* |

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| **AIQ 7** | | Table 3.8-18 | | HAPs emissions shown are greater than 25 ton/yr, calculated emissions are less than 25 ton/yr.<br><br>Footnote a is not accurate for activities and controls.<br><br>Control discussion in footnote a is incorrect.<br><br>Remove light plants from footnote b.<br><br>*Revise with information from Air Sciences 2016 main report and emissions inventory appendix (includes power plant operation on natural gas)* |
| **AIQ 7** | | Table 3.8-19 | | Minor permit thresholds for CO and PM2.5 are incorrect, they should be 100 and 10 ton/yr respectively.<br><br>PM is not shown, however, there is a major source threshold and a significant emission rate for PM.<br><br>There is no PSD major source threshold for HAPs, 250 ton/yr is incorrect. |
| **AIQ 7** | 3.8.3.3.1 | 3.8-41 | | Update VISCREEN analysis methodology. Update model versions. |
| **AIQ 7** | 3.8.3.3.1 | 3.8-42 | Donlin Gold used 5 years of …show compliance with the AAAQS. | Donlin Gold used 5 years of …show compliance with PSD increments and the AAAQS. |
| **AIQ 7** | | Table 3.8-20 | | Update this table with information from Air Sciences 2016. Control discussion in footnote b is incorrect, 90% control is not applied to material handling, dozing, and grading. Remove light plants from footnote c. |
| **AIQ 7** | | Figure 3.8-3 | | Update this figure. Reference to Air Sciences Inc. 2015A (deposition memorandum) is incorrect, it should refer to the modeling report (Air Sciences Inc. 2016). |
| **AIQ 7** | | Table 3.8-21 | | Update table with information from Air Sciences 2016. |
| **AIQ 7** | | Table 3.8-22 | | Update table with information from Air Sciences 2016. |
| **AIQ 7** | | Figure 3.8-4 | | Update this figure. Reference to Air Sciences Inc. 2015A (deposition memorandum) is incorrect, it should refer to the modeling report (Air Sciences Inc. 2016). |

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| AIQ 7 | | 3.8-46 | | Paragraph 1, "…..the AAAQS are generally the same as the NAAQS, as they cannot be less stringent". PM2.5 annual AAAQS is higher (15) than the corresponding NAAQS (12). |
| AIQ 7 | 3.8.3.3.1 | 3.8-46 | | Paragraph 3, update project emissions in O3 discussion. |
| AIQ 7 | | Table 3.8-25 | | Air Sciences Inc. 2015b is listed incorrectly as a source for this table. |
| AIQ 7 | 3.8.3.3.2 | 3.8-53 | | Paragraph 5, 9,900 gallon ULSD storage tank for the generators is not mentioned. |
| AIQ 7 | | Table 3.8-26 | | Air Sciences Inc. 2014a is listed incorrectly as a source for this table. |
| AIQ 7 | 3.8.3.3.2 | 3.8-55 | | Description of the access road segments is not accurate and do not match Air Sciences' emissions inventory. The description of what is being transported does not match the transporters, for example: Mine Access Road - the term "maintenance activities" being transported is not correct. Personnel are not listed to go with buses. These cases must be reworded to match the subject with each transporter, such as: "Mine Access Road - transporting cargo, maintenance equipment, fuel, and personnel from Angyaruaq (Jungjuk) Port to the mine site using container trucks, tanker trucks, and light vehicles. Graders and water trucks will be used for maintenance."<br><br>Reference Air Sciences Inc. 2015a (deposition parameters) is not correct for Mine Access Road and Airport to Camp Road narratives. |
| AIQ 7 | | Table 3.8-27, page 3.8-56 | | Update this table. Footnote b sources that are not included in Air Sciences emissions inventory (aircrafts and their frequencies) are not verifiable. |
| AIQ 7 | | Table 3.8-31, page 3.8-61 | | Aircraft operations described in footnote b are not accurate. Typical aircraft operations during pipeline operation would include one surveillance flight per week with a single engine fixed wing aircraft and localized work requiring 2 helicopter flights per month. |
| AIQ 7 | | 3.8-62 - 63 | Activities would include removing all aboveground pipeline structures, signs and markers, and abandoning in place below grade and horizontal directional drilling. | Activities would include removing all aboveground pipeline structures, signs and markers, and abandoning in place pipe buried below grade and in borings that were completed using horizontal directional drilling. |

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| **AIQ 7** | 3.8.3.3.4 | 3.8-63 | | Bullet #1. Add ambient air quality standards<br><br>Bullet #2. Remove 40 CFR 63, Subpart CCCCCC. |
| **AIQ 7** | 3.8.3.3.4 | 3.8-63 | | Bullet #3: SRK 2013b is not the correct reference<br><br>Bullet #6: Donlin Gold 2014b is not the correct reference |
| **AIQ 7** | 3.8.3.3.6 | 3.8-65 | Design features most important for reducing impacts to air quality include: | Bullet #1. Verify GHG reduction.<br>Bullet #2. Add oxidation catalyst reduction in CO, HAPs and GHG<br>Since Bullet #3 mentions MACT, add another bullet for BACT |
| **AIQ 7** | 3.8.3.3.6 | 3.8-65 | Standard Permit Conditions and BMPs most important for reducing impacts to air quality include: | Bullet #2. Mention compliance with NAAQS and PSD increments in addition to AAAQS |
| **AIQ 7** | 3.8.3.4. to 3.8.3.6 | | | The source of emissions estimates for alternatives 3A, 3B, and 4, could not be determined. The DEIS states that emissions for all pollutants will decrease under Alternative 3A (LNG instead of ULSD in haul trucks), whereas, for 3B (ULSD instead of NG in power plant and dual-fuel equipment) will increase all pollutants except VOC, is this correct? Power plant VOC emissions are significantly higher for ULSD as compared to NG (1,123 ton/yr vs. 490 ton/yr).<br><br>*See Air Sciences 2016 Emissions Inventory for emissions for ULSD versus NG firing of power plant.* |
| **AIQ 7** | | 3.8-69 | | Paragraph 2, update percentage of PM2.5 24-hr NAAQS. |
| **EDIT 5** | | Table 3.8-33, first page (page 3.8-71) | Alternative 2, Operations and Maintenance row:<br><br>Mercury emissions would be released …; from the TSF. | Mercury emissions would be released …; and from the TSF. |
| **AIQ 7** | | Table 3.8-33 | | Update Operations and Maintenance discussion for Alt. 3B based on Sections 3.8.3.4. to 3.8.3.6 comment above. |
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| **NOI 2** | 3.9.4.3.3 | Table 3.9-28, page 3.9-53 | Helicopter Maximum Noise Levels, LMAX at<br>50 Feet (dBA) = 1104 | This noise level for a helicopter isn't correct – please re-check the source numbers. |

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| EDIT 5 | 3.9.4.3.2 | 3.9-46 | 1.25-miles or more | 1.25 miles or more, same suggested edit on page 3.9-50 |
| NOI 2 | 3.9.4.3.2 | 3.9-50 | Indirect noise effects for the Bethel and Dutch Harbor Port sites construction and operations phases are analyzed in most conservative and ideal-case scenarios, for comparison. | Suggest adding context that the types of expected noises are not uncommon in these developed areas with similar existing activities. |
| EDIT 5 | 3.9.4.3.3 | 3.9-67 | …to high intensity (e.g., pipeline construction and pipe laying), depending on the location of the activities | …to high intensity (e.g., pipeline construction and pipe laying at Rainy Pass Lodge), depending on the location of the activities |
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| NEP 7 | 3.10.3.2.2 | 3.10-53 | Removing the population of fowl mannagrass (if confirmed) would be a medium intensity impact because it is a species much more common in other areas. | Medium impact level is an overstatement of effects and inconsistent with the definitions provided in Table 3.10-7 (stated below). The loss of fowl mannagrass (if even present) represents a minor component of the plant community. If it even exists in the community, the loss would represent one of a "small number of species changed" consistent with an impact level of low.<br><br>From Table 3.10-7:<br>Low: Changes in plant communities may not be measurable or noticeable; limited to small areas or small number of species changed.<br>Medium: Noticeable changes in plant communities. Larger portions of communities are altered. |
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| WET 1 | 3.11 | 3.11-19,<br>3.11-33,<br>3.11-53,<br>3.11-59 | …seem to… | "Seem to" is not appropriate language for an EIS. It implies that the subject matter expert isn't sure how to interpret the data. The Final EIS should be reviewed by a subject matter expert who is qualified to interpret the data as presented. |

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| **WET 2** | 3.11 | Throughout | References to BGC 2007c | The conclusions based on wave energies presented in BGC 2007c need to be revisited throughout the EIS. Donlin Gold provided updated wake height information the BGC 2015 Update to Potential Barge Induced Bank Erosion – Kuskokwim River, Rev 1. The relationship between wake height and wave energy is a squared function and therefore small changes in wake heights have non-linear effects on wave energy. Wake energies have been included in BGC's 2016 revision of the earlier memos (Update to Potential Barge Induced Bank Erosion – Kuskokwim River, Rev 2). |
| **BARG 4** | 3.11.4.2.5 | Table 3.11-40 | **Summary Impact Rating:** Moderate Potential Barge Wake Erosion Impacts | As indicated on page 3.11-89, waves are not considered to substantially affect bank erosion rates, primarily because of the substantive effects of natural forces. This is reflected in the projected erosion rate increases shown in Table 3.11-28 (which need to be revised per above). In addition, the DEIS acknowledges the effects of existing barge traffic, including vessels that travel closer to shore. As such, we believe that a summary rating of minor is appropriate. |
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| **EDIT 5** | 3.12.2.1.1 | 3.12-8 | These comparisons were estimated through the calculation of HQs | These comparisons were estimated through the calculation of hazard quotients (HQs). |
| **EDIT 5** | 3.12.2.1.2 | 3.12-9 | TSF water would be expected to freeze in winter, so the liner and shape of the basin would be accordingly. | Something is missing from this sentence. |
| **BIRD 3** | 3.12.2.1.2 | 3.12-10 | Table 3.12-1 and subsequent text<br><br>The mallard is not at risk… | The text should disclose why the mallard is not at risk. The average reader would not be able to glean that information from the table. Including the table provides little value since most readers do not understand what the HQ numbers mean. The table should be deleted from the Final EIS (preferable) or there should be context provided relating HQs to risk. Rather than spending half a page explaining the dose calculation, the discussion on HQs should be expanded to put them in context, such as - HQs are used to…; HQ levels less than 1 indicate… HQ levels between 1 and 10 indicate… |

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| WILD 6 | 3.12.2.1.3 | 3.12-11 | Shores may be vegetated and could provide good habitat values for some species. | This section is about risks to wildlife species and the text identifies a set of species considered for analysis. For which species would the shores of the Upper CWD provide "good habitat values" and are those species included in the analysis? The statement should be better explained. |
| WILD 6 | 3.12.2.1.3 | 3.12-11 | Tables 3.12-2 and 3.12-3 and subsequent text<br><br>The mallard, dipper and vole are not at risk… | Same comment as previous. The text should explain why those species are not at risk. Along with the data tables the Final EIS should include the information necessary for a general reader to interpret them. |
| WILD 6 | 3.12.3.3.2 | 3.12-36 | However, Donlin Gold would need to hire thousands of people to work during the construction phase and hundreds to operate the mine and transportation system, many of which would not already be local residents. Some of these people could choose to live in nearby communities such as Bethel rather than traveling long distances when they are off-shift. This increase in the local human population, and the potential for improved motorized access for current residents that are employed by the mine, could lead to increased hunting pressure for recreational and subsistence purposes, especially for popular big game species such as moose and caribou. | We believe it is highly speculative to assume that non-local residents would move to the region, become hunters, and hunt at levels that could affect area-wide populations – particularly during the operations phase when the total number of non-resident employees is likely to be in the few hundreds. The statement "many of which would not already be local residents" is unsubstantiated and counter to Donlin Gold's objectives and our lease agreements with Calista and TKC.<br><br>What is "improved motor access" referring to? As noted previously, use of the mine access road by non-mine personnel (including off-shift employees) would be trespass.<br><br>The document should provide examples of comparable development projects in remote areas of Alaska to support the conclusions. If such studies are not available, suggest at least indicating that this finding is highly speculative. |
| WILD 6 | 3.12.3.2.2 | 3.12-41 | However, animals like moose are unlikely to change their patterns of crossing the river in response to barges, and the increased frequency of barges will leave less time free for crossing during the shipping season. | Given the low number of barges on the long stretches of the river at any given time and the existing barge and other river traffic, it would be appropriate to caveat this conclusion by saying the incremental reductions in time for crossing would be small. |

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| **WILD 7** | 3.12.3.2.2 | 3.12-47 | The overall direct and indirect effects of the construction, operations, and closure phases under<br>Alternative 2 would be considered moderate from a regional perspective, | The overall direct and indirect effects of the construction, operations, and closure phases under Alternative 2 would be considered moderate from a local perspective.<br><br>*The results of the analysis do not support the finding that the mine site would have region-wide impacts given the relatively small area of disturbance compared to the vast size of and habitat area within the region.* |
| **NEP 7** | 3.12.3.2.8 | Table 12-8 (Page 3.12-60) | BMPs would reduce impacts to minor | There is a very low probability of impacts. BMPs would further reduce the level of potential effects to minor |
| **EDIT 5** | 3.12.4.2.2.2 | 3.12-77 | The nearest major harbor seal haulout and pupping area is in Nanvak Bay in northern Bristol Bay and outside of the Donlin Gold Project Area, so large scale disturbance of sensitive habitat and life stages is unlikely. | The nearest major harbor seal haulout and pupping area is in Nanvak Bay in northern Bristol Bay and outside of the Donlin Gold Project Area, so large scale disturbance of sensitive habitat and life stages is very unlikely. |
| **WILD 6** | 3.12.4.2.2.2 | Table 3.12-11 | Contamination and Fuel Spills | Suggest deleting from the table since this is covered separately, in detail, in Section 3.24. |
| **BIRD 5** | 3.12.5.2.2.2 | 3.12-157 | The magnitude of impact of increased barge traffic disturbing shoreline nesting birds is medium because it could cause a noticeable change in behavior and may affect reproduction. | The basis for this finding should be explained. Common sense would suggest that nesting birds would be more likely affected by numerous fast-moving smaller boats closer to shore compared to few, slow-moving barges in deep water channels. Considering the number of barges compared to smaller boats we request the Corps complete a literature review that focused on what aspects of boat traffic are most impactful to nesting birds likely to occur in the area. Without better justification, the conclusions as presented here are arbitrary and speculative. |
| **BIRD 5** | 3.12.5.2.2.2 | 3.12-157 | …while regional or extended impacts are possible if migratory birds are affected. | It is highly unlikely regional level impacts would occur given the relatively small area of facility disturbances and limited spatial presence of barges at any given location on the river at any specific time. In addition, the analysis does not take into account the existing barge and other vessel traffic on the river. |
| **BIRD 5** | 3.12.5.2.2.8 | Table 3.12-44 | Increased barge traffic | Suggest describing the specific potential effects to birds rather than just indicating the number of barge trips for each alternative. |

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| **EDIT 5** | 3.13.2.1.1 | 3.13-16 | Backwaters and abandoned channels (relic meander cutoffs) accounted for only 38.3 mi2 or 5 and 6 percent … | This paragraph is duplicated on the page. |
| **EDIT 5** | 3.13.2.1.1 | 3.13-17 | Quartz Gulch (site QZ1) is a small, high-gradient drainage with an area of 1.2 mi2. This drainage has been extensively mined in its lower end… | These paragraphs duplicate text on page 16. |
| **WAQ 28** | 3.13.2.1.5 | 3.13-30 | Ongoing and future mining activities in the Crooked Creek drainage would contribute to additional inputs of mercury to surface water from atmospheric and aqueous sources, possibly causing exceedances of the 12 ng/L chronic criterion at sites within the drainage. | This sentence should be deleted from the Final EIS. There is no ongoing mining activity in the Crooked Creek drainage as of Summer 2014; reclamation efforts on the placer operation in the upper portions of the drainage were concluded in Summer of 2015. The suggestion that those activities could have contributed to exceedance of the chronic criterion for mercury is unsubstantiated in the text and speculative as presented. Regardless, past mining activities should be considered part of cumulative effects.<br><br>Attributing the potential exceedances of the chronic criterion to future mining activity is out of place in the affected environment discussion since that activity would be associated with the proposed action and action alternatives. Standard NEPA practice is to present effects of the proposed action and alternatives as part of the environmental consequences discussion rather than in the description of baseline conditions.<br><br>The key point here is that naturally-occurring levels of mercury have the potential to cause exceedances of the chronic water quality criterion. |
| **FISH 7** | 3.13.3.2.1 | 96-97 | General | A description of the documented uses of the stream reaches should be described since it would enable the reader to better understand effects. For example, if off-channel habitat is used by juveniles, but no juveniles were documented in particular off-channel habitats that may be affected, there would be no effect on fish. |

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| **HYD 7** | 3.13.3.2.1 | 99-100 | Historic undisturbed pre-project flow conditions in this reach reflect winter (March) baseflows that have varied from a monthly average of 48.1 cfs to a 10-year low of 15.1 cfs, a reduction of about 68 percent. Corresponding water surface elevations for these flows have varied from 13.8 inches to 6.3 inches, respectively, or a reduction of about 54 percent. | This natural variability should be presented before the estimated impacts due to Donlin because they put the potential Donlin-related impact into context and illustrate that the potential effects from the Donlin Gold Project are minimal relative to the natural variability of the stream system. |
| **FISH 2** | 3.13.3.2.1 | 3.13-124 | Potential impacts from anticipated flow reductions in Crooked Creek would be minor relative to broader populations of fish in the Kuskokwim River. | Potential impacts from anticipated flow reductions in Crooked Creek would be negligible relative to broader populations of fish in the Kuskokwim River, except in the high K scenario when very minor effects could occur.<br><br>*Except in the high K scenario, the impacts would be limited to middle Crooked Creek which should have little or no effect on the broader fishery. Even in the high K scenario, there is no evidence that Crooked Creek has a substantive impact on the fishery in the Kuskokwim River.* |
| **FISH 3** | 3.13.3.2.1 | 3.13-126 | Streamflow changes and overall aquatic habitat | These conclusions ignore the natural variation in stream flows that occur annually in response to snowmelt and rain. The natural variability of the system is an obvious and logical measuring stick against which to provide context to the characterization of potential project impacts. |
| **BARG 6** | 3.13.3.2.2 | 3.13-128 | …fuel barge tows in this section of the river would involve two or four barges configured side to side with a draft of 3 to 7.5 feet. | The maximum operating draft of the fuel and cargo barges is correctly stated at 7.5 feet; however, the maximum load proposed by Donlin Gold (AMEC 2013) would result in a draft of 7 feet. The barging scenario that established the fuel barge traffic levels analyzed in the DEIS assumed a 4.25-foot draft for the fuel barges. |
| **FISH 7** | 3.13.3.2.2 | 3.13-130 | At certain times and locations, increased barge traffic also may periodically affect small-boat traffic routing and subsistence fishing activities. | Suggest deleting, this should be covered in the sections related to transportation and subsistence. |

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| BARG 9 | 3.13.3.2.2 | 3.13-130 | Note that in the Kuskokwim River, spawning habitat disruption from dislodging of eggs or sedimentation can result from natural flooding, ice break up, bank erosion, and riverbed scour (from both natural causes and boat/barge traffic). | Existing natural and anthropogenic impacts (e.g., ice breakup and small boat traffic close to the shore) could have substantive impacts on current aquatic conditions and should be discussed in greater detail to put the potential effects of the project into context. |
| FISH 7 | 3.13.3.2.2 | 3.13-131 | the available channel width of the Kuskokwim River would be only 129 feet when low flow period approach about 39,000 cfs | the available channel width of the Kuskokwim River would be only 129 feet when the low flow period approaches about 39,000 cfs |
| FISH 7 | 3.13.3.2.2 | 3.13-133 | This resulted in minor wave heights of 0.6 to 1.3 inches in these respective reaches. | This resulted in very small wave heights of 0.6 to 1.3 inches in these respective reaches. |
| BARG 4 | 3.13.3.2.2 | 3.13-137 | However, barge wakes of sufficient magnitude to cause stranding (>1 foot) are not expected. | This language, which is supported by the barge data, appears to contradict a number of other statements in the paragraph that suggest impacts could occur. Other references to potential impacts from barge wakes should be reassessed. |
| FISH 5 | 3.13.3.2.2 | 3.13-137 | As a result, potential impacts of fish displacement and/or stranding from downriver barge traffic traveling at speeds over 8 knots (about 9 mph) could range from negligible to moderate depending on the character of confined channel segments with shallow-gradient shorelines; the location, timing, and density of schools of small, young-of-year outmigrant salmon encountered by the barge traffic; and the frequency of barge-generated wakes of about 9 inches in height that reach the shore zone in these areas. | Request adding context to illustrate that potential moderate effects would only be seen in localized areas at limited times. As such, there should be very limited impacts on the overall aquatic life conditions in the river. |

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| **BARG 6** | 3.13.3.2.2 | 3.13-143 | When the river stage (and depth) increases… during periods of high flow, the maximum operating draft of cargo and fuel barges was assumed to increase to 7.5 feet (AMEC 2014). | The maximum operating draft of the fuel and cargo barges is correctly stated at 7.5 feet; however, the maximum load proposed by Donlin Gold (AMEC 2013) would result in a draft of 7 feet. A 7-foot draft maximum would be the appropriate value for the EIS analysis. |
| **FISH 2** | 3.13.3.2.2 | 3.13-149 | Similar impacts to other resident fish species that could spawn in the mainstem channel also would be at risk. | This is a very general statement without any specific supporting information. Unlike the anecdotal information that was provided by residents regarding rainbow smelt spawning, there is no suggestion that spawning of other resident species occurs in river areas potentially affected by prop wash. Without such information, the statement is speculative and should be deleted. |
| **FISH 6** | 3.13.3.2.2 | 3.13-153 | Therefore, anticipated fish injuries or mortalities from tug and barge traffic along the navigation channel would range from negligible to moderate depending on the seasonal timing of fish migrations, life stages, time of day, and the concentration of fish encountered by barge traffic relative to confined and shallow channel segments. | Request additional detail be provided to better describe the effects of existing barge and other vessel traffic on the river, especially during the fishing season. The additional detail should be used to put potential project-related effects into the context of existing conditions and activities. |
| **FISH 7** | 3.13.3.2.2 | 3.13-154 | …scheduling of all blasting when fish and embryos are not present in the area; | …scheduling of all blasting when fish and embryos are not present in the area to the extent practicable; |
| **FISH 14** | 3.13.3.2.2 | 3.13-155 | Based on the design standards and BMPs that would be implemented in compliance with the Title 16 Fish Habitat Permit, the number of stream crossings proposed, and the extent of the mine access road corridor, the intensity of anticipated impacts on fish and aquatic resources and their associated habitat would be low to medium. | Based on the design standards and BMPs that would be implemented in compliance with the Title 16 Fish Habitat Permit, the number of stream crossings proposed, and the extent of the mine access road corridor, the intensity of anticipated impacts on fish and aquatic resources and their associated habitat would be low.<br><br>*Compliance with fish habitat permits issued by ADFG, should limit any potential impacts on aquatic resources to less than medium levels of effects.* |
| **EDIT 5** | 3.13.3.2.3 | 3.13-163 | …during the water withdrawal and discharge permit review processes | …during the water withdrawal and discharge permit application review processes |

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| **FISH 2** | 3.13.3.2.3 | 163-164 | As a result, direct and indirect effects of pipeline operation on local fish populations in affected tributaries along the pipeline ROW would range from minor to moderate. | With appropriate BMPs and reclamation in accordance with permit requirements, impacts should be minor especially since the construction impacts are characterized as minor. This comment also applies to the conclusion in the overall summary of pipeline impacts.<br><br>*Again, compliance with ADF&G permits should result in effects levels less than medium/moderate.* |
| **FISH 2** | 3.13.3.2.4 | 3.13-169 | On a conservative basis, the net over all impacts, therefore, would range from moderate to major. | The "conservative basis" used here unjustifiably overstates the findings of detailed analysis. It should be clearly stated that the only "major" projected impacts to aquatic life in the river are related to the potential effects of prop wash on rainbow smelt spawning. This is especially important in the comparison of alternatives. |
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| **EDIT 5** | 3.15.1.1 | 3.15-4 | Figure 3.15-1A | The map includes two shades of blue designating different land management types but the legend only has one shade of blue. Something is missing. |
| **LAND 8** | 3.15.1.1 | 3.15-4 | Figure 3.15-1A | Figure includes a proposed electric transmission line; the electric transmission line is no longer part of the proposed action since the compressor station would be powered by natural gas (reference to the electric transmission line also appears on p.3.15-15). |
| **LAND 8** | 3.15.1.5.4 | 3.15-24 | Three 100- to 400-foot | Table 3.15-3 indicates that the three easements in question are all 400 feet wide. |

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| LAND 8 | 3.15.3.2.2 | 3.15-41 | Barge traffic will generate propeller wash and wakes that may contribute to riverbank erosion between Bethel and the Angyaruaq (Jungjuk) Port. Throughout this corridor, the uplands are owned by various Alaska Native Village Corporations (surface) and Calista (subsurface). The Kuskokwim River is a very dynamic water system, with the breakup of winter river ice generating tremendous force along the river banks. High water periods through the summer also sculpt the river channel. Barge traffic would add to these forces acting on the river banks and affecting the interests of the upland owners. | The effect of wakes needs to be reconsidered with the smaller wakes described in BGC 2015m and BGC 2016 (to be provided). The tractive wave energy data suggest that annual barge traffic would add between 0.4 and 2.7 percent of the natural tractive energy forces in the river; these levels would be difficult to discern from natural variability and again indicate that natural forces will cause much greater bank erosion impacts than those resulting from Donlin Gold's barging activities. |
| LAND 8 | 3.15.3.2.2 | 3.15-47 | No existing agricultural areas were identified within the vicinity of the proposed pipeline route. However, the eastern part of the proposed pipeline, associated facilities, and transmission line under Alternative 2 cross over soils designated as farmlands of local importance by the MSB. | Suggest noting that there is very low expectation of future use of these lands for agriculture. |
| LAND 8 | 3.15.3.2.5 | 3.15-49 | However, as impacts to lands would be beneficial for some land owners, and a low intensity change in use on a small extent of state lands. | This is not a complete sentence and appears repetitive of previous statements, suggest deleting. |
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| NEP 7 | 3.16.3 | 3.16-12 | Low: Changes in recreation access, setting, activities, or use levels may not be measurable or apparent. | Suggest that this is not a "low" impact but rather no or negligible impact. Low impacts should include some discernable change. |

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| **REC 4** | 3.16.3.2.1 | 3.16-13 | Displacement of recreation activities during the construction period would be considered low in intensity due to the small number of recreationists that would be potentially affected. | Displacement of recreational activities during the construction period would be considered negligible in intensity due to the minimal number of recreationists that would be potentially affected.<br><br>*It is our understanding that there is virtually no recreational use of the mine site. This language is consistent with the summary impact rating in Table 3.16-6.* |
| **REC 4** | 3.16.3.2.1 | 3.16-15 | Under Alternative 2, the intensity of impacts to recreation resources would be of low intensity as recreation use levels at the mine site are low. | Under Alternative 2, the intensity of impacts to recreation resources would be of extremely low intensity as recreation use levels at the mine site are minimal. |
| **REC 5** | 3.16.3.2.1 | 3.16-17 | Impacts would affect recreation resources that are commonly found throughout the region, with the exception of important Section 17(b) easement designations. | Designation of a Section 17(b) easement should not be the sole criteria as an important resource – actual use needs to be considered. Like the mine site conclusion as indicated on page 3.16-15, the lack of use of the easements potentially affected by the transportation plan makes these impacts common in context. |
| **REC 9** | 3.16.3.2.1 | 3.16-19 | There are 79 permitted big game guides and transporters in the GUAs potentially affected by the pipeline ROW (GUAs 16-01, 16-02, 16-03,<br>16-04, 19-02, 19-05, 19-07, 19-08, 19-09, 19-10, and 19-12). | The Corps should review ADF&G data to determine the nature and quantity of big game hunting that actually occurs in the immediate vicinity of the pipeline during the time periods (e.g., winter) when construction would occur. Also important is whether local guides have access to other readily accessible hunting areas. Our belief is that the actual numbers of affected individuals (where mitigation is unavailable) is very small. |
| **REC 4** | 3.16.3.2.3 | 3.16-19 | …where the ROW is near guided hunting operations (particularly between MP 150 and 180), making them regional in extent. | We question the determination that the area between MP 150 and 180 is considered regional. By the definition in Table 3.16-2, regional extent "effects realized by communities throughout the EIS analysis area." The DEIS presents no evidence that the use of this areas includes communities from the lower or middle Yukon-Kuskokwim region; therefore, it would be more appropriately characterized as "local" since it would affect the communities within a subregion (e.g., upper Kuskokwim). |
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| VIS 3 | 3.17 | 3.17-2 | Taken together, the effects to visual resources from at the mine site are considered to be moderate. | Request changing this to low given the very small number of individuals in the mine viewshed. This comment also applies to the more detailed discussion in Section 3.17.3.3.1 as well as the mine access road and airstrip under transportation. |
| VIS 1 | 3.17.3.3.2 | 3.17-54 | Kuskokwim River subsection | This section should acknowledge the effects of the existing barge and other boat traffic on the river – viewers are accustomed to seeing vessels on the river. This also applies to the related language in Section 3.17.3.3.5. |
| VIS 3 | 3.17.3.3.3 | 3.17-57 | This shift in use areas could result in proliferation of user trails | Given the remoteness of the region and limited duration of the construction periods in any given area, it is highly speculative to suggest there could be a "proliferation" of user trails. This also applies to the comparable language on page 3.17-69. |
| EDIT 5 | 3.17.3.3.3 | 3.17-57 | Direct impacts from removal of vegetation for infrastructure sites and the pipeline ROW is expected to range from low to high intensity. | Direct impacts from removal of vegetation for infrastructure sites and the pipeline ROW are expected to range from low to high intensity. |
| EDIT 5 | 3.17.3.3.3 | 3.17-60 | At Big River, direct impacts from new construction infrastructure is expected to be of low to medium intensity | At Big River, direct impacts from new construction infrastructure are expected to be of low to medium intensity |
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| SER 28 | 3.18.2.2.2 | 3.18-43 | …this analysis used the total pipeline cost of $11.22 billion…20 mil rate for oil and gas property to the $11.22 billion peak… | The cost of the pipeline presented in SRK 2013b is $1.12 billion. The number (and any resulting calculations) should be corrected in the Final EIS. |
| SER 27 | 3.18.2.1.1 | 3.18-35 | These effects would be important in context (affecting primarily minority and low-income communities). | Table 3.18-7 only provides common and unique for context ratings. Either the context rating needs to be revisited or the "important" context needs to be added to the impact criteria table. |
| SER 26 | 3.18.2.2.1 | 3.18-38 | For example, project construction workers may spend money in local hotels, restaurants, and shops. The effect of these expenditures would likely be concentrated in Bethel, as there are few retail and service outlets in the smaller communities. | The text should be revised to indicate that workers would not have access to retail/service outlets in the smaller communities since they would be housed in remote construction camps. |

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| **SER 10** | 3.18.2.2.2<br>3.18.2.2.3 | 3.18-46<br>3.18-47 | In-migration to the region is not anticipated…<br><br>Economic stability could …attract new residents | These two statements within the socioeconomics discussion are at odds with each other. The analysis should be consistent with how it deals with the potential for in-migration. |
| **SER 10** | 3.18.2.2.3 | 47 | Also difficult to forecast are changes in the demand for public goods and services caused by project effects on the well-being of individuals, families, and communities in the Y-K region… Current levels of funding for local and regional public service providers may be inadequate to cover this increased demand for services. | While there may be detrimental effects to some individuals, we contend that the overall effects will be positive associated with having good, high paying jobs. This is particularly applicable to young people in the region who have few comparable opportunities. Moreover, the existence of a drug and alcohol free workplace at Donlin Gold should establish a model that will likely lead to less substance abuse among workers and their families. As such, we contend that mine development is more likely to lead to less demand for public services to address social problems. |
| **SER 30** | 3.18.2.2.6 | 3.18-52 | Socioeconomic monitoring: Monitor socioeconomic conditions (population, demographics, employment, income, and education) in Y-K villages using existing/annually updated state and federal statistics. | It outside Donlin Gold's responsibility and authority to implement any kind of socioeconomic management scheme within the region. While Donlin Gold has been and is committed to continue being a good neighbor in the region, this measure does not provide any value as presented and should be deleted from the Final EIS. |
| **EDIT 5** | 3.18.2.2.6 | 3.18-52 | If these mitigation measures were adopted and required, socioeconomic impacts would be slightly reduced. | If these mitigation measures were adopted and required, *adverse* socioeconomic impacts would be slightly reduced. |
| **SER 30** | 3.18.2.2.6 | 3.18-52 | Socioeconomic monitoring could identify potential adverse effects in time to possibly remediate them… | This claim is unsubstantiated. The DEIS is unclear how would monitoring data would be used and by whom. It is also unclear what remedial actions are envisioned and what entity would undertake them. Additional detail and justification should be provided or the statement should be stricken from the text in the Final EIS. |
| **SER 28** | 3.18.2.4.2 | 3.18-54 | Fiscal effects under Alternative 3B would be similar to those under Alternative 2 with one exception. | There would be two exceptions. Add "as under Alternative 3A, no additional diesel storage capacity would be necessary in Dutch Harbor (no additional taxes)." |

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| SER 28 | Table 3.18-19 | 3.18-60 | Lease Fees… Alt 3B<br>Same as Alt 2 except… | Same as Alternative 3A except…<br><br>There would be no additional diesel storage capacity necessary in Dutch Harbor |
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| EJ 4 | 3.19 | All | The analysis of Environmental Justice does not discuss ANCSA which was passed with the specific intent to benefit Alaska Natives, a minority population. | Add references to ANCSA in Section 3.19 as a benefit to EJ. |
| EJ 9 | 3.19 | 3.19-2 | While there would be beneficial effects from the project, adverse impacts would disproportionately impact minority and low-income populations, and Alternative 2 would raise an environmental justice concern. | As indicated in the previous sentences, the beneficial impacts to minority and low-income populations are likely to outweigh the potential adverse effects to these groups. Therefore, we disagree with the conclusion that the project poses an environmental justice concern. |
| EJ 4 | 3.19.1 | 3.19-3 | General | The Regulatory Environment should discuss the importance of ANCSA to Alaska Native self-determination. |
| EJ 9 | 3.19.2 | 3.19-4 | The proposed project's potentially impacted population includes those who live, work, subsist,<br>or recreate within the vicinity of the proposed Project Area, as well as shareholders in the<br>Calista, Doyon, and CIRI Alaska Native regional corporations. | There needs to be an explanation of why shareholders of the Alaska Native regional corporations are identified separately. Alaska Native village corporations (e.g., TKC) should also be identified. |
| EJ 4 | 3.19.3.1 | 3.19-15 | General | The No Action Alternative needs to describe the impact of not developing the project on EJ given the intent of ANCSA to provide for Alaska Native economic benefits and self-determination. Denial of the rights of TKC and Calista and their shareholder to develop and gain the benefits of their resources that they have selected for development would cause a major disproportionate impact on minority and low income populations. Further, since royalties would be shared with other ANCSA corporations, there would be state-wide adverse effects on these populations. |

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| EJ 5 | 3.19.3 | 3.19-14/15 | Tables 3.19-5 and 3.19-6 | A stronger reference to Section 3.22 (Human Health) should be used as the source of information for human health effects rather than the tables. The tables alone provide an incomplete picture of both the methodology and how the HIA process is reconciled with the NEPA process. |
| NEP 7 | 3.19.3 | Various | "magnitude or intensity" | References to "intensity" should be eliminated for references to Human Health effects. "Magnitude" is clearly defined in Table 3.19-5 and in 3.22-15 but the reader is left to try and decipher what is meant by "intensity" as it pertains to Human Health effects. To offer "magnitude or intensity" is confusing. |
| EJ 9 | 3.19.3 | Overall | | The human health effects in Section 3.19 are overstated in that the discussion provides no distinction between direct and indirect human health effects and avoids disclosing the speculative nature of how effects are predicted (and presented) in Section 3.22. |
| EJ 9 | 3.19.3.1.1 | 3.19-17 | The magnitude of the effects of project payments to state and local governments and ANCSA corporations would be medium to high and beneficial over a long-term duration. | The magnitude of the effects of project payments to state and local governments and ANCSA corporations would be high and beneficial over a long-term duration. |
| EJ 9 | 3.19.3.2.2 | 3.19-18 | Increased competition with non-local residents surrounding the pipeline ROW and Farewell airstrip use could bring medium intensity subsistence competition impacts to McGrath, Nikolai, and Takotna. | The Farewell airstrip is currently available for use by subsistence and non-subsistence hunters and that use will continue with our without the Donlin Gold Project. The analysis presents no justification or documentation supporting the assumption the Alternative 2 (or any of the alternatives) would increase the use of the airstrip for access to hunting in the area. |
| PHL 3 | 3.19.3.2.3 | 3.19-18 | General | Health consequences should note the beneficial impact of Donlin Gold on local health (addiction, safety) as a result of operations during the exploration phase. See also our comments on the health effects analysis disputing the conclusions related to adverse effects associated with substance abuse, hazardous constituents, and infectious diseases. |

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| **SUB 16** | 3.19.3.2.2 | 3.19-18 | Impacts to subsistence resource abundance would increase to medium intensity for subsistence fishing in the narrow, shallow reaches of the Kuskokwim River. | Stating that there would be impacts to subsistence resource abundance is an unsubstantiated characterization of effects. The impact assessment for aquatic resources does not find that the project would affect the abundance of fish in the Kuskokwim River. Likewise, the characterization of a reduction in "resource abundance and availability" presented in the subsistence section (Table 3.21-23) is not substantiated in the text. Rather the analysis considers transportation facilities may result in the disturbance of subsistence fishing activities. The Final EIS should be clear that an interruption in fishing activity is not equivalent to a reduction in resource abundance. |
| **EJ 9** | 3.19.3.2.3 | 3.19-19 | Alternative 2 would have disproportionately adverse effects to minority and low-income populations. | This summary conclusion is misleading, as suggested throughout the section and Table 3.19-8, the overall beneficial impacts of local jobs and increased revenue (i.e., indirectly to Calista and TKC) to minority and low-income populations outweigh the potential adverse impacts. |
| **EJ 5** | 3.19.3.2.5 | 3.19-19 | "Table 3.19-7 summarizes…" | This section should simply refer to the applicable health section (3.22.4.2). The "table" is out of context in terms of this presentation. The Corps should convert the health information into a format that is consistent with the resources presented in Table 3.19-8. |
| **TWL 5** | 3.19.3.2.5<br>3.19.3.2.6 | 3.19-26<br>3.19-27 | Bullet #3 on p 26 and bullet #3 on p 27 | These measures seem to be the same thing. If the intent is to use traditional knowledge to inform the existing design feature (bullet #3 p.26) it should be stated more clearly. |
| **EJ 9** | 3.19.3.3 | 3.19-28 | Under Alternative 3A, there would be … reduced potential exposure to hazardous constituents in air and water… | The rationale for this conclusion should be justified. If the Corps is stating that eliminating diesel emissions from the truck fleet would reduce the exposure of environmental justice communities to hazardous constituents in the air, the "benefit" is significantly overstated. |
| **CLIM 2** | 3.19.3.3.1 | 3.19-28 | Impacts associated with climate change would be the same as discussed for Alternative 2. | This statement is not accurate. Burning less diesel fuel would generate a smaller impact from the project on climate change. |
| **AIQ 7** | 3.19.3.4 | 3.19-29 | | The discussion does not include the potential for exposure to air contaminants related to increased diesel emissions (see comments above). |
| **CLIM 2** | 3.19.3.4.1 | 3.19-29 | Impacts associated with climate change would be the same as discussed for Alternative 2. | This statement is not accurate. Burning more diesel fuel to generate power would create a greater impact from the project on climate change compared to burning natural gas. |

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| EDIT 5 | 3.19.3.6 | 3.19-30 | Alternative 5A would substitute “dry stacks” as the method… | Alternative 5A would substitute “dry stack” as the method… |
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| SUB 18 | 3.21 | All | General | The analysis of subsistence impacts considers only cash generated by wages paid by Donlin. Calista and other regional and village corporations will benefit from royalties paid to Calista and TKC, which will likely increase dividends paid to shareholders also increasing support for subsistence. Increased revenues should allow increased and diversified investments on the part of both Calista and TKC, which in turn could further benefit shareholders, directly or indirectly. Thus, the cash income benefit extends beyond individuals who are employed at the project. |
| SUB 14 | 3.21 Synopsis | 3.21-2 | Alternative 2 …except that waterfowl users on the Bering Sea coast may perceive that waterfowl potentially accessing the tailings pond and the pit lake (after mine closure) could be contaminated. | The EIS should address this concern and put exposure to potential contaminants in context. There would be no risk to subsistence hunters on the Bering Sea coast from waterfowl exposed to the tailings pond or pit lake. The Corps and cooperating agencies cannot make permitting decisions based on a perception of effects. |

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| **SUB 8** | 3.21 | 3.21-2 | Summary impact for the pipeline would be minor, except moderate for increased competition<br>near Farewell Airstrip. During construction, intensity of effects on subsistence hunting and fishing is low because there is little overlap between subsistence use areas and the pipeline right-of-way and because the disturbance during construction is limited to short periods. During operations, the intensity of effects from the buried pipeline is low, but less than during construction. However, increased activity at the Farewell Airstrip would constitute a localized moderate intensity increase in competition, affecting the subsistence uses of the communities of McGrath, Nikolai, and Telida. | Summary impact for the pipeline would be minor. During construction, intensity of effects on subsistence hunting and fishing is generally low because there is little overlap between subsistence use areas and the pipeline right-of-way and because the disturbance during construction is limited to short periods. However, the potential for increased activity at the Farewell Airstrip could constitute a short-term, localized moderate intensity effect on the subsistence uses of the communities of McGrath, Nikolai, and Telida through the temporary displacement of game during the construction period. During operations, the intensity of effects from the buried pipeline is low, and less than during construction.<br><br>*It is unclear why, throughout the DEIS, the Corps believes that the Project will increase hunting activity near the Farewell Airstrip. The Farewell Airstrip already provides public access – anyone is free to use the airstrip for purposes they deem appropriate. If public access and associated effects on subsistence are not existing concerns, it is unclear why these will become issues as a result of pipeline construction. At a minimum, the suggested impacts should be caveated as potential affects since there is no certainty they will occur. It is also important to distinguish between effects on the limited guided hunting in the area versus community-level subsistence impacts. Note this comment also applies to the related text in Sections 3.21.6.3.3 and 3.21.6.3.5.* |
| **EDIT 5** | 3.21.5.6.1 (Figure 3.21-35) | 3.21-95 | | Figure is labeled x.xx-x. Colors are difficult to distinguish at this scale, particularly between low and medium use levels (text says medium along natural gas pipeline). |
| **SUB 14** | 3.21.6.1.2 | 3.21-127 | | The EIS should directly address the “perceived” concern and put exposure to potential contaminants in context. |

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| SUB 18 | 3.21.6.1.2 | 3.21-133 | If a large proportion of young men and male heads of mature households (i.e., those most likely to contribute to high harvesting households) were to relocate to urban centers, this could affect the configuration of labor within family groups, overall community subsistence production, and sharing of subsistence foods. | While it is understood that the mine could cause some to leave the region, it is equally possible that the Project would cause many young men and male heads of mature households to remain when they would otherwise leave to look for work. The message consistently communicated to young people in the Y-K region is to get a good education and pursue meaningful careers. At present, there are little or no opportunities to achieve these goals in the Y-K region villages – forcing many to consider employment and residence outside the region. The Donlin Gold project will provide a unique opportunity to both attain socioeconomic benefits while continuing to practice traditional subsistence activities. See the related text on pages 150-151. |
| SUB 11 | 3.21.6.2.1 | 3.21-137 | "There would be no increase in competition from non-local residents for subsistence resources." | "There would be no project-related increase in competition from non-local residents for subsistence resources."<br><br>The affected environment indicates that a number of individuals participating in subsistence expressed concerns with existing competition for subsistence resources. The sources of these concerns could continue, intensify, or diminish in the future in the absence of the project. To state there would be no increase in competition under the no action alternative ignores the baseline condition.<br><br>Further, this section should note that Y-K region residents would continue to face the challenges associated with not having enough resources to pursue modern subsistence activities. |
| SUB 11 | 3.21.6.2.1 | 3.21-138 | The loss of jobs would likely not be easily offset and could result in some families leaving the region, continuing a recent trend | The loss of jobs would likely not be easily offset and could result in some families leaving the region~~, continuing a recent trend~~<br><br>The affected environment discussion indicates a trend of increasing population in the lower Kuskokwim River villages, which is contrary to this statement. The statement should be deleted or reconciled with the affected environment discussion within the Subsistence section. |

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| **SUB 19** | 3.21.6.3.1 | 3.21-140 | Potential impacts to subsistence fish resources, including both salmon and non-salmon species, could result from habitat removal (in-stream, and wetland and riparian buffers) and fish losses, as well as changes in streamflow, stream temperature, and stream sedimentation…<br>The geographic extent of impacts associated… Under a High K scenario referring to high hydraulic conductivity of the bedrock aquifer], impacts to fish and aquatic habitat in the middle and lower reaches of Crooked Creek would be major. | The reference to the High K scenario is out of context and should be deleted. The EIS is already excessively long and a reference to another section (e.g., 3.13) should be just that – a reference and not a complete repeat of a separate section. |
| **EDIT 5** | 3.21.6.3.1 | 3.21-141 | After closure of the mine site under Alternative 2, active mining would cease and the mine site reclaimed… | After closure of the mine site under Alternative 2, active mining would cease and the mine site *would* be reclaimed… |
| **EDIT 5** | 3.21.6.3.1 | 3.21-148 | First, Donlin Gold would prohibit participation in subsistence harvest activities by employees and contractors while they are on shift during all phases of the project. | This should read "on site" rather than "on shift." On shift implies employees might be able to participate after their shift, which is not the case. As proposed, the operation would allow no hunting, fishing, or gathering within the project area boundaries under any circumstance. The only exception may be limited fishing as required by permits to sample under the aquatic monitoring program. |
| **BARG 6** | 3.21.6.3.2<br>3.21.6.3.2<br>3.23.2.2.2 | <br>3.21-155<br>3.23-24 (2x) | … a total of 122 per year, which would represent new barging equal to 180 percent of baseline. Added to the baseline of existing barging activity, the new total would be 290 barge round trips, or 280 percent of the baseline level. | …Added to the baseline of existing barging activity, the new total would be **190 barge round trips.**<br><br>Additionally, in order to fully understand vessel traffic on the Kuskokwim River, the EIS should provide an inventory/characterization of small vessel traffic and an assessment of how that traffic affects activities and resources on the river. |

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| SUB 16 | 3.21.6.3.2 | 3.21-155 and 3.21-155 | First full paragraphs on both pages | The EIS is inconsistent in how the size of the area affected Jungjuk Port is defined (0.5 mi vs. 1.0 mi). Project-related activities will displace subsistence users over a particular distance. The area of displacement may be driven by regulatory requirements (e.g., ADEC air boundary or Department of Homeland Security security perimeter) or could be perception-based (i.e., subsistence users may have concerns about dust). Either way, the displacement of activities around the port, road, or mine site should be consistent from one aspect of the discussion to the next. |
| FISH 7 | 3.21.6.3.2 | 3.21-166 | According to the analysis in Section 3.13.3.2.2, Fish and Aquatic Resources, waves from upriver bound barges would be of negligible height (0.01 to 0.05 feet), while waves from downriver bound barges would be up to 1 foot, depending on the river channel configuration. | These wave height numbers have been revised as reflected in Section 3.13.3.2.2. |
| TRAN 5 | 3.21.6.3.2 | 3.21-167 | …current levels of barge traffic has already influenced… | …current levels of barge traffic have already influenced… |
| BARG 6 | 3.21.6.3.2 | 3.21-167 | Information on barge locations and speed would be available on the Internet, and net locations would be incorporated into electronic river charts to reduce incidents of damage (AMEC 2013). | Donlin Gold recognizes the importance of minimizing the potential for conflicts between subsistence users and barge operations. However, the text misrepresents the discussion of communications in the reference cited, which identifies (emphasis added) "*examples* of communication and navigation initiatives that *could* be taken." The report also states "the International Maritime Organization has requested that all member countries keep information such as vessel position, speed, and heading off the Internet and other broad-based communication systems for security reasons." Donlin Gold is committed to developing and implementing a communication system that provides river users the information they need to safely and effectively conduct subsistence activities on the river while complying with all applicable regulatory requirements. |
| SUB 19 | 3.21.6.3.2 | 3.21-168 | low to moderate levels of impact to fish resources | The finding would be of greater value to general readers by clarifying that potential moderate effects are limited to Crooked Creek and localized, narrow sections of the Kuskokwim River. |

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| SUB 19 | 3.21.6.3.3 | 3.21-180 | Effects from Changes in Socio-cultural Aspects of Subsistence (Construction; Operations and Maintenance; and Closure, Reclamation, and Monitoring)<br><br>The socio-cultural effects of pipeline construction would be the same as those associated with employment at the mine site. | The duration of socio-cultural effects associated with construction of the pipeline are overstated. The socio-cultural effects of pipeline construction would be the same as those associated with construction-related employment at the mine site and of limited duration (2.5 years). |
| SUB 19 | 3.21.6.3.5 | 3.21-181 | (Mine site) Geographic extent is generally regional, and the resources and subsistence practices affected are generally important. | Geographic extent is generally regional, **the resources are generally common,** and subsistence practices affected are generally important.<br><br>With all due respect to the importance of subsistence activities and resources, increasing the context description of resources in the summary from common as noted throughout the section (with the exception of moose and Chinook salmon) to important is not an accurate representation of the data being summarized. The summary tables presented throughout Section 3.21 identify chum, coho, sockeye, and pink salmon; whitefish, sheefish, and smelt; black bear, brown bear, caribou, hare, beaver, and muskrat; and duck, upland birds, and eggs as common resources that are used, harvested, given or received. Since the analysis considers the context of these species common as such, cumulatively (generally) their context would be common. (This comment also applies to summary Table 3.21-27)<br><br>***Note**: the only reference in Table 3.21-22 to the context of practices calls them unique.* |
| SUB 19 | 3.21.6.3.5 | 3.21-181 | (Transportation facilities) The resources and practices affected are generally important in context, particularly in regard to Chinook salmon and moose, which have been the objects of exceptional conservation measures in recent years. | The practices affected are unique in context. Resources affected are generally common in context with the exception of Chinook salmon and moose, which have been the objects of exceptional conservation measures in recent years and therefore important in context. (This comment also applies to summary Table 3.21-27)<br><br>See rationale and note above. |

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| SUB 19 | 3.21.6.3.5 | 3.21-181 - 3.21-182 | The resources affected are generally important in context. | The resources affected are generally common in context. (This comment also applies to summary Table 3.21-27)<br><br>See rationale above. |
| SUB 19 | 3.21.6.3.5 | 3.21-182 | Standard Permit Conditions and BMPs important for reducing impacts to subsistence include: | The discussion should also reference permit conditions in ADF&G habitat modification permits. |
| SUB 19 | 3.21.6.3.5 | Table 3.21-23 | Summary rows<br>Context = important | Context = common<br>See rationale above |
| SUB 16 | 3.21.6.4 | 3.21-186 | This reduction in river barge traffic would reduce by about one-third the potential effects on riverine habitat and subsistence resources, potential barge interference with subsistence fishing gear, fish camps, and processing rafts. | Page 3-168 states: "Although the increase in barging activity and intervals between barge tow passages can be quantified, it is not possible to quantify a likely percent of decline in subsistence fishing harvest levels as a result."<br><br>Subsistence harvest practices are strategic and adaptive. Subsistence users have harvest targets and may redirect effort to adjacent areas, extend time spent in harvesting, or increase harvest of other species to compensate for impaired access in some areas. As a result, it is not possible to extrapolate a linear relation between increased disturbance and reduced overall harvest success. Thus, the one-third reduction in the number of barges would not have a linear benefit to subsistence fishing. |
| SUB 20 | 3.21.6.3.6 | 3.21-186 | Donlin Gold should use current information and traditional knowledge to identify locations and times when subsistence activities occur; and to the extent practicable, minimize impacts to these activities. | Acknowledged. We concur that this type of information will be valuable in reducing the potential for conflicts and developing our communications protocol. |

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| **SUB 14** | 3.21.6.3.6 | 3.21-186 | …testing of bird carcasses, if appropriate. | We understand the concern related to the perception of contaminant exposure of waterfowl from Donlin Gold's proposed operating facilities. We are committed to developing communication protocols and processes that will enable sharing of information in both directions between Donlin Gold and our neighbors in the region. However, specifically calling out the testing of bird carcasses in the DEIS is misleading as to its value in addressing concerns and perceptions about contamination. Surely the subject matter experts involved understand that it would be impossible to test a bird carcass in a way that would provide a linkage between the presence of environmental contaminants and Donlin Gold's operations. Admittedly, an analysis of a bird carcass found at the mine site could potentially confirm the result of an acute toxicity response; however, any other sources of contaminants present would be impossible to determine. In the case of a migratory bird carcass collected offsite, contaminants present could come from anywhere across its entire range of travel. |
| **SUB 19** | 3.21.6.4 | 3.21-187 | Taking into account reduced barge traffic… except for Chinook salmon, which are | Taking into account reduced barge traffic… except for Chinook salmon **and moose**, which are |
| **BARG 17** | 3.21.6.5 | 3.21-186 | Total river barge traffic, including fuel and supply barges, would see a 32 percent reduction, from approximately 122 annual round trips in Alternative 2 to 83 trips in Alternative 3A. | Section 3.21.6.3.2 provides an extended discussion of the increase in barging over the baseline condition. The change in barge traffic discussed here should be compared to baseline as well as to Alternative 2. |
| **BARG 17** | 3.21.6.5 | 3.21-187 | without fuel barging, the barging activity would consist of 64 round trips per year for cargo, instead of 122 round trips, a reduction of 48 percent. | Section 3.21.6.3.2 provides an extended discussion of the increase in barging over the baseline condition. The change in barge traffic discussed here should be compared to baseline as well as to Alternative 2. |

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| **BARG 7** | 3.21.6.5 | 3.21-188 | Since barging accounts for a large portion of all impacts to subsistence fishing from the project, the effects of Alternative 3B to subsistence resources and access to subsistence resources along the Kuskokwim River corridor would be reduced by about half. | Page 3-168 states: "Although the increase in barging activity and intervals between barge tow passages can be quantified, it is not possible to quantify a likely percent of decline in subsistence fishing harvest levels as a result."<br><br>Subsistence harvest practices are strategic and adaptive. Subsistence users have harvest targets and may redirect effort to adjacent areas, extend time spent in harvesting, or increase harvest of other species to compensate for impaired access in some areas. As a result, it is not possible to extrapolate a linear relation between increased disturbance and reduced overall harvest success. Thus, the one-third reduction in the number of barges would not have a linear benefit to subsistence fishing. |
| **SUB 19** | 3.21.6.7 | 3.21-191 | … the potential for exposure of subsistence resources to toxic water sources downstream from the mine site would be slightly lower under Alternative 5A than Alternative 2. | Reword. There would be no "toxic" water sources downstream from the mine under any alternative. |
| **EDIT 5** | 3.21.6.9 | 3.21-191 | IMPACT COMPARISON – ALL ALTERNATIVES<br>A comparison of the impacts to recreation by alternative is presented in Table 3.21-27. | A comparison of the impacts to **subsistence** by alternative is presented in Table 3.21-27. |
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| PHL 2 | 3.22 | Various | All | Donlin Gold has a number of concerns about the applicability of the Health Impact Assessment (HIA) methodology and its integration into the NEPA process.<br>• Purpose of analysis. The Draft EIS states that "the health assessment for this project is intended to document baseline health status in the EIS Analysis Area so that project-related negative health consequences may be avoided or reduced and health benefits optimized." While this is an admirable undertaking for a HIA, it is different than the purpose of a NEPA analysis, which is to disclose impacts and identify mitigation measures to minimize those impacts.<br><br>• Breadth of analysis. The description of the HIA process notes that scoping is a part of HIA as well as NEPA and that the process is used to develop the scope of the issues to be addressed. However, the scoping process was not used to focus the health impact analysis on key issues; rather, the analysis includes the entire range of HEC categories and subcategories identified in the ADHSS HIA toolkit. This approach is inconsistent with NEPA (and the HIA toolkit itself) since it does not focus on the key issues but rather takes an encyclopedic approach to the analysis. As a result the issues and categories that truly may be affected by the project are obscured. The health impacts section should be pared down to the issues that can be shown to be directly affected by the project (see further comments below) and those that enhance the ability of decision-makers to select among alternatives. |

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| **PHL 2 cont.** | | | | • Rates. The text identifies rate changes as a key component of many of the HECs. The baseline condition and effects analysis regularly refer to rates but rarely present a characterization of the basis of the rates (e.g., per 10,000 population) and more critically, the drivers of rate changes as they relate to project-related facilities or factors. If the analysis predicts changes rates, there should be some supporting evidence (e.g., literature) as to why. As written, there is little to no solid basis for conclusions that the project will drive changes in rates of HECs.<br><br>• Lack of cause and effect linkages. The HIA process arbitrarily assigns ratings to Health Effects, Magnitude, Duration, Extent and Likelihood without any supporting information or references. While the authors may have expertise in specific areas, there is often much disagreement among the professional community on the causes and impacts of complex health issues. Without specific data to support the ratings, their value is questionable. Moreover, this approach is generally inconsistent with NEPA analyses where conclusions need to be fully supported. |

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| **PHL 2 cont.** | | | | • Lack of documentation/literature. The analysis is deficient in the degree to which it uses observations collected in the baseline (e.g., accident rates) or professional literature to tie health effects with specific project components. For example, the impact assessment for accidents/injuries associated with water transportation (Section 3.22.4.2.2) uses 6 citations to establish the exiting level of barge traffic but no citations to describe the type or severity of injuries associated with barge collisions with smaller craft, or the frequency of such collisions. The assessment fails to acknowledge that the baseline data (sections 3.22.3.4.2 and 3.23.1.3.2) collected for the Kuskokwim River identifies a single collision in the record and an apparent absence of any injuries that would have required treatment beyond basic first aid. However, the analysis concludes that injuries would be similar to those observed in aircraft plane crashes with a likelihood of 10-33% of occurring. The disconnect between baseline and impact assessment is only one example of a recurring theme throughout the section.<br><br>• Likelihood of Occurrence. The document is unclear on what the likelihood of occurrence means for any given effect. Anticipating a single occurrence over the life of a project is different from anticipating ongoing occurrences but this is impossible to distinguish. Whether the likelihoods apply to an individual or multiple people is significant yet unexplained. This is especially important where major impacts are projected (e.g., increases in suicide and substance abuse). The authors arbitrarily assign likelihoods based on standard formulas for conducting HIAs without providing any supporting data. It is our view that for many of these areas the likelihood percentages greatly overestimate the actual likelihood. At a minimum, the DEIS should clearly explain this uncertainty. |

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| PHL 3 | 3.22 | 3.22-2 | Medium adverse effects could include increases in psychosocial stress, substance abuse rates, and family stress and instability. | We disagree with each of these conclusions regarding adverse impacts. In each of these areas, existing conditions in the Y-K region reflect the lack of socioeconomic opportunities. Psychosocial stress, substance abuse, and family instability can be correlated to worries about long-term futures. Working in good jobs at the Donlin Gold mine would give residents a sense of pride and afford them the financial resources to take care of themselves and their families. This has already proven to be the case through exploration and at other comparable projects in Alaska like the Red Dog mine. In contrast, the DEIS does not provide any relevant examples to support the findings of potential adverse impacts in these areas.<br><br>The model of an alcohol- and drug-free workplace should in fact help to reduce substance abuse levels in the region. In his March 1, 2016 letter to the Corps, Willie Kasayulie specifically states:<br><br>*"Residents will have motivation to give up dangerous vices, which could lead to fewer drug and alcohol related deaths. With fewer deaths in the region, we could experience a brighter future for our communities tormented by tragedies, financial turmoil and broken dreams. The Donlin Gold project has the potential to be a beacon of light for our people."*<br><br>We encourage the Corps to take into account the comments provided by Willie and other native leaders in the region regarding the social and health benefits of the Donlin Gold Project.<br><br>*Note this comment and the following ones on the summary also apply to the specific discussion of each of these topics.* |

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| PHL 9 | 3.22 | 3.22-2 | Medium level adverse effects could include the potential for accidents and unintentional injury. | As a matter of company policy and to comply with extensive laws and regulations related to worker health and safety, Donlin Gold will continue to implement a rigorous health and safety program to prevent accidents and injuries from occurring. The expectation of success is based on the fact that Donlin Gold has not had a lost-time incident for more than 10 years (over 2 million hours worked). All safety incidents and near misses are reported and assessed by management to avoid future occurrences. Not only will this approach minimize the risk of accidents and injuries associate with project activities, workers will continue to bring Donlin Gold's safety first culture back to their villages. We believe strongly this will encourage safe practices in resident's daily lives. Finally, Donlin Gold has undertaken long-term initiatives to promote health and safety throughout the Y-K region. For example, the river-wide distribution of life vests has been extraordinarily successful in changing attitudes towards boating safety. We intend to continue and expand on these initiatives as mine construction and operations move forward. |
| PHL 16 | 3.22 | 3.22-2 | Adverse impacts from exposure to potentially hazardous materials are generally considered low. | The potential for adverse impacts from exposure to potentially hazardous materials is generally considered extremely low.<br><br>*We disagree with the finding of "low" adverse impacts from exposure to hazardous materials. As documented throughout the DEIS, there is no expected exposure of Y-K residents to hazardous materials at levels of concern to human health.* |
| PHL 5 | 3.22 | 3.22-2 | Adverse impacts due to increased rates of infectious diseases are rated low to medium. Increases in infectious disease rates could occur due to employment of workers from outside the region and/or the rotation of the workforce during the project phases. | Request that the Corps consider that Donlin Gold health policies promote a healthy workplace where workers who have infectious diseases would be diagnosed and treated, and measures taken to avoid transmittal of diseases to others. This is in direct contrast to the lack of access to day-to-day health care in many villages in the Y-K region. |

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| PHL 8 | 3.22 | 3.22-2 | Adverse effects due to the availability and quality of water and sanitation facilities are considered low; it is unlikely that water and sanitation services of communities located near the proposed project would be affected. | Adverse effects due to the availability and quality of water and sanitation facilities are considered low; it is very unlikely that water and sanitation services of communities located near the proposed project would be affected.<br><br>*Moreover, the Donlin Gold Project will likely bring financial resources to the Y-K Region that could be used (at the discretion of community leaders) to invest in necessary improvements to existing village water and sanitation systems.* |
| PHL 21 | 3.22 | 3.22-2 | Increased rates of cancer, respiratory disease, and cardiovascular morbidity and mortality are considered unlikely (10-33 percent), with a summary impact rating of medium. | Increased rates of cancer, respiratory disease, and cardiovascular morbidity and mortality are considered extremely unlikely, with a summary impact rating of medium.<br><br>*In this and other places, the generic use of percentages provides a false suggestion that such major health effects could result from the Donlin Project. There is no evidence to support the conclusion that they would actually occur and this should be reflected in the findings.* |

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| PHL 2 | 3.22.1 | 3.22-3 | Regulatory Environment | The section should be treated similarly to socioeconomic (Section 3.18) in that there is no discussion of regulatory environment. Similar to socioeconomics, the only driver for the assessment of human health effects in the EIS is NEPA. The discussion of the Alaska Department of Health and Social Services (ADHSS) and the International Finance Corporation, is out of place in the context of regulatory environment since neither have any kind of regulatory authority that would apply here. Likewise, the Health Impact Assessment (HIA) guidelines have no regulatory driver.<br><br>At the same time, a discussion of the relationship among health effects and existing environmental regulations and within the NEPA context is completely absent. The Clean Air Act, Clean Water Act, the regulations defined under Alaska Administrative Code (AAC) Title 18, Section 31 are just some of the laws and regulations applicable to human health effect concerns yet are conspicuously absent from the entire analysis.<br><br>This discussion should be refocused in the Final EIS to discuss the relevant regulatory programs in the NEPA context. |
| PHL 19 | 3.22.3 | 3.22-10 | …draft version of the NewFields HIA | To our knowledge a NewFields HIA has not been released or used to develop the project record. References to this document should be removed from the document. |
| PHL 2 | 3.22.3.3 | 3.22-13 | …the HEC discussions in this HIA are limited to health endpoints… | The EIS is not an HIA. The baseline section should be reviewed within the context that this is an EIS and not a formal HIA. The two employ very different methodologies and have different objectives. |

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| PHL 21 | 3.22.3 | Various | Health Effects Category discussions | Table 3.22-1 links health effects categories with specific health impact issues. This should be the roadmap for this aspect of the analysis. Instead, the body of the text is expanded to discuss numerous other health impact issues that have no clear tie to the proposed project or the impacts assessment including but not limited to: life expectancy, abuse and sexual violence, oral health, suicide, micronutrient deficiencies and liver disease. Section 3.22.3 would be easier to follow and more relevant and if the discussions in the body of the text corresponded to the issues identified in Table 3.22-1 by deleting the discussions of factors/issues that do not contribute to the impact assessment. |
| PHL 2 | 3.22.3.4.2 | 3.22-18 | Dry/Wet/Damp Community | This discussion should be deleted from the Final EIS. While the nature of alcohol sales and possession is part of the existing conditions in the region, they have no direct relationship with any aspect of the Project under consideration in this EIS (see the regulations for implementing NEPA 40 Code of Regulations (CFR) Section 1502.2(a) – Environmental impact statements shall be analytic rather than encyclopedic). |
| AIQ 7 | 3.22.3.4.3 | 3.22-19 | Air Quality<br>…There were no specific data available on air quality for the EIS Analysis Area (NewFields 2015). | The next two sentences in the paragraph should be deleted since they are speculative and unsubstantiated (the document acknowledges that no specific data are available). |
| EDIT 5 | 3.22.3.4.3 | 3.22-19 | Due to the extreme cold and frozen ground, local practices of burning trash and running diesel generators could contribute to poor air quality outdoors. | Local practices of burning trash, generating power using diesel generators, and heating of some homes using wood stoves could contribute to poor air quality outdoors. |
| PHL 16 | 3.22.3.4.3 | 3.22-20 | Exposure to potentially hazardous materials is shown in Table 3.22-7. | The information presented in Table 3.22-7 is not exposure to hazardous materials, it is a summary of the observed levels of mercury and lead in different populations. There does not seem to be a basis for the assumption that the contaminants of concern at the Formerly Used Defense sites listed above this statement include mercury or lead. |
| PHL 16 | 3.22.3.4.3 | 3.22-20 | Pre-existing Environmental Hazardous Materials | There is no disclosure or characterization of the hazards associated with any of the sites or of the risk of exposure to local residents. Therefore, this section should be deleted from the Final EIS. If it remains, it needs to be augmented to provide meaningful information within the context of contaminant exposure and how that ties to the impact assessment. |

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| PHL 16 | 3.22.3.4.3 | 3.22-21 | Preexisting Environmental Hazardous Materials and Table 3.22-7 | There is no indication that increases in lead concentrations are anticipated in association with the proposed action and alternatives. The information is unnecessary and distracting. The table should be deleted from the Final EIS. |
| PHL 16 | 3.22.3.4.3 | 3.22-21 | Table 3.22-7 | If the table is not deleted, it would be more meaningful and informative if it included the ATSDR screening level (15.3 ppm) and/or ADHSS's cut off for follow up (5 ppm) as cited in the body of the text. |
| PHL 16 | | Table 3.22-7 | Table 3.22-7: Exposure to Potentially Hazardous Materials | Table 3.22-7: Observed Levels of Mercury and Lead in Alaska and National Populations |
| EDIT 5 | | Table 3.22-7 | Children Elevated Blood Lead Level Case Rate | Children Elevated Blood Lead Level Case Rate (per 100,000) |
| PHL 21 | 3.22.3.4.8 | 3.22-27 | Figure 3.22-3 | This figure provides no value to decision-makers or the public related to the impacts analysis of the proposed action and alternatives and should be deleted from the Final EIS. |
| PHL 21 | 3.22.3.6.1 | 3.22-29 | Table 3.22-11 | The text should clarify the use of this table in setting the stage for baseline conditions that are then carried through the impact assessment. The context for how the items in the table support the impact analysis should be provided or the table should be deleted from the Final EIS. |
| PHL 21 | 3.22.3.6.2 | 3.22-30 | Dry/Wet/Damp Community. Nikolai is a "dry" community and Red Devil is a "damp" community; the others allow sale and possession (AST 2012, as cited in NewFields 2015).<br>Accidents and injuries are shown in Table 3.22-12. | The text is unclear as to how accident rates in Table 3.22-12 are linked to whether a community is wet, damp, or dry. There appears to be no linkage between the two. Likewise there is not even an indirect linkage between Dry/Wet/Damp and the project under analysis. This section should be deleted from the Final EIS since it provides no value to the analysis. |
| PHL 21 | 3.22.3.6.3 | 3.22-31 | Existing Contaminated Sites | The text should be clear as to the purpose of accounting for the various contaminated sites in this section. Simply because the topic is included in the HIA Toolkit is not adequate justification. There is no disclosure or characterization of the hazards associated with any of the sites or of the risk of exposure to local residents. This section should be deleted. |

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| CLIM 2 | 3.22.3.7 | 3.22-34 | Entire section | This section is purely speculative ("Climate change has likely contributed to recent declines in moose in GMU 19A and Chinook salmon populations in the Kuskokwim River"). There is no clear evidence of what, if any, impacts climate change is having versus the many other factors that influence the populations of these species. |
| PHL 15 | 3.22.4 | 3.22-35 | While different from the terminology in other sections, the analysis and impact ratings for human health are consistent with the principles of analysis required by NEPA. | This statement is not accurate and understates the No Action condition for health impacts. The health assessment does not assign ratings to the No Action alternative and as such, precludes a reasonable comparison with other alternatives; this approach is not consistent with the principles of analysis under NEPA or in comparison to other resource areas. As presented, the baseline conditions attributable to health do not represent a zero level of effect when considered in relation to the impact dimensions provided in Table 3.22-15. The reader needs to be provided with a reasonable description of the No Action effect levels.<br><br>A hypothetical assessment of STIs under the No Action alternative for a project in the Y-K region using the criteria in Table 3.22-15 could be determined as follows. The health effect is 1– medium because intervention is necessary; the duration is 3– very high since an individual could contract an STI over their entire adult lifetime; the magnitude is 1– medium since the impacted person would adapt; and the extent could be 0 to 3 depending on the activity of that individual (say 1 for this exercise). Therefore, the impact score of this baseline condition is 6. Since STI levels in the region are relatively high (3x the state rate for chlamydia) the likelihood (Table 3.22-16) could be 33-66% "about as likely as not" **resulting in an overall impact rating of Medium as the baseline (No Action) condition**. |

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| PHL 15 cont. | | | | An analogy for the health no action would be the existing traffic conditions in relation to a proposed highway improvement project under a NEPA analysis. The basis for comparison of a No Action alternative is not zero traffic, it is the existing level of traffic.<br><br>The analysis references the baseline conditions presented in Sections 3.22.3 but this is insufficient and misleading as the basis for comparison. Impact ratings need to be developed for the No Action alternative in the Final EIS in order for a valid comparison to be made across all alternatives under the Human Health resource area. |
| PHL 21 | 3.22.4.1 | 3.22-37 | Human health impacts … potential increases or decreases in social determinants of health, such as income, psychosocial stress, substance abuse, and family stability. | The text should clarify whether there would be increases or decreases and by how much. See comment above on Section 3.22.4. A tabular assessment of this alternative needs to be developed similar to that done for the other alternatives in order to support a reasonable comparison among alternatives. |
| PHL 15 | 3.22.4.1 | 3.22-37 | Other health factors would return to pre-project levels, such as exposure to accidents, injuries, diseases… | Under the No Action, there is no "return" to pre-impact levels. The No Action alternative defines the pre-impact level of effects and serves as the basis for comparison. The action alternatives are the source of "new" impacts.<br><br>For an effective analysis, the specific ratings of pre-project exposures to accidents, injuries and diseases need to be provided. A tabular assessment of this alternative needs to be developed similar to that done for the other alternatives in order to support a valid comparison among alternatives. |
| PHL 14 | 3.22.4.1 | 3.22-37 | …and potentially hazardous materials would cease | This statement is inaccurate and should be rephrased. The potential exists for one of the existing supply or fuel barges to spill some its contents. The BLM is currently working on cleanup plans for the Red Devil mine site to reduce contaminant exposures through Kuskokwim River receptors. Presumably there would be the potential for exposure to hazardous chemicals through any of the known (or potentially unknown) hazardous materials sites in the region. The atmospheric deposition of mercury and other airborne contaminants unrelated to the Donlin Gold project occurred in the past and would continue under the No Action alternative. |

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| CLA 22 | 3.22.4.1 | 3.22-38 | The duration would likely be up to 6 years… | The duration of the No Action alternative would be permanent if this alternative is to be evaluated in a manner consistent with the other alternatives. |
| CLA 22 | 3.22.4.1 | 3.22-38 | The magnitude would be medium, with those affected able to adapt and return to pre-impact levels of health. | Under the No Action, there is no "return" to pre-impact levels. The No Action alternative defines the pre-impact level of effects and serves as the basis for comparison. The action alternatives are the source of "new" impacts. |
| PHL 3 | 3.22.4.2.1 | 3.22-38 | Increases in household incomes, employment rates, and education attainment could result in an improvement to the overall health and well-being of residents | Increases in household incomes, employment rates, and education attainment would result in an improvement to the overall health and well-being of residents.<br><br>*Some improvement would occur; the only question is the scale.* |
| EDIT 5 | 3.22.4.2.1 | 3.22-39 | Increases in economic opportunities could result in an increase in the number of individuals in the potentially affected communities investing in their education, resulting in positive behavioral changes that could improve health | Increases in economic opportunities would likely result in an increase in the number of individuals in the potentially affected communities investing in their education, resulting in positive behavioral changes that could improve health |
| PHL 21 | 3.22.4.2.1 | 3.22-41 | Rates of Substance Abuse<br>Alcohol abuse is also associated… | This paragraph belongs in the affected environment discussion if it belongs anywhere. It remains unclear how the wet/damp/dry conditions apply to the impact assessment and how this information supports an informed decision by the decision-makers. The value of this discussion should be justified or it should be deleted from the Final EIS. |
| PHL 9 | 3.22.4.2.1 | 3.22-40/41 | Rates of Substance Abuse | One point not made in this discussion is that Donlin Gold has a strict drug and alcohol policy that would tend to limit the duration of employment of substance abusers. It is also likely to motivate potential and current employees to refrain from participating in substance abuse. In addition to Donlin's substance abuse policies, the analysis should consider the positive impacts of Donlin Gold employees having access to health insurance. |

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| PHL 3 | 3.22.4.2.1 | 3.22-42 | Family Stress and Instability | This discussion is supported by limited and dated literature sources. The Diavik document is over 15 years old and reflects Canadian rather than US business, regulatory, and social dynamics. It reports "the current perception among many women is that the companies are not interested in hiring women other than as cleaners and cooks helpers, and that hiring and promotion seems to be geared towards men. In one community it was stated that Diavik did not discuss employment or other opportunities for women while there to do a community presentation." This is just one example where we strongly disagree that the conditions are representative of the training programs currently supported by Donlin Gold or our employees' experiences during exploration activities. It is also unclear how our agreements with Calista and TKC would support or tolerate such discriminatory practices.<br><br>The fact that the UBC report notes "women reported incidents where they were harassed and treated with disrespect by Qablunaat miners. They reported incidents of racist and unacceptable behavior." While anything is possible we believe that our track record would support Donlin Gold's commitment to equality in the workplace and that our rigid policies against sexual harassment has and will continue to maintain a substantially different work culture than that presented in this report.<br><br>With such strong statements of potential impacts, the Final EIS should provide specific context of why they are applicable to the Donlin Gold Project. Operations at both the Red Dog mine and the North Slope have been going on for years and would be more reflective comparable operational conditions within Alaska. An effort needs to be made to broaden the research used to support this aspect of the analysis. |
| PHL 9 | 3.22.4.2.2 | 3.22-47 | HEC 2: Accidents and Injuries | The introduction indicates that Donlin Gold would provide safety training for all its employees but it fails to note that the workplace is "inside the fence" and governed by the Occupational Health and Safety Act and the Mining Safety and Health Act. NEPA assessments are typically limited to activities "outside the fence" which should be made clear in the introduction. |

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| PHL 13 | 3.22.4.2.2 | 3.22-48 | The potential for accidents and injuries due to air transportation is … considered unlikely (10-33 percent). | Based on the data presented in the Transportation section, Donlin Gold's air transportation during construction would represent an increase of approximately 4 percent (1.4 percent during operations) over current flights at the Bethel airport. It is unreasonable to suggest that likelihood rating of 10-33 percent is appropriate based on an increase of regional traffic of less than 5 percent. |
| PHL 13 | 3.22.4.2.2 | 3.22-48 | Unintentional Accidents and Injuries<br>This road would be located in an area that is remote, and not pass near existing settlements or communities, nor would it connect with an existing road system. | This road is a private, controlled-access industrial access road and since it is "inside the fence" it should not be part of this analysis. Any use of the road by non-employees would be trespassing. |
| PHL 13 | 3.22.4.2.2 | 3.22-48 | Unintentional Accidents… Surface Transportation<br><br>Similar to air transportation, the health effect would be very high due to the potential for serious health injury and loss of life if an accident were to occur. | The text should be clear that unintentional surface transportation accidents are indirect effects that could result from Donlin Gold employees driving to and from work. All other surface transportation occurs within work zones from which the public would be excluded.<br><br>The analysis overstates the effects of a vehicular accident by equating an accident at sub-highway speeds (likely less than 45 mph) with the effects of a plane crash. It would be more appropriate to assume that the magnitude of surface transportation accidents is likely to be low (minor) or medium (able to adapt with ease…). What are the speed limits for most roads in Bethel and Dutch Harbor? What are the hospitalization rates for motor vehicle accidents? Please revisit the magnitude of surface accidents or provide a reference that justifies equating vehicular accidents with plane crashes in this particular context. |
| PHL 13 | 3.22.4.2.2 | 3.22-48 | Unintentional Accidents… Water Transportation<br><br>Similar to air and water [sic] transportation, the health effect would be very high due to the potential for serious health injury and loss of life if an accident were to occur. | This statement completely ignores the data presented in section 3.22.3.4.2 and 3.23.1.3.2, which notes that barge-related incidents are very infrequent and have produced zero deaths or injuries that would require treatment beyond simple first aid. The analysis should be re-done based on the observations presented in the affected environment discussions. The data support a determination that water transportation accidents are likely to have a minor (low) magnitude of health effect. |

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| PHL 13 | 3.22.4.2.2 | 3.22-49 | Unintentional Accidents… Water Transportation<br><br>The likelihood of a water transport accident occurring is considered unlikely (10-33 percent) | The 10-33 percent rating is completely arbitrary. The increase in barge traffic under Alternative 2 is approximately 180 percent over the baseline condition. At the same time, the data on collisions and traffic levels presented in section 3.23.1.3.2 indicate that historically, hundreds of boats a day have been observed on the Kuskokwim River with no reported crashes with barges. Considering the observations, one could reasonably conclude that collisions with barges are extremely unlikely (<1 percent). Based on a realistic baseline condition (<1 percent) a more appropriate increase would only make a collision very unlikely (1 -10 percent). In general, the Final EIS needs to provide supporting data to justify rating percentages, especially where there is an implication of significant consequences. |
| PHL 10 | 3.22.4.2.2 | 3.22-50 | The summary impact to human health due to increases in suicide rates would be medium for all project phases. | Donlin Gold recognizes the seriousness of the issue of suicide in the region and throughout rural Alaska and feels for all of those touched by this tragedy. However, we are compelled to comment on how the topic is handled in the human health impact assessment in the DEIS.<br><br>The inclusion of the Intentional Injury: Suicide Rate health effect category (HEC) illustrates the incompatibility between the fact-based NEPA process and the speculative nature of the HIA process and its arbitrary and generally unsupported rating system. Our concern specifically focuses on the term “rates” and its complete absence from the analysis. |

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| **PHL 10 cont.** | | | | The DEIS states that "expectations regarding suicide rates should be treated with caution since the causes of suicide are complex and unpredictable…" yet it goes to conclude that all phases of Donlin Gold's activities will have a medium effect on suicide rates. The document presents an extremely limited discussion about suicide rates and no discussion or literature citations linking increases in suicide rates with commercial/industrial/economic/transportation activity – or any other potential drivers. In fact, testimony provided at the DEIS public meetings in the region indicated that employment opportunities in an area with so little economic opportunity could reduce suicide rates; no commenters voiced concerns that the project would increase rates.<br><br>The "analysis" provides no explanation of how changes in suicide rates are identified, measured, or modeled or how the results of the HIA process formula relate to potential changes in rates. This approach is inconsistent with standard NEPA practice.<br><br>Reviewing the details of the HIA rating system (Section 3.22-4 and Tables 3.22-15 and -16) it is difficult to see how the Project drives this HEC. The rationale for how the authors differentiate between the Alternative 1 (No Action) and any of the action alternatives is unclear. For example, a face value comparison of alternatives 1 and 2 shows that the Health Effect is Very High (mortality) under both alternatives. In both cases, the Magnitude of effect is also Very High (the victim is not able to adapt or maintain the pre-impact level of health). Under both alternatives the Duration is Very High (long-term) – in the case of Alternative 1, a person's lifetime where they would face the potential causes of suicide versus the case of Alternative 2 which would last for 27 years under the operational phase. The Extent under both alternatives is Low (individual cases). This approach yields no difference between the No Action and Proposed Action alternatives. |

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| PHL 10 cont. | | | | We **strongly** disagree with the conclusion that there is a 10-33 percent chance that suicides would increase on a large scale due to the Donlin Gold Project. As we have previously stated, the increase in long-term stability and hope associated with project development should in fact help to reduce depression and potential suicides in the Y-K region. Unless there is specific data to support this finding, it should be modified or deleted in the Final EIS. |
| PHL 21 | 3.22.4.2.3 | 3.22-54 | (e.g., release of mercury used in mine operations activities) | Mercury is not used in mine operations activities. |
| PHL 21 | 3.22.4.2.3 | 3.22-54 | …CSMs were developed for each of the project components (Figure 3.22-4, Figure 3.22-5, and Figure 3.22-6) for Alternative 2<br>…<br>CSMs were not developed for the other alternatives since they are similar to Alternative 2, with regard to human health analysis. | … CSMs were developed for each of the project components (Figure 3.22-4, Figure 3.22-5, and Figure 3.22-6). **Because of the similarity among alternatives in relation to exposure pathways, the models are representative of all the action alternatives.**<br>…<br>~~CSMs were not developed for the other alternatives since they are similar to Alternative 2, with regard to human health analysis.~~ |
| PHL 17 | 3.22.4.2.3 | 3.22-58 | All pollutants were found to be well below the air quality standards and threshold values that would trigger permitting requirements. Permitting requirements typically take human health into consideration along with other factors. | All pollutants were found to be well below the air quality standards for protection of human health. |
| PHL 17 | 3.22.4.2.3 | 3.22-58 | Health effects related to air quality during the construction phase are considered to be medium… | The statement is unclear as to what health effects are being referenced. It is unclear that the inhalation of dust and vapor produce at a level where “no intervention would be required” truly represents an adverse health effect. If some degree of effect is retained it should be supported by the specific exposure pathway and expected effects. |

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| PHL 2 | 3.22.4.2.3 | 3.22-58 | Health effects related to air quality during the construction phase are considered… of low intensity (below permitting thresholds), temporary (3 years or less), and a medium/local geographic extent… | The methodology being employed to determine ratings is unclear. Table 3.22-15 identifies health impact dimensions as health effect, duration, magnitude and extent. The reference to intensity (below permitting thresholds) and medium/local graphic extent mixes the NEPA analytical approach with the HIA analytical approach. The health section should be using an approach consistent with NEPA rather than relying on a HIA-modified methodology (Table 3.22-15) as discussed in Section 3.22.4. |
| PHL 16 | 3.22.4.2.3 | 3.22-59 | Surface Water Quality<br>… The primary exposure pathway by which surface water quality may affect human health is if people use untreated contaminated surface water… | The primary exposure pathway in this case is not a realistic scenario. Residents and subsistence users would not have access to the mine site so there would be no opportunity for people to use untreated, contaminated surface water. A discharge of untreated water would be in violation of the Clean Water Act and therefore outside the realm of a standard NEPA analyses. Therefore as long as the project discharges water in compliance with the Alaska Pollutant Discharge Elimination System (APDES) permit, people would not be exposed to untreated contaminated surface water.<br><br>The analysis should be revisited in consideration of a different primary exposure pathway or an acknowledgement that this exposure scenario represents a non-permitted activity. The latter solution is not appropriate for a NEPA analysis. |
| PHL 2 | 3.22.4.2.3 | 3.22-60 | Human health effects related to surface water during the construction period are considered to be low (effects not perceptible), of low intensity (no exceedances of AWQC), of temporary duration (3 years or period of construction), medium/localized in extent and low in likelihood | The methodology being employed to determine ratings is unclear. Table 3.22-15 identifies health impact dimensions as health effect, duration, magnitude and extent. The reference to intensity (no exceedances of AWQC) and medium/local geographic extent mixes the NEPA analytical approach with the HIA analytical approach. The health section should be using an approach consistent with NEPA rather than relying on a HIA-modified methodology (Table 3.22-15) as discussed in Section 3.22.4. |
| PHL 21 | 3.22.4.2.3 | 3.22-60 | After closure of the mine, all treatment water, runoff, and seepage would be retained on site in the pit lakes and treatment facilities and treated in the post-closure waste treatment plant. | After closure of the mine, all contact water~~, runoff, and seepage~~ would be retained on site in the pit lake~~s and treatment facilities~~ and treated in the post-closure waste treatment plant. |

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| **PHL 2** | 3.22.4.2.3 | 3.22-62 | Health effects related to groundwater quality during the construction phase are considered to be low (effect not perceptible), of low intensity (no exceedances of AWQC in potable groundwater), of very high/long-term duration (as long as metal concentrations are locally elevated), medium/localized in extent (on-site only, not in off-site areas of groundwater usage)… | The methodology being employed to determine ratings is unclear. There would be no health effects. Table 3.22-15 identifies health impact dimensions as health effect, duration, magnitude and extent. The reference to intensity (no exceedances of AWQC) and medium/local graphic extent mixes the NEPA analytical approach with the HIA analytical approach. The health section should be using an approach consistent with NEPA rather than relying on a HIA-modified methodology (Table 3.22-15) as discussed in Section 3.22.4. |
| **SOI 10** | 3.22.4.2.3 | 3.22-63 | Soil Quality<br>Only antimony, arsenic and mercury were at levels that exceeded ADEC's soil cleanup levels in a source material or baseline soil. | The statement mischaracterizes the analysis presented in Section 3.2.3.2.4. Antimony and mercury **were not** at levels that exceeded ADEC's soil cleanup levels in baseline soils. As stated within the same paragraph, only arsenic exceeded ADEC cleanup levels in some baseline samples. Estimations of dust (not soils) metals concentrations presented in Table 3.2-12 indicate elevated arsenic concentrations in six identified dust sources and elevated antimony concentrations in two dust sources. None of the dust sources indicate levels of mercury above ADEC soil cleanup levels. |
| **SOI 1** | 3.22.4.2.3 | 3.22-63 | Table 3.22-19 | Predicted End-of-Mine-Life Soil = 174<br><br>Table 3.2-13 indicates 172 mg/kg.<br><br>Note that the footnote references for Table 3.22-19 should be checked for accuracy (and "a" through "e" need to be added to the notes). |
| **SOI 1** | 3.22.4.2.3 | 3.22-66 | As discussed earlier, NAG and PAG may be used to construct the roads | None of the alternatives call for PAG material to be used in road construction. This and any earlier discussions need to be revised based on the fact that PAG material would NOT be used for road construction. |
| **EDIT 5** | 3.22.4.2.3 | 3.22-73 | …in the bethel Census Area… | …in the Bethel Census Area… |

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| PHL 5 | 3.22.4.2.5 | 3.22-79 | Because the project would use individuals primarily from the region for the workforce (i.e., there would not be a major influx of workers from outside the region) and statewide STI rates are lower than for communities located in the EIS Analysis Area, it is expected that STI rates would not show a discernable change; hence, the likelihood of increased STI rates is considered as likely as not (33-66 percent) for the construction and operations phases of the mine, but unlikely (10-33 percent) for the operations phase of the transportation facilities and the pipeline,<br>as well as for the closure phase due to the smaller workforce required for those components and phases. | We agree with the conclusion that STI rates would not show a discernable change for the reasons cited. Therefore, we disagree strongly with the conclusion that there is an equal likelihood that the STI would increase during the construction and especially the operations phases of the project. If this is retained, specific data should be provided to support the conclusion on how and why it would occur as a result of the Donlin Gold Project. Moreover, we disagree with the 10-33 probability assigned to the operations and closure phases of the transportation and pipeline components. The analysis provides no supporting documentation for the conclusions. |
| PHL 2 | 3.22.4.2.5 | 3.22-80 | Increases in Rates of Foodborne Illness | Food services and the work camps are “inside the fence.” Potential impacts associated and are part of aspects typically not addressed as part of the NEPA process. |
| PHL 2 | 3.22.4.2.5 | 3.22-80 | Increases in Rates of Foodborne Illness | Regulations at 18 AAC 31 address food services with the intent of avoiding problems like foodborne illnesses. It is unclear whether the Medium health effect and the Medium magnitude assume compliance with 18 AAC 31 or lack of compliance. There is no basis or assuming non-compliance with the regulations in which case the effect would be a worst-case scenario and beyond the scope of NEPA. |
| PHL 5 | 3.22.4.2.5 | 3.22-80 | The potential for increased rates of foodborne illnesses and zoonotic diseases due to improper food handling/catering services and food disposal (harboring wildlife) would be expected to impact primarily the local communities located near the project components. | We fail to see the linkage between food handling practices at the Donlin remote camps (i.e. inside the fence) would affect illnesses/disease rates in local communities. Local residents would not be fed by Donlin Gold’s food service caterers. |

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| PHL 8 | 3.22.4.2.6 | 3.22-80 | …the likelihood of affecting the availability and quality of water and sanitation services of communities located near the proposed project is considered unlikely (10-33 percent). | There is no basis for a finding that there is a 10-33 percent probability of effects on the availability and quality of water and sanitation services. It is unclear what is even being evaluated – the rates, or the availability, or the effect of the Donlin Gold Project on these rates in the region.<br><br>Our position is that if the project enhances the local economy, is it possible that some funds may become available for *improving* access to water and sanitation services. |
| PHL 8 | 3.22.4.2.6 | 3.22-83 | …the likelihood of affecting the availability and quality of water and sanitation services of communities located near the proposed project is considered unlikely (10-33 percent). The potential impact of increases in mortality and morbidity rates due to change in the availability and quality of water and sanitation services would be low for the potentially affected communities for all project phases. | Here again, we disagree with the percentages (10-33%) assigned to potential adverse effects due to community water and sanitation services. In reality, there is minimal chance these impacts will occur. Since no related increases in mortality and morbidity will occur, it is inaccurate to suggest that the impacts will be "low." |
| PHL 21 | 3.22.4.2.7 | 3.22-87 | …and cardiovascular diseases (e.g., particulate matter, PM) | Particulate matter is not an example of cardiovascular disease. |
| PHL 17 | 3.22.4.2.7 | 3.22-87 | Health effects related to cancer, respiratory, and cardiovascular morbidity and mortality would be considered high (moderate injury that may require intervention), **if exposure were to occur.** | The text should clarify the type and duration of exposure that would need to occur to produce the stated effects. Unless an actual pathway for exposure can be documented as reasonably foreseeable, such phrasing should be deleted from the Final EIS. |
| PHL 17 | 3.22.4.2.7 | 3.22-87 | Based on the air quality modeling results (Section 3.8, Air Quality), the likelihood of increased cancer, respiratory, and cardiovascular morbidity and mortality rates due to increased exposure to hazardous air pollutants is considered unlikely (10-33 percent). | The text should be clarified to include the translation method used to correlate the likelihood of changes to increased cancer etc., rates with the air quality modeling results. Without some kind of linkage between rates and air quality modeling results, this value would appear to be arbitrarily assigned. We would further argue that there is absolutely no basis for a conclusion of a 10-33 percent likelihood of increases in these effects. |

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| **PHL 21** | 3.22.4.2.7 | 3.22-87 | However, health effects and the intensity of the impact at estimated levels of exposure are considered to be low (similar to background levels). | However, no health effects are projected at the estimated levels of exposure (similar to background levels).<br><br>*Low levels of effects are not supported by the analysis.* |
| **PHL 2** | 3.22.4.2.8 | 3.22-87 | The following subsections present the evaluation of<br>the potential impacts due to **decreased** access to healthcare under routine conditions and emergency situations that could overwhelm local and regional healthcare capacities. | This approach is inconsistent with NEPA since it ignores potential positive impacts from the project. For example, healthcare access may be improved if employees are able to get some health services (e.g. a flu shot) at work. |
| **CLA 23** | 3.22.4.2.8 | 3.22-87 | Access to Routine Healthcare | The first paragraph in this subsection is a description of baseline conditions and should be moved to the affected environment discussion. |
| **PHL 21** | 3.22.4.2.8 | 3.22-92 | Under emergency situations, the summary impact is considered high with potential to overwhelm health care capacities. | The conclusion should be caveated by the fact that emergency situations are expected to be rare and that many emergency situations would be handled by more advanced health care facilities in Anchorage (especially given the relative distances from the mine to Bethel and Anchorage). |
| **SER 30** | 3.22.4.2.11 | 3.22-97 | Monitor socioeconomic conditions (population, demographics, employment, income, education, and health indicators) in Y-K villages using existing/annually updated state and federal statistics. | This type of monitoring is challenging because measured changes in the region may be completely unrelated to Donlin Gold. In addition, requiring this type of monitoring is outside the authority and expertise of the Corps. |
| **PHL 9** | 3.22.4.2.10 | 3.22-97 | Design features most important for reducing impacts to human health include: | Donlin Gold would provide health coverage for employees which should be a significant factor for improving and maintaining health status. |

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| **TRAN 2** | 3.22.4.3.1 | 3.22-98 | Under Alternative 3A, the increase in barge traffic for both ocean and river barges under<br>Alternative 3A (relative to baseline), though less than Alternative 2, would still result in noticeable disturbance and limited displacement of other uses at the Bethel port facilities and in narrow reaches of the river. | A new port facility would be built in Bethel (separate from the existing facility) to handle the transfer of materials bound for the project from ocean barges to river barges. It is not clear why the analysis assumes Donlin Gold's activities would result in "noticeable disturbance and limited displacement of other uses at the Bethel Port facilities." |
| **AIQ 7** | 3.22.4.4.2 | 3.22-100 | Relative to Alternative 2, this alternative would have less negative impacts on air quality… | No. Emissions from diesel generators would result in more adverse effects on air quality compared to natural gas-fired generators. |
| **PHL 13** | 3.22.4.8 | 3.22-103 | Table 3.22-27<br>HEC 2 - Alt 4 | The increased potential for surface transport reflects employees operating "inside the fence" and should not be included here (it's not included in the body). |
| **AIQ 7** | 3.22.4.8 | 3.22-104 | Table 3.22-27<br>HEC 3 - Alt 3B | A diesel pipeline would result in the use of diesel-powered generators rather than natural gas and would result in increased impacts on air quality, not decreased impacts. |
| **TRAN 2** | 3.23.1.3.2 | 3.23-11 | …the Bethel general cargo dock and staging area are critical to the shipment of freight to the Delta. (City of Bethel 2011) The cargo dock is used for offloading and loading sand, gravel, and freight and is capable of handling and storing hazardous materials (City of Bethel 2011). | …the Bethel general cargo dock and staging area are critical to the shipment of freight to the Delta. The cargo dock is used for offloading and loading sand, gravel, and freight and is capable of handling and storing hazardous materials (City of Bethel 2011). |
| **TRAN 5** | 3.23.2 | Table 3.23-9 | Noticeable disturbance of displacement of<br>transportation access, mode, or traffic levels… | Noticeable disturbance or displacement of transportation access, mode, or traffic levels… |

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| TRAN 5 | 3.23.2.2.3 | 25 | The direct and indirect effects of the Donlin Gold transportation facilities on existing transportation systems would result in medium intensity impacts, due to noticeable congestion and limited displacement of current uses in narrow reaches of the Kuskokwim River at the Bethel Port facilities during the summer shipping season. The addition of project-related port facilities and dedicated barge vessels reduced the potential strain on existing infrastructure and displacement of current uses. | The direct and indirect effects of the Donlin Gold transportation facilities on existing transportation systems would result in medium intensity impacts, due to noticeable congestion and limited, intermittent displacement of current uses in narrow reaches of the Kuskokwim River at the Bethel Port facilities during the summer shipping season. The addition of project-related port facilities and dedicated barge vessels would reduce the potential strain on existing infrastructure and displacement of current uses.<br><br>*Suggest including some context to the reference to congestion taking into account the extent of all existing boat traffic and the limited number of barges given the scale of the river system* |
| TRAN 5 | 3.23.2.2.5 | 29 | …due to noticeable, but limited disturbance and displacement of existing uses from increases barge traffic… | …due to noticeable, but limited disturbance and displacement of existing uses from increased barge traffic… |
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| FSR 8 | 3.24 | | General | The inclusion of all resource areas in the spill discussion confounds and confuses the analysis and contributes to what is already a long and encyclopedic EIS. The benefit provided to the reader (decision-makers or the public) in terms of comparisons among alternatives is unclear. The alternative comparison, the basis for undertaking an EIS, is completely lost in this presentation. |

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| **HMZ 15** | 3.24 | Throughout | Probability of spill | The description of risk of spill is completely arbitrary since the document fails to provide a defensible description of spill probabilities. The footnote to Table 3.24-6 states "very high has a probability approaching one, very low has a probability of approaching zero." The average reader would benefit from some level of scale beyond 0 to 1. Does very high level mean the event is likely to occur once a week, day, or year? Would high levels be expected to occur once during the lifetime of the project or regularly? The likelihood of one or all of these scenarios – the roots of which all currently occur on some basis throughout the world – would be much more valuable and defensible if they were based on existing accident statistics. This is especially important because the data show that there is virtually no precedent for large spills of diesel fuel, mercury, and cyanide considering the measures Donlin will use to store, handle, and transport them. As such, they represent worst-case scenarios beyond the scope of NEPA and should be deleted from the document.<br><br>At a minimum, this assessment should be revisited to provide context to the likelihood of an incident occurring; the scale of 0 to 1 provides no value to the average reader. |
| **FSR 15** | 3.24 | Various locations | Spill response equipment would be kept at several locations along the access road. | The statement as it appears in the throughout this section of the DEIS is inaccurate and misleading. The specific location of spill response equipment has not been determined. The spill plan details will be developed as part of the detailed engineering process and will reflect the specific needs from a regulatory and a risk management standpoint. |
| **FSR 7** | 3.24 | 3.24-1 | …liquefied natural gas (LNG)… | LNG should not be included in this analysis. Liquefied natural gas is a subcomponent to one of the alternatives (not the proposed action) and even in that case would not be transported to the site but rather would be generated on-site within secondary containment. As such, there is essentially no spill potential and the analysis of spill impacts is beyond the scope of NEPA. |
| **EDIT 5** | 3.24 | 3.24-1 | …and dam tailings | "Tailings" or "tailings behind the dam." |

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| FSR 5 | 3.24.1.1 | 3.24-4 | The operator would prepare and provide an SPCC signed by a professional engineer to ADEC and U.S. Environmental Protection Agency (EPA) | The operator would prepare an SPCC Plan signed by a professional engineer.<br><br>We are unaware of a requirement to submit an SPCC plan to ADEC or EPA. |
| FSR 5 | 3.24.1.1 | 3.24-5 | Depending on the type of waste, there are numerous regulatory agencies and local government requirements that need to be addressed to maintain compliance, such as EPA, and ADEC (18 AAC 60, Solid Waste). Donlin has prepared an integrated waste management plan; but if needed, a waste management plan specific to the oil spill response would be drafted in the event of an oil spill. Where appropriate, this event-specific plan would be tailored to coincide with Donlin Gold's waste management plan. | Depending on the type of waste, there are numerous regulatory agency and local government requirements that need to be addressed to maintain compliance, such as EPA and ADEC requirements (18 AAC 60, Solid Waste). Donlin has prepared an integrated waste management plan for normal facility operations; but if needed, a waste management plan specific to the oil spill response would be drafted. Where appropriate, this event-specific plan would be tailored to be consistent with Donlin Gold's integrated waste management plan. |
| EDIT 5 | 3.24.2 | 3.24-9 | …to handle a spill of LNG, cyanide, mercury. | …to handle a spill of LNG, cyanide, or mercury. |
| FSR 15 | 3.24.3.1.2 | 3.24-13 | The projected frequency of large spills is greater than the life of the Donlin Gold Project; between once in 33 years and once in 1,000 years (ERM 2014). | Based on historical spill data, the projected frequency of a spill of between 1,000 and 10,000 gallons is greater than the life of the Donlin Gold Project; between once in 33 years and once in 1,000 years (ERM 2014). The distinction is important because in Table 3.24-1 large spills are defined as up to 100,000 gallons. |
| FSR 7 | 3.24.3.1.2 | 3.24-15 | In the event of a failure of the secondary containment simultaneously with a tank failure, or the failure of multiple tanks at once, it is possible, but unlikely, for a large amount of diesel to be released to the surrounding environment. | Given the requirements to maintain adequate secondary containment at all times, a simultaneously major failure of a tank and secondary containment represents a worst-case scenario and should not be considered in the Final EIS. At a minimum, the probability should be changed from "unlikely" to "extremely unlikely." See the language on page 3.24-137 |

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| FSR 15 | 3.24.3.1.3<br>3.24.3.1.4 | 3.24-16 | The decrease in barge volume would dramatically reduce the spill risks associated with diesel fuel transport. | Please provide an explanation as to why a decrease is spill rates would be dramatic rather than proportional to the change in barge traffic. This statement illustrates the confused use of "risk" in this section by equating the number of barges on the river with the risk. The entire section needs to explain risk more carefully and accurately. Moreover, as noted above, this should be based on actual precedent for spill occurrence, which is extremely low for Alternative 2. |
| EDIT 5 | 3.24.3.1.4 | 3.24-17 | …much more significant… | Significant in a NEPA context? Significance should be defined. |
| FSR 1 | 3.24.3.1.4 | 3.24-17 | Generally, pipelines are less prone to very large spills compared to trucks and railcars… | Table 3.24-1 indicates that a very large spill is greater than 100,000 gallons. Using that definition, neither a truck nor a typical tanker railcar could carry enough material to produce a very large spill. As such, what is the basis for this statement? |
| FSR 11 | 3.24.3.1.4 | 3.24-17 | Diesel fuel spills could occur… if a bulk carrier<br>tanker ran aground navigating to the Tyonek facility ... The carrying capacity of the tankers … However, only one or two barge compartments would be expected to fail in a grounding… | This discussion appears to be about tankers then switches to barges in discussing compartments – are storage compartments the same with tankers and barges? Same likelihood of spills from each? |
| FSR 15 | 3.24.3.1.4 | 3.24-17 | The potential for a spill risk due to a grounding of a river fuel barge is significantly reduced… | The analysis should reference the transportation or surface water hydrology discussion where the significant difference among alternatives related to the likelihood of grounding is discussed in more detail. Specifically, the analysis shows that the risk of grounding, let alone a spill, is very low. As such, we contend that the risk cannot be "significantly" reduced. |
| FSR 15 | 3.24.3.1.5 | 3.24-18 | This increased risk can be mitigated … requiring two-man driving teams, and ensuring no gaps in radio communication along the whole road. | The concept of requiring 2-man driving teams for a 76-mile long industrial access road is excessive and unnecessary. Donlin Gold would ensure that radio communications would be available along the entire access corridor. |
| FSR 15 | 3.24.3.2 | 3.24-20 | 3.24.3.2 Liquefied Natural Gas | This subsection is about LNG yet the introductory language talks about a spill of natural gas (rather than LNG) per unit mile. This is confusing – are we talking about natural gas or LNG? Sections 3.24.3.1, 3.24.3.3, 3.24.3.4 and 3.24.3.5 have no introduction. Section 3.24.3.2 would be more consistent with the other corresponding sections and less confusing if the introductory paragraph were eliminated. |

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| HZM 10 | 3.24.3.3.2 | 3.24-22 | Sodium cyanide is a USDOT Class 6 hazard, of which 9 metric tonnes were shipped nationally in 2007 (0.5 percent of all hazard material shipments). | This number (9 metric tons) doesn't seem reasonable. If Donlin Gold is proposing to use over 2,000 tons of sodium cyanide annually, it is difficult to believe that more cyanide is not transported annually in the USA since numerous gold mines in the continental US are likely to be using cyanide. This number should be validated. |
| FSR 15 | 3.24.3.3.2 | 3.24-22 | Cyanide used by Donlin Gold will be managed as described in the previous sections to minimize the environmental impacts. | What previous sections? The Draft EIS is too long and inconsistent in its organization for a statement like this to be of any value to the reader. |
| FSR 7 | 3.24.3.4.2 | Table 3.24-6 | All probabilities | Given the multiple levels of containment of mercury during storage and handling, there is a negligible risk of spill. As such, any spill large enough to be of consequence represents a worst-case scenario and the effects should not be evaluated in the Final EIS. Note that we are not aware of any precedent for a mercury spill under comparable conditions. |
| FSR 15 | 3.24.4.1.1 | 3.24-33 | …in the event of overwinter storage at Angyaruaq (Jungjuk) Port there would likely be transportation of diesel by tanker truck during the winter. | Unless one of the alternatives has been reconfigured to include trucking diesel (or transporting any cargo) during the winter, this reference should be deleted in the Final EIS. While the potential to store materials overwinter exists, Donlin Gold has no plan to transport fuel or supplies between the mine and port site during winter months. |
| FSR 4 | 3.24.4.2 | 3.24-34 | If a large amount of LNG is spilled on water within a short period of time, the relatively warmer temperature of the water will cause the LNG to rapidly transition to its gaseous phase, a process known as rapid phase transition (RPT). | Large amounts of LNG would not be in proximity to a significant water body; therefore, a release of LNG from the large storage tanks to a water body is unforeseeable. |

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| HZM 15 | 3.24.4.4 | 3.24-37 | … Care should be taken not to disperse the pools during the cleanup process, as that increases the evaporation rate. | This section reads like a book report. The purpose of an EIS is not to inform response teams about the proper clean up methods of spilled materials and this information does nothing to advance the EIS analysis. This section, similar to the one on cyanide, rambles without clearly defining its purpose (fate and behavior of SPILLED materials) and ultimately provides little value. Discussing the consequence of mercury emissions to ambient air in the context of spill (short-lived exposure) takes the analysis well beyond speculative. A more effective approach would be to focus the discussion on fate and behavior of material that could be spilled – elemental liquid mercury and mercury-impregnated carbon. The liquid mercury would be transported in specialized flasks or kegs (pigs) and while the mercury-impregnated carbon from the filtration system would be transported in sealed drums. Suggest refocusing this discussion on specifics directly relevant to spills. |
| EDIT 5 | 3.24.4.5 | 3.24-37 | There would likely be less possible reduced erosion… | Please rephrase this sentence. |
| FSR 15 | 3.24.4.5 | 3.24-37 | Impacts from fluids on the subsurface would be difficult to control or remediate. | Please clarify "the subsurface." |
| DAM 9 | 3.24.5 | 3.24-38 | …and dam tailings… | Either …and tailings… or …and tailings from behind the tailings dam… |
| FSR 7 | 3.24.5.1 | 3.24-40 | For a 2.94 million gallon barge with six equal sized compartments, this scenario would result in a release of 735,000 gallons of diesel. | Vast quantities of diesel fuel are transported annually in Alaska waters and there is no recent precedent for a spill of this magnitude in Alaska and virtually no precedent throughout the US. Therefore, this clearly represents a worst-case scenario and should not be analyzed under NEPA. At a minimum, the Final EIS should emphasize the extremely low/negligible probability of occurrence. |
| FSR 7 | 3.24.5.2 | 3.24-41 | As a result, approximately 50 percent of the cargo would ultimately be released to the river, accounting for 37,817 gallons. | See the previous comment; there is no recent precedent for a spill of greater than 10,000 gallons from river barging of diesel. Moreover, with double hulled barges, detailed barging procedures to avoid grounding, and spill prevention and control plans, the risk of a diesel fuel spill to the river from the Donlin Gold Project will be lower than other barging operations. As such, this represents a worst-case scenario that should not be analyzed under NEPA. At a minimum, the Final EIS should emphasize the extremely low/negligible probability of occurrence. |

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| FSR 15 | 3.24.5.3.4 | 3.24-43 | A low probability, very small volume (less than 10 gallons)…, this scenario could occur anytime during the year. | A low probability, very small volume (less than 10 gallons)…, this scenario could occur anytime during the *shipping season*.<br><br>Note that none of the alternatives consider shipping during the winter. |
| FSR 15 | 3.24.5.4.1 | 3.24-43 | A low probability, medium to large volume (up to 13,500 gallons), potential spill scenario is an accident resulting from a tanker truck rollover of major collision | A low probability, medium to large volume (up to 13,500 gallons), potential spill scenario is an accident resulting from a tanker truck rollover or major collision |
| FSR 15 | 3.24.5.4.2 | 3.24-43 | 3.24.5.4.2 TANKER TRUCK COLLISION | 3.24.5.4.2 MINOR TANKER TRUCK COLLISION |
| FSR 7 | 3.24.5.5.2 | 3.24-44 | Causes might include … a major earth movement (resulting from slides, an earthquake, or thaw settlement) | The pipeline would be designed and permitted to withstand a given level of seismic event. To assume that a properly designed pipeline would fail under designed conditions is not consistent with a NEPA analysis. To assume a larger than design event causing a pipeline rupture represents an unrealistic, worst-case scenario, which is also inconsistent with standard NEPA analyses. |
| FSR 4 | 3.24.5.6 | 3.24-45 | Fueling the LNG-fueled trucks may also be a source of frequent but very small to small spills. | Please clarify that an LNG fueling spill would occur on a hard surface within secondary containment. |
| FSR 15 | 3.24.5.6 | 3.24-45 | Rupture of a storage tank at the LNG plant would have the potential to release a maximum of 55,000 gallons of LNG (equivalent to the storage capacity of the tank). | Please note that the storage tanks would be located within secondary containment (as is stated in Section 3.24.5.3.1). |
| FSR 15 | 3.24.5.6 | 3.24-45 | Scenario 6 summarizes the potential spill or release causes, behavior, and potential impacts that might result directly or indirectly from the transportation and storage of LNG. | Scenario 6 summarizes the potential spill or release causes, behavior, and potential impacts that might result directly or indirectly from the site production, storage, and use of LNG. |
| FSR 7 | 3.24.5.7.2 | 3.24-46 | Rupture of a container and sodium cyanide contact with water would be considered a worst case event and extremely unlikely to occur. | See above comment, we agree with this conclusion. Since a worst-case scenario is inappropriate for consideration under NEPA, such a release to water from barges should be deleted from the Final EIS. Suggest ensuring that this finding is clearly stated in each section about resource impacts. We also believe that this applies to the lost cargo overboard scenario for mercury discussed in Section 3.24.5.8.1. |

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| **FSR 15** | 3.24.5.8.3 | 3.24-48 | A low probability potential spill scenario may result from transportation to Angyaruaq (Jungjuk) Port. | A very low probability potential spill scenario may result from transportation to Angyaruaq (Jungjuk) Port. *This reduction in probability is warranted given the low traffic on the road, the integrity of the mercury containers, and the multiple levels of containment.* |
| **HZM 10** | 3.24.6.1 | 3.24-54 | The dissolved sodium cyanide collected in secondary containment and properly disposed of would be considered to have low impact to bedrock, | Suggest clarifying how cyanide retained within secondary containment would have any impact on bedrock. This is the kind of inane analysis that contributes to the encyclopedic nature of the DEIS and should be eliminated from the Final EIS. |
| **FSR 15** | 3.24.6.1 | 3.24-54 | Overall impacts under Scenario 7 are considered minor to moderate. | This statement is included at the end of the discussion of a mercury spill (Scenario 8). The Final EIS should be clear whether this statement directed at Scenario 7 or Scenario 8. |
| **FSR 15** | 3.24.6.1 | 3.24-54 | Overall impacts under Scenario 7 are considered minor to moderate. | Assuming this should be Scenario 8, why is a corresponding statement not included for the cyanide scenario? If conclusions about impacts are included under one scenario, they should be included for all applicable scenarios. |
| **EDIT 5** | 3.24.6.2.1 | 3.24-56 | There would be no potential impact to soils in such scenario, given the sodium cyanide is… Water Quality. | There would be no potential impact to soils in such a scenario. |
| **SOL 2** | 3.24.6.2.1 | 3.24-56 | Therefore, spills at the marine terminal or the mine facility would be considered to have low impact to soils, and impact duration would be temporary due to readily available and immediate response measures and secondary containment. | Therefore, spills at the marine terminal or the mine facility would be considered to have negligible potential impact to soils due to readily available and immediate response measures and secondary containment.<br><br>*This is one of a number of places where impacts are projected to be low where there is essentially no potential for migration to soils.* |
| **EDIT 5** | 3.24.6.2.1 | 3.24-56 | If the sodium cyanide briquettes come into contact with water, the sodium cyanide would dissolve and a cyanide spill could result. | Under normal operating conditions, sodium cyanide briquettes would remain inside sealed tank containers. Those containers would be attached to the processing train as a unit; solution would be pumped into the tank, dissolving the briquettes. The sodium cyanide would remain inside a closed system through the entire process. Therefore any release of sodium cyanide briquettes from a tank is a cyanide spill (no water would need to be present). |
| **EDIT 5** | 3.24.6.2.1 | 3.24-57 | The liquid elemental mercury could collect in the secondary containment… | The liquid elemental mercury would collect in the secondary containment… |

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| AIQ 7 | 3.24.6.2.1 | 3.24-57 | Spent carbon would be very similar to sodium cyanide discussed under Scenario 7, | The similarity is not apparent. Spent carbon is very different from sodium cyanide in its chemical and physical characteristics. Also, this appears under the Mercury Release scenario – the conditions under which mercury would be separated from the carbon need to be considered for there to be a "release" of mercury. |
| AIQ 7 | 3.24.6.2.1 | 3.24-58 | Mercury is volatile, so such remediation may involve vapor recovery. | This statement is made in the context of a spill from a truck on the road from the mine to the Jungjuk port. Use of vapor recovery as remediation for such a spill is not likely. |
| EDIT 5 | 3.24.6.2.1 | 3.24-61 | Anaconda and Crooked Creek | Anaconda and Crooked creeks |
| EDIT 5 | 3.24.6.2.1 | 3.24-61 | …physical and chemically impaired soils | …physically and chemically impaired soils |
| EDIT 5 | 3.24.6.2.3 | 3.24-63 | …pipeline closure proceedings | …pipeline closure |
| EDIT 5 | 3.24.6.5.1 | 3.24-67 | …and would likely be completed by the time cleanup could be initiated. | …which would likely be completed by the time cleanup could be initiated. |
| CLA 8 | 3.24.6.5.1 | 3.24-68 | A temporary run out at dam at the Crooked Creek confluence | Needs rewording |
| FSR 15 | 3.24.6.5.2 | 3.24-69 | Under Alternative 3A, an uncontrolled release of LNG would not be affected by surface water hydrology, as the LNG released would dissipate into the atmosphere, provided that no ignition source triggers an explosion before the LNG dissipates. | Under Alternative 3A, surface water hydrology would not be affected by an uncontrolled release of LNG, as the LNG released would dissipate into the atmosphere, provided that no ignition source triggers an explosion before the LNG dissipates. |
| WAQ 29 | 3.24.6.6.1 | 3.24-73 | Potential secondary impacts to the biosphere from groundwater contamination would generally be limited to microorganisms found in the subsurface. | Here and a number of places in this section it should be recognized that the section relates to impacts to groundwater hydrology (not groundwater quality). |
| FSR 15 | 3.24.6.7.1 | Table 3.24-13 | General | Include the AWQS (aquatic life) of 5.2 ug/L for WAD CN. Also, because of applicability and the column header, suggest including only the AWQS not MCLs. |
| WAQ 27 | 3.24.6.7.3 | 3.24-104 | In summary, the overall impacts to sediment quality resulting from tanker truck release would be considered moderate if 13,500 gallons of diesel are released directly to the water. | Given the recent truck spill data presented in Table 3.24-3 and the limited areas along the access route with immediate access to water, suggest noting that a direct release to water is highly improbable. |

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| **WILD 8** | 3.24.6.7.3 | 3.24-138 | The summary impact level of a tank farm release on marine mammals would, therefore, be negligible to minor. | The summary impact level of a tank farm release on marine mammals would, therefore, be negligible.<br><br>*Given the probabilities, it is unclear how "minor" impacts could be reasonably foreseeable from a spill occurring within secondary containment (to assume a breach of secondary containment is a worst-case scenario and inappropriate for consideration under NEPA).* |
| **FSR 15** | 3.24.6.12.3 | 3.24-141 | Oil harms wildlife through physical contact, poisoning through ingestion or inhalation, destruction of food sources or habitat, and can cause long-term reproductive problems. | Oil harms wildlife through physical contact, poisoning through ingestion or inhalation, and destruction of food sources or habitat, and can cause long-term reproductive problems. |
| **WILD 8** | 3.24.6.12.3 | 3.24-143 | The summary impact level of an ocean barge rupture and large diesel release on birds could be major. | This is another place where it is important to emphasize the extremely low probability of a very large spill occurring – based on historical Alaska and US records. This comment also applies to the major impact conclusion for Scenario 2 on page 3.24-3. In addition, because of secondary containment, the effects of a tank farm release to birds should be minimal (not minor). These comments further apply to the characterization of impacts to fish and aquatic resources for scenarios 1-3 on pages 3.24-146-149, ESA protected and candidate marine mammals for Scenario 1 on page 3.24-162, and human health impacts on pages 3.24-200-201. |
| **FSR 4** | 3.24.6.12.3 | 3.24-144 | If a large amount of LNG is spilled on water within a short period of time, the relatively warmer temperature of the water will cause the LNG to rapidly transition to its gaseous phase. | This scenario should consider where a large amount of LNG would be in proximity to a significant water body in relation to the facility layout of the proposed project. Fuel tanks on the haul trucks are relatively small, and a release of LNG from the large storage tanks to a water body is very unlikely. |
| **WAQ 19** | 3.24.6.18.2 | 3.24-182 | Water contamination could also create drinking water bans, which would also negatively impact local business and consumers. | Given the scale of the modeled releases and the dilution afforded by the Kuskokwim River, it is highly unlikely that there would sufficient water quality impairment to necessitate a drinking water ban where water is used as a drinking water source. |
| **SUB 19** | 3.24.6.19.1 | 3.24-185 | Most of the travel area would be far from shore, and would have minimal effects of local commercial or subsistence fisheries. | Most of the travel area would be far from shore, and would have minimal effects on local commercial or subsistence fisheries. |

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| CUL 1 | 3.24.6.20.1 | 3.24-191 | The spill scenario could affect sites important in context (sites near the mine site and potentially along the Kuskokwim River), with long-term to permanent duration impacts. | Are there any cultural resource sites in the modeled path of the partial tailings dam failure release? Moreover, given that the majority of the release would be confined to the Crooked Creek watershed, suggest indicating how downstream cultural resource sites could be disturbed. Similar under scenario 4, what identified cultural sites could actually be impacted. As noted above, the probability of a spill at a specific location along the access road is extremely low. |
| HZM 14 | 3.24.6.22.1 | 3.24-202 | If elemental mercury is spilled, some of it would be emitted as gaseous mercury, which could be highly toxic to terrestrial mammals harvested by subsistence hunters. | Considering that a mercury spill could be such that volatilization could be at levels toxic to terrestrial animals takes the impact analysis into the absurd. This discussion is completely unsubstantiated and should be deleted. |
| PHL 14 | 3.24.6.22.1 | 3.24-202 | If a release occurred in summer, drinking water in Crooked Creek and other communities closest to the mine site could be adversely impacted if a release infiltrated subsurface materials. | This is a very general conclusion without any supporting data or analyses. The document should be clear as to which communities are at risk. Crooked Creek is immediately downstream from the mine site but the basis for determining how other communities may be affected is absent. Please correlate this statement with the characterization of water resources presented in sections 3.5, 3.6 and 3.7. |
| SUB 15 | 3.24.6.22.1 | 3.24-202 | A tailings release in winter could impede snowmachine travel by subsistence hunters from Crooked Creek | The basis for this statement is unclear. Residents of Crooked Creek would be excluded from the mine operations area as an ongoing matter of safety. The tailings dam failure scenario presented in the failure modes effects analysis (FMEA) did not show a tailings failure scenario where tailings would be deposited outside the immediate area of the mine site. Considering the dry closure proposed for the TSF, a post-closure failure is even more unlikely than one during operations. With these things considered, the analysis should reconsider whether and how a tailings release could affect subsistence hunters traveling by snow machine. |

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| **PHL 14** | 3.24.6.22.1 | 3.24-203 | A tailings dam release may involve injury or fatality | This is highly unlikely for the partial dam failure release scenarios described in the DEIS. First, monitoring would likely show conditions that could cause a failure well in advance of a release. Second, for a Class I dam, ADNR requires emergency management procedures to notify and protect local residents in the event of a failure. Third, it would take an extended period for tailings solids to reach downstream communities – such that there would be sufficient time to warn residents and take appropriate precautions to avoid injuries and deaths. |
| **FSR 6** | 3.24.8 | Table 3-24-27 | General | For the summary, it would be helpful to generate overall impact ratings that take into account not only the level of effect on each resource but also the probability of occurrence. |
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| **CLIM 6** | 3.26 | 3.26-2 | Overall, project impacts on climate change would range from minor to moderate for the mine site. | Greenhouse gas (GHG) emissions and climate change impacts are not interchangeable. The EIS is evaluating the former, and the additional GHG contributions discussed in Section 3.26 can be quantified. Further, using this arbitrary scale the DEIS may find that GHG emissions from the project may be minor to moderate when compared to emissions within the State of Alaska. However, this arbitrary rating of GHG contributions cannot be translated a conclusion that the project would have minor to moderate effects on climate change. The project's contributions from these specific emissions on a global scale are all minor and realistically imperceptible on a global scale. The Final EIS should be clear that the assessment is about GHG emissions in Alaska rather than "climate change." This clarification needs to occur throughout the section. |
| **CLIM 2** | 3.26.4.2.2 | 3.26-32 | …and its use and related structure design is governed by regulation. | …and its use and related structure design are governed by regulation. |
| **CLIM 13** | 3.26.4.2.2 | 3.26-34 | Because 2 to 3 years is adequate time to fix potential equipment problems, the likelihood of potential overflow of contaminated pit lake water to Crooked Creek is considered low to medium | Because 2 to 3 years is adequate time to fix potential equipment problems, the likelihood of potential overflow of contaminated pit lake water to Crooked Creek is considered low.<br><br>*Given the statement that there would be sufficient time to respond to a faster than anticipated fill rate (and associated need to treat and discharge pit lake water), a medium likelihood of an overflow is not justified.* |

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| **CLA 32** | 4 | All | General | As indicated on page 4-1, cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions" (40 CFR 1508.7)." As such, the EIS analysis should include not just the incremental effect of the proposed action and alternatives but also the *combined* effects when added to the impacts of other foreseeable actions. These combined effects do not appear to be clearly stated in the DEIS. |
| **EDIT 6** | 4.2.2 | Table 4.2-1 | Mineral exploration and mining has occurred in several locations in the Kuskokwim River basin, | Mineral exploration and mining have occurred in several locations in the Kuskokwim River basin, |
| **EDIT 6** | 4.2.2 | Table 4.2-1 | Continued attention to intercept fisheries affecting Kuskokwim River bound salmon. | Suggest rewording "attention to intercept fisheries" |
| **EDIT 6** | 4.2.2 | Table 4.2-1 | Upriver barging – Kuskokwim | Upriver barging – Kuskokwim River |
| **GEO 11** | 4.2.2 | 4-12 | Overall, the incremental contribution of Alternative 2 to cumulative effects to bedrock would be minor to moderate due to the localized, but large-scale changes in resource character. | Suggest noting the demand for the impacted resources is very low (and likely to remain so) for the foreseeable future. |
| **GEO 11** | 4.3.1.2.2 | 4-20 | Therefore, the additive incremental impacts attributable to Alternative 2 permafrost would be minor to moderate. | Therefore, the additive incremental impacts attributable to Alternative 2 permafrost would be minor.<br><br>*In the context of overall state-wide impacts, the contributions of the project are minor compared to the far reaching effects of global climate change.* |
| **HYD 11** | 4.3.1.5.2 | 4-26 | Thus, Alternative 2 impacts would result in minor to moderate cumulative effects on surface water hydrology overall. | Suggest noting that the incremental effects of the project on hydrological conditions in the Kuskokwim River would be minor compared to the combined impacts of other reasonably foreseeable natural and man-made actions on the river. |

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| **CLIM 6** | 4.3.1.8.1 | 4-35 | Overall, project impacts on climate change would range from minor to moderate. | Considering the world-wide nature of inputs of greenhouse gas emissions and their influence on global climate change, concluding that the project would have a moderate effect on climate change is an overstatement of effects. The document provides no justification for the finding, which should be independent of the size of the emissions in comparison to other projects in the state of Alaska. Simply being a large source of GHG emissions compared to the rest of the state does not necessarily correspond to a higher level of effect on a global level. |
| **NOI 2** | 4.3.1.9.1 | | | Blasting and machinery noise during operation is not addressed. |
| **NEP 7** | 4.3.2.1.1 | 4-38 | The contribution to vegetation cumulative effects for this alternative is considered moderate. | The contribution to vegetation cumulative effects for this alternative is considered minor.<br><br>*The contribution to cumulative effects from the project on vegetation is minor compared to the potential impacts to the hundreds of thousands to millions of acres that are likely to occur as a result of climate change and wildfires alone. This comment also applies to the rating applied to wetlands impacts.* |
| **WILD 6** | 4.3.2.3.1 | 4-39 | The contribution to cumulative effects on wildlife is also considered moderate. | The contribution to cumulative effects on wildlife is also considered minor.<br><br>*The contribution to cumulative effects from the project is minor compared to the impacts of other natural and man-made actions (including region-wide hunting practices and agency management actions)* |
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| **EDIT 7** | 5.1.2 | 5-3 | After development of the EIS, if the subsequent permitting phase determines that a permit would be issued, additional conditions, stipulations and/or requirements may be added that could act as further mitigation. Monitoring to assess that mitigation measures are achieving the expected results or monitoring for adaptive management shall be used as an assessment tool where applicable. Any such post-EIS requirements are not considered in this EIS. | The use of "shall" in this context is inappropriate and appears to be a directive applicable to those entities issuing permits rather than to the proponent. Use of the word "shall" should be reserved for use in specific permits or authorizations. The word used in this case is meaningless. |
| **CLIM 2** | | Table 5.2-1 | | I.D. M18. Update GHG reduction based on comments on Chapter 3.<br>I.D. M19. Update based on Page 3.8-65, Bullet #2 comment.<br>I.D. M20. Update based on Page 3.8-65, Bullet #3 comment. |
| **MIT 4** | Table 5.5-1 | 5-28 | Mit 24 - Where appropriate include mannagrass (*Glyceria striata*) species or other confirmed sensitive and rare plant species identified in the Project Area as part of the seed mix used in the Reclamation Plan to mitigate for loss of habitat. | Delete item in Final EIS. *Glyceria striata* can contain cynogenetic compounds and the plant has been associated with cyanide poisoning of livestock in the continental US. Because of the overall sensitivity to cyanide contamination surrounding this project it would be inappropriate to include a plant species with the potential (albeit remote) to cause cyanide poisoning in any organism. The species is common throughout North America and does not provide anything ecologically unique in terms of habitat; therefore, there is no compelling reason to include the species in the reclamation seed mixture. It should be noted that Donlin Gold's reclamation seed mix consists of native species and was developed with based on recommendations from the Plant Materials Center, the state's experts on the reclamation of disturbed lands in Alaska. |
| **MIT 2** | Table 5.7-1 | 5-41 | Mon 18 - Based on performance of the Seepage Recovery System in operations… | This would be a better fit as a mitigation measure rather than being placed under monitoring and adaptive management. The suggestion is not monitoring and adaptive management spells out a process for change rather than prescribing a specific solution. |

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| MON 1 | Table 5.7-1 | 5-41 | Mon 19 and 20 | Donlin Gold fully intends to monitor the effects of barge traffic not only with respect to barge speed but also with respect to other watercraft using the river. However, other than TKC, it is unclear how any of the other entities identified under Agency/Authority might have the jurisdiction to require these measures. |
| MON 10 | Table 5.7-1 | 5-42 | Mon 21 - Based on monitoring results, consider mitigation measures such as … | This is more appropriately broken in two as a monitoring suggestion and as a mitigation measure. Adaptive management refers to a process rather than the definition of a specific remedy (or remedies) as identified here. It is unclear that any of the entities identified have the regulatory authority to impose this requirement. |
| MON 10 | Table 5.7-1 | 5-42 | Mon 22 - Continue baseline project fish and water quality studies … if impacts occur beyond what are expected. | Considering the lack of specificity in the presentation of the impacts assessment, the process of defining impacts "beyond what are expected" would be subjective and arbitrary. Thresholds should be clearly defined or the measure deleted from the Final EIS. |
| MON 10 | Table 5.7-1 | 5-43 | Mon 23 - Predicting the level of potential effects on fish and aquatic resources requires additional analyses based on the type of tug and barge combinations proposed for the project in order to assess the locations, magnitude, character, and extent of vessel-generated turbidities. | The objective of the DEIS is to predict the level of potential effects. NEPA addresses uncertainty and the lack of data, which can and should be addressed as part of the analysis. Donlin Gold believes that for the purpose of NEPA, the analysis presented in the Draft EIS is sufficient to describe the effects of barge operations on turbidity and the full spectrum or other effects described throughout the document. The inclusion of this measure as presented is unwarranted and unjustified. |
| MON 10 | Table 5.7-1 | 5-43 | Mon 23 - If warranted, specific adaptive management measures to reduce adverse impacts would be considered. | The document does not state what entity would consider adaptive management. As noted previously, adaptive management refers to a process so to suggest that specific measures would be considered voids the entire concept of adaptive management replacing it with a series of prescribed mitigation measures. The statement should be rephrased either as a mitigation measure defining specific steps or with recognition that adaptive management is a process through which operational changes could be considered. |
| MON 10 | Table 5.7-1 | 5-43 | Mon 24 - Fish tissue monitoring should include development of site-specific bioaccumulation factors for methylmercury evaluation. | Development of site-specific bioaccumulation factors is highly complex, especially where anadromous species are involved. This is beyond the Corps' expertise and should be left to the appropriate state agency as part of a biomonitoring program required under the APDES or other state permit. |

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| MON 10 | Table 5.7-1 | 5-43 | Mon 24 - Contingency measures (adaptive management) should be developed and defined if impacts occur beyond what are expected. | Considering the lack of specificity in the presentation of the impacts assessment the process of defining impacts "beyond what are expected" would be subjective and arbitrary. The threshold should be clearly defined, for example "if mercury levels in the discharge exceed APDES permit limits." If thresholds can't be clearly defined, the measure should be deleted from the Final EIS. |
| MON 10 | Table 5.7-1 | 5-43 | Mon 25 - Monitor reclaimed construction areas and other previously disturbed sites for revegetation to meet visual resource objectives. | Visual resource objective is not defined in the Draft EIS so this measure is without context or meaning. Further, unless a citation is provided to the contrary, Donlin Gold considers the application of this measure project-wide as outside the authority of ADNR and BLM, even if the terms was defined. |
| MON 10 | Table 5.7-1 | 5-43 | Mon 25 - Take remedial action where expected revegetation success is not achieved. | This aspect of the measure is unreasonably broad and poorly defined. The definition of "expected revegetation success" should be defined per applicable unit (i.e., state land, etc.) |
| MON 10 | Table 5.7-1 | 5-43 | Mon 26 - Socioeconomic monitoring: Monitor socioeconomic conditions (population, demographics, employment, income, education, and health indicators) in Y-K villages using existing/annually updated state and federal statistics. | The purpose of this measure is unexplained. There is no authority upon which to base the measure and no clear rationale for even including it. The measure should be eliminated from the Final EIS. |
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| AIQ 7 | Appendix I | Table 1: Emissions Units Subject to NSPS/NESHAPS. | | 40CFR60, Subpart Dc: Add the two power plant auxiliary heaters (PP-HEU-100, 200).<br><br>40CFR60, Subpart LL: Add SAG mill feed conveyor (16-CVB-300). Remove the following sources: 16-BIN-350, 16-FEE-550, 560, 570.<br><br>40CFR63, Subpart JJJJJJ: Remove, it's not applicable.<br><br>40CFR63, Subpart EEEEEEE: Add the pregnant solution tank (56-TNK-518).<br><br>The Air Sciences Inc. 2015a reference (deposition memorandum) underneath Table 1 is not relevant. The other two references also seem irrelevant to Table 1.<br><br>Suggest the author(s) refer to PSD Application Section 4 (Regulatory Analysis) to assist in this revision. |
| | | | | |
| ANIL 6 | Appdx N | None | None | The Section 810 analysis should formally consider the fact that part of the reason for development of the Donlin Gold Project is to fulfill the economic benefits to Alaska Natives intended through the Alaska Native Claims Settlement Act (ANCSA) in exchange for settling aboriginal claims to the land. The mine is not proposed to be built on state or federal lands but rather ANCSA corporation lands for the specific reason of realizing the obligation of ANCSA. |

Attachment 1

Owl Ridge Natural Resource Consultants – Evaluation of DEIS Section 3.13

## MEMORANDUM

**To:** Enric Fernandez – Senior Environmental Coordinator
Donlin Gold LLC

**From:** William Morris – Senior Aquatic Scientist
Owl Ridge Natural Resource Consultants, Inc.

**Date:** May 17, 2016

**Subject:** Evaluation of Draft Environmental Impact Statement – Donlin Gold Project, Section 3.13, Fish and Aquatic Resources

## INTRODUCTION

Owl Ridge Natural Resource Consultants, Inc. (Owl Ridge) has prepared this memorandum on behalf of Donlin Gold LLC (Donlin Gold). The purpose of the memorandum is to present our review comments of the Donlin Project (Project) Draft Environmental Impact Statement (DEIS) (US Army Corps of Engineers, 2016), Section 3.13, Fish and Aquatic Resources.

This memorandum presents excerpted information from the DEIS regarding impact analyses and determination of impact levels, Owl Ridge comment(s) on the DEIS statements, and a supporting narrative that explains the reason(s) for the Owl Ridge comment. All baseline environmental data used in support of Owl Ridge comments, not referenced otherwise, are based on OtterTail, 2014. The information is organized by Project component (as in the DEIS): Mine Site and Transportation Facilities. Owl Ridge has no comments on the DEIS regarding impacts from the proposed natural gas pipeline to fish and aquatic resources.

### DEFINITION OF IMPACT LEVELS

The DEIS provides the following definitions of impact levels (DEIS Section 3.0.4.2):

- *No effec*t: The alternative would not affect the resource.
- *Negligible*: Impacts are generally extremely low in intensity (often they cannot be measured or observed), are temporary, localized, and generally do not affect unique resources.
- *Minor:* Impacts tend to be low intensity, of temporary duration, and local extent, although common resources may experience more intense, longer-term impacts.
- *Moderate*: Impacts can be of any intensity or duration, although common and important resources may be affected by higher intensity, longer-term, or broader-extent impacts. Unique resources may be affected by medium or low intensity

impacts, shorter duration or intermittent episodes of impact over a long period, at a local or regional scale.

- *Major*: Impacts are generally medium or high intensity, long-term or permanent in duration, a regional or extended scope, and affect important or unique resources.

Impact level determination for each potential effect includes an analysis of the effect intensity, duration, geographic extent, and resource context (common, important or unique resource), as described on pages 3.0-3 through 3.0-5 of the DEIS.

## OVERALL COMMENT

Based on our review and evaluation, the primary comment is: There is inconsistency between the impact analyses and results, as compared to the determination of impact level. This is particularly noteworthy regarding potential effects of Project transportation on fish in the Kuskokwim River.

**FISH 2** The impact analyses for the DEIS and discussions of potential effects to fish and Essential Fish Habitat (EFH) within Crooked Creek and its tributaries fails to place potential Project-induced changes to fish habitats within the context of: the natural variability of the drainage; the overall contribution to Crooked Creek fish production from specific tributaries; or fish populations of the Kuskokwim River. Determination of summary impact levels should be consistent with results of the detailed analyses of potential impacts to fish.

## MINE SITE

### DEIS page 3.13-2 (Synopsis)

- Alternative 2 – Donlin Gold's Proposed Action: The overall effect of the mine site component on fish and aquatic resources of the Crooked Creek drainage is expected to be moderate.
- Other Alternatives – The effects of other alternatives on fish and aquatic resources would be similar to those of Alternative 2.

### Owl Ridge Comment 1

**FISH 2** The description in the DEIS of potential effects to fish and aquatic resources, including discussions regarding the magnitude and distribution (extent) of effects, does not support a moderate level of impact to fish. An overall potential impact level of minor is supported by the results of the analysis.

## Discussion

### Direct Loss of Fish Habitat

*Few salmon will be directly affected by mine site development*.

The Crooked Creek drainage represents 0.07% of the Kuskokwim River and fish populations in the drainage probably make up an overall smaller proportion of Kuskokwim River fish populations, as the drainage is characterized with higher overall turbidity and sediment than other similar-sized Kuskokwim River drainages (OtterTail 2014). Overall salmon escapement for the Kuskokwim River is not established, so direct comparisons of Crooked Creek salmon contribution to the Kuskokwim River populations are not possible. However, when comparing streams with established escapement goals for Chinook and coho salmon, Crooked Creek contributes a relatively low percentage of salmon. Chinook salmon escapement is established for 14 populations in the Kuskokwim River. Crooked Creek contributes 0.5% of that total Chinook escapement, with weir counts in Crooked Creek averaging 59 Chinooks annually between 2008 and 2012. Only three coho populations within the Kuskokwim drainage have established escapement goals and Crooked Creek contributes between 3.4% and 4.9% of the combined total of those three populations. Annual weir counts for coho salmon in Crooked Creek averaged 1,634 fish between 2008 and 2012.

*Minimal salmon habitat will be lost from Crooked Creek tributaries*.

Approximately 8 miles (mi) of tributary stream habitat within the Crooked Creek drainage would be removed by constructing the tailing storage facility (TSF), constructing the waste rock facility (WRF), and excavating the pit. Of stream habitat directly removed by mining, American and Anaconda creeks are the only tributaries with documented fish habitat, including juvenile coho rearing. Results of analyses in the DEIS indicate that most segments of filled stream are non-fish bearing, but that in some years, habitat for up to an estimated 200 juvenile coho could be removed, thus displacing those fish. Those estimates are extrapolated from catch data collected at discrete 300-foot-long sampling reaches established within mine area streams. Estimates of total coho production for the drainage are not available, but comparison of coho catch rates for the overall drainage and habitats removed by mining indicates that habitats proposed for removal are not significant producers of coho salmon. Between 2004 and 2014, drainage-wide sampling averaged 405.1 coho per all 300-foot stream reaches combined. On average, American Creek contributed 6 (1.48%) coho per 300 feet and Anaconda Creek contributed 0.1 (0.02%) coho juveniles per 300 ft. All coho juveniles were captured in the lower sampling reaches of both creeks, nearest their confluences with Crooked Creek. No other salmon species were captured in stream habitats that would be removed by mine development.

*Mine Site development will have little effect on resident fish species.*

Catch rates for most resident fish species also were generally low in American and Anaconda creeks. Slimy sculpin were the most common species captured in the Crooked

Creek drainage between 2004 and 2014, with an overall average annual catch of 2,185 fish. On average, American Creek contributed 41 (1.9%) and Anaconda Creek contributed 12.4 (0.6%) slimy sculpin annually – some of the lowest catch rates encountered in the drainage. Dolly Varden are the next most commonly captured species in the Crooked Creek drainage, averaging 205.4 fish annually with all sample sites combined. The furthest downstream sampling site in American Creek contributed 8.2 (4%) Dolly Varden, while the upper-most reaches contributed zero fish. However, one sampling event was conducted in the middle reach of American Creek in 2012, and 57 individual Dolly Varden were captured, indicating that a high number of Dolly Varden could potentially reside in portions of American Creek. On average, Anaconda Creek contributed 4.8 (2%) Dolly Varden to average annual catches. Other resident fish species were captured in much lower numbers.

*The overall contribution of fish production in the Crooked Creek drainage from American and Anaconda creeks is exceptionally low for salmon and low for resident fish species. In terms of overall Kuskokwim River production, contributions from Crooked Creek are negligible.*

**FISH 2** The potential loss of habitat for 200 coho juveniles and other resident species would be immeasurable in terms of Crooked Creek and Kuskokwim River fish populations which, by the definition used in the DEIS, would be a negligible impact.

**Indirect Effects of Flow Reductions on Fish and Aquatic Resources**

*Potential flow reductions would have minor effects on aquatic resources in the Crooked Creek drainage.*

Predictions of seasonal flow and water surface elevation reductions all fall within the observed natural variability of Crooked Creek. Therefore, we conclude these flow reductions would have minor impact on fish, fish habitats, and aquatic resources. Over the life of the mine, reductions in summer and winter baseflows in the Crooked Creek drainage are anticipated and addressed in the DEIS by stream reach. Reductions would be most extreme later in the mine life as pit depth and dewatering become more extensive. Reaches between American Creek and Omega Gulch are anticipated to see the highest potential reductions while habitats below Omega Gulch, below both the proposed discharge and Crevice Creek, would experience more attenuated reductions because of inflow from the summer discharge and year-round flow from the major tributaries Getmuna and Bell creeks.

During the 10-year low flow winter scenario at Year 20 of the mine life, the water surface elevation reduction in Crooked Creek between American Creek and Omega Gulch is estimated to be 1.5 inches while historic undisturbed flows show winter water surface elevations naturally vary between 14.6 and 8.3 inches. A 1.5-inch reduction in winter water levels in this reach is well within the natural range of flows observed. Summer water levels in this reach are predicted to be reduced by about 1 inch at the 10-year low flow at Year 20 of mine life. Undisturbed summer low-flow water surface elevations naturally range

from 19.3 to 12.3 inches. Potential mining-induced reductions in summer water levels are well within the natural variability of the drainage.

The potential effects on fish habitat of these water level changes would be minor when compared to the existing conditions observed annually in the drainage. Only by relying on the high bedrock groundwater conductivity model (High K scenario) for mine Year 20 can potential flow reduction impacts be characterized as major because the model indicates that during winter Crooked Creek would be dry. However, analysis of the High K scenario model indicates poor model fit, poor baseline data fit, and overall poor predictive capability (BGC 2014). The scenarios of flow reductions described above, based on the base case, provide the best model fit and are more likely to accurately predict flow reductions for Crooked Creek.

*Stream flow reductions related to the Mine Site would have little effect on salmon spawning.*

Reductions in baseflow in Crooked Creek are predicted to have the most potential for effects to aquatic resources in the middle reaches of Crooked Creek between American Creek and Crevice Creek. Inflow from other streams would overshadow the flow reductions below Crevice Creek and no reductions of flow would occur upstream from Snow Gulch. The middle reaches of Crooked Creek could experience up to 11% to 25% and 25% to 33% reductions in flow during summer and winter, respectively. The majority of documented salmon spawning occurs below Crevice Creek where reductions in flow are anticipated to be minor, or upstream from this reach where mine activities would have no effect on flow. Summer Chinook and chum salmon redd counts conducted in 2009 through 2014 in Crooked Creek, reported an average of 165 redds; 95% of which occurred downstream from Crevice Creek. Fall coho salmon redd counts reported an annual average of 288 redds in the Crooked Creek drainage. Sixty-five percent (65%) of all fall redds occurred in areas that would be unaffected by mining, with 20% in the upper drainage of Donlin Creek, 25% in Getmuna Creek, and 20% in Bell Creek. Fall aerial surveys for coho salmon adults, while a snapshot in time, further indicate that in the Crooked Creek mainstem, including Donlin Creek, most coho spawning occurs upstream from reaches anticipated to see the highest reductions in flow. On average, 68.5% of coho adults were found upstream from Flat Creek in Donlin Creek, 21.5% in the middle reaches of Crooked Creek between Flat Creek and below Eagle Creek, and 10% in lower Crooked Creek. Nearly 80% of coho spawning occurs in areas with little or no potential for flow reduction.

Potential impacts on salmon spawning would be minor because the majority of salmon spawning in Crooked Creek occurs below the confluence of Getmuna Creek where reductions in flow would be much lower, or upstream of Flat Creek where there would be no reduction in flow. Reductions in baseflow can affect stream character, stream habitats, and fish as described in the DEIS sections. However, it is important to recognize the natural variability of the Crooked Creek drainage in terms of its annual flow regime. A comparison between predicted reductions in baseflow and naturally occurring variability

in stream flows and water surface elevations shows reductions would occur well within the natural variation of observed stream flows.

The potential loss of eggs from spawning areas that become dewatered during winter and allow freezedown into the substrates of redds was analyzed for and addressed in the DEIS. However, this condition already occurs in some reaches of middle Crooked Creek, and likely partially explains why most salmon spawning occurs either upstream or downstream of the reach. While winter baseflow reductions could lead to additional substrate freezedown, anticipated flow reductions, as discussed above, would still be within the natural variability of the system and would not alter drainage fish production or survival to any measurable extent.

*The primary fish habitat documented in the middle reaches of Crooked Creek is for juvenile coho salmon and resident fish species rearing.*

Slimy sculpin, juvenile coho salmon, and Dolly Varden were the most frequently captured species in sampling of the Crooked Creek drainage. The middle reaches of Crooked Creek, described above, annually contributed about 40% of sculpin, 41% of juvenile coho salmon, and 4.8% of Dolly Varden captured. The overall contribution of juvenile coho salmon within this reach is somewhat overrepresented above because of one large catch of 832 juveniles in 2009 which substantially increased the annual average. It is important to note that far higher numbers of juvenile coho salmon were captured in backwater habitats connected to Crooked Creek and that those fish numbers are not accounted for above. Backwater habitats would be unlikely to be affected by mine operations. Flow reductions within this reach during summer are unlikely to substantially reduce available habitat to outside of background annual variation. Only in the high groundwater conductivity modelling scenario discussed above, would available habitats be substantially reduced.

**Summary**

DEIS sections describing the overall impacts of direct and indirect loss of fish habitat, and flow reductions in Crooked Creek all suggest that in Crooked Creek below Crevice Creek, and particularly below Getmuna Creek, effects to fish and fish habitats would be low. The DEIS discussion indicates that between Queen Gulch and Anaconda Creek, impacts could be moderate to even major; however, the most substantial use of these areas by fish is for rearing, which is not a limiting habitat type in the drainage. Fish habitat actually lost to mine development would primarily consist of much of American Creek, which, as estimated in baseline studies, could provide habitat for up to 200 age-0 and age-1 coho and some resident species. The total removal of that habitat would not equate to a complete loss of fish because alternative habitats would remain available in mainstem Crooked Creek or other tributaries. Even middle reaches of Crooked Creek that would experience the most significant flow reductions would still offer rearing habitat for all species in the drainage. Furthermore, as stated in the DEIS sections on Crooked Creek,

permit conditions associated with water management would further help reduce potential impacts.

On page 3.13-124 of the DEIS, under the Summary of All Mine Site Area Impacts, the discussion concludes that, while some tributary streams and reaches of Crooked Creek could see potential impacts from low to high, overall impacts to Crooked Creek in the broader context of the Kuskokwim River would be minor. However, in the Section 3.13 Summary of Impacts, the overall impacts are described as moderate.

**HYD 5** The DEIS analysis does not support an overall moderate impact level to Crooked Creek. Only in the unlikely High K scenario would impact levels to the drainage exceed minor and, as discussed previously, that model provides poor predictive capabilities and does not fit the system. Because of the relative minor value of habitats directly lost to mining, the relative lower value of habitats potentially most affected by flow reductions, and the minor alterations in summer and winter water levels, impacts to Crooked Creek fish and fish habitat would be minor and impacts to Kuskokwim River fish and fish habitat would not be measurable.

**FISH 2**

## TRANSPORTATION FACILITIES – BARGING

### DEIS page 3.13-2 (Synopsis) (page 3.13-2 and 3.13-3)

Because the nature and intensity of potential impacts of barge traffic would vary based on a range of factors, the overall effects on fish and aquatic resources, which may be minor, are characterized as "conservatively moderate."

### Owl Ridge Comment 2

**FISH 2** The DEIS descriptions and analyses of potential effects do not equate to a moderate potential effect on fish resources. An overall potential impact of negligible to minor is supported by the results of the analyses.

### Discussion

**FISH 5** The DEIS indicates that while overall effects on fish and aquatic resources may be minor, the effects have been conservatively categorized as moderate, because of the potential for varying and potential impacts of barging. However, the DEIS analyses methods and discussions provide no reason to be overly conservative in determining impact level.

**FISH 5** Analyses of potential barge-induced effects on fish and aquatic resources do not support a determination of an overall moderate level of impact. The fish injury and mortality section summarizes the potential barge related effects as ranging from negligible to moderate, the only section in the DEIS where a potential for a moderate level of impact is hypothesized. Ultimately, the overall analyses of transportation-related effects is then summarized as moderate.

The DEIS addresses potential effects from barging activities on fish and aquatic resources in the mainstem Kuskokwim River and the potential effects of vessel wave energy,

propeller generated energy (prop wash), and their associated potential to cause fish mortality either directly or through displacement and stranding of fish. Section 3.13.3.2.5,

HYD 5

Summary of Impacts for Alternative 2, provides overall effects summaries for the wave energy and prop wash as medium to high. No analyses described in the DEIS exceed the moderate level of effect. Rather, results of analyses indicate that most effects would be negligible to minor.

The DEIS summarizes the potential effects related to barging as stated below:

> "Impacts of a medium to high level of intensity could result from:
>
> - barge traffic waves and turbulence that could displace or strand young-of year salmon or degrade shoreline water quality along shorelines of confined segments of the Kuskokwim River navigation channel (four of five of the narrowest channel segments are located at or upriver from Birch Tree Crossing);
> - riverbed scour and degradation of aquatic habitat, in areas utilized for rainbow smelt spawning and egg-incubation in late May and June as a result of tug propeller forces along the navigation channel where depths are shallow and generally less than about 8 -10 feet; and
> - potential injuries or mortalities from tug propeller shear forces when small young-of-year salmon or resident fishes are migrating in dense concentrations, particularly where barge traffic is passing through constricted channel segments of the river."

**Vessel Wave Energy**

DEIS Section 3.13.3.2.2 Transportation Facilities subsection Vessel Wave Energy, discusses various potential mechanisms for barge-produced wave energy to affect fish habitats along the Kuskokwim River. Potential effects include increased bank erosion rates, bed scour, and changes to thermal and water quality conditions. The analysis section concludes on page 3.13-134 that anticipated impacts from wave forces on nearshore erosion, suspended sediment levels, turbidity, and fish rearing habitat water quality would be minor and further, on page 3.13-134, concludes that potential effects to fish nearshore rearing habitat based on temperature effects would be negligible to minor.

BARG 12

However, in the summary of impacts for Alternative 2 on page 3.13-165, the DEIS states:

> "Impacts of a medium to high level of intensity could result from barge traffic waves and turbulence that could displace or strand young-of year salmon or degrade shoreline water quality along shorelines of confined segments of the Kuskokwim River navigation channel."

The analysis presented in the DEIS of habitat effects from barge waves correctly concluded that, based on the high natural turbidity and sediment levels in the Kuskokwim

**BARG 12 cont.** River, effects to aquatic organisms including juvenile fish and their rearing habitats would be minor. The summary statement that overall impacts on habitat would be medium to high is not supported by prior analyses or conclusions.

In the DEIS, all results of analyses of vessel wave energy effects on fish and fish habitat along the barge channel conclude that the overall effects would be negligible to minor with the exception of fish displacement and stranding. Section 3.13.3.2.2 (subsection Fish Displacement and Stranding), discusses the various potential mechanisms and wave heights required to lead to fish stranding. Wave heights for barges are predicted to be between 0.6 and 1.3 inches high for upstream moving barges and between 4.1 and 8.9 inches high for downstream moving barges. Wave height predictions have not been calculated for all reaches of the river but areas considered are within some of the pinch points identified as having potential to cause fish stranding. On page 3.13-137, the DEIS states that wave heights from barges are not expected to be sufficiently high (greater than 1 foot) to cause stranding and concludes that evidence of stranding and displacement could be detected at low intensity during salmon smolt migrations. The section then concludes on pages 3.13-137 and 3.13-138, that vessel wake impacts on fish would range from negligible to possibly moderate. Wave height analyses clearly indicate that wave heights will not be high enough to strand fish, therefore, potential impacts of barge induced stranding should remain assessed as negligible. Based on the supporting information, strandings would not be expected.

In addition, smolt outmigration studies referenced in the DEIS found that smolt numbers in mainstem Kuskokwim River habitats were highest in mid-May through early June and dropped to essentially absent by July. Only chum smolt were present in relatively high numbers by mid to late June, though numbers were lower than peaks encountered during early season sampling (Owl Ridge 2015 a). In addition, 95% of chum smolt captured in mid to late June sampling were over 40 mm long, larger than size classes most susceptible to wake induced displacement and stranding (Owl Ridge 2015a). Because Donlin barging would not typically be initiated until June, the majority of salmon smolt would no longer be within the areas of concern for potential stranding or would be large enough to avoid stranding, further reducing the potential for displacement and stranding related impacts to salmon.

**FISH 2** All analyses of barge wake induced effects on fish, fish habitat, and water quality support an overall negligible potential impact. The majority of salmon most susceptible to barge wave displacement and stranding would have largely moved out of the river by initiation of barging and predicted wave heights are not large enough to strand salmon smolt or other juvenile fish using the river margins during summer.

**Prop Wash, Bed Scour, and Fish Injury/Mortality**

DEIS Section 3.13.3.2.2 (subsection Prop Wash, Bed Scour, and Fish Injury/Mortality), discusses the potential mechanisms for barge prop wash energy to affect fish and fish habitat. Primary mechanisms include displacement of river bed substrates and organisms

associated with that substrate, including fish eggs, particularly rainbow smelt eggs in the vicinity of Kalskag, and direct mortality of individuals that experience propeller entrainment.

Analyses of bed scour from propeller wash show that with depths greater than 10 ft below keel, bed scour of medium to coarse gravel is eliminated. The analysis also shows that propeller wake energy would extend laterally about 44 ft on either side of the propeller.

**BARG 4** The discussion states that annual flooding, barge, and small boat navigation likely already disturbs much of the area most susceptible to Donlin barge propeller energy erosion and scour, and concludes that effects would be negligible. The text continues to conclude that in areas not subject to prior disturbance by flooding, local barges, and small boats, that effects could be moderate to major. However, Donlin barges would travel the same routes used by local barges and the same areas that would be affected by seasonal flooding. Potential effects should not be elevated to moderate based on the hypothetical scenarios proposed. Rather, potential effects should be stated as negligible as supported by the results of the analysis.

Further, rainbow smelt spawning surveys in 2014 and 2015 found that smelt spawned in mixed gravel substrates with more than half of sites sampled showing components of large gravel which would be more resistant to erosion as described in the DEIS (Owl Ridge 2015b). In 2014, rainbow smelt spawned just above Kalskag along the margins of the main channel in average water depths of 8.5 ft, however, most spawning occurred at locations greater than 44 ft from the barge channel and so would be unaffected by bed scour from barges. In 2015, rainbow smelt spawning surveys found that smelt spawned in two locations downriver from lower Kalskag, in narrow river segments with large gravels and at a deeper mean depth of 14.5 feet (range 8.7 to 23.4 feet). While spawning occurred closer to the barge channel in 2015 at one spawning location, most spawning occurred within gravels and at depths less susceptible to scour (Owl Ridge 2015b). The other 2015 spawning location was in a side channel separated from the main channel by an island and would not be exposed to any barge-related effects.

Donlin Project-related barge travel is expected to begin in early June, at which point smelt spawning would be complete. Rainbow smelt spawning was complete by May 22 and May 30 in 2014 and 2015, and water temperatures at spawning were 11.1 and 12.5 °C. Smelt eggs incubate for 8 to 30 days before hatching, depending on water temperature, with hatching occurring in 11 and 8 days at water temperatures of 12 and 16.5 °C respectively (USFWS 1989). In 2015, by June 3, water temperatures had increased to 15.2 °C. Given the water temperatures at the time of spawning and the rapid warming trend through early June, smelt eggs probably hatch sometime within 8 to 14 days after spawning. Most smelt eggs would be hatched and out of the gravel very early in the barging season or potentially prior to barging in some years. Because of the spatial and temporal separation of smelt eggs from the majority of barging activity, an overall negligible level of impact would be expected. Direct mortality from propeller energy entrainment of fish is also discussed in the section and, on page 3.13-153, is assessed to be negligible to moderate. The basis of

the moderate level of impact is related largely to the seasonal outmigration of salmon smolt, which leads to high concentrations of smolt potentially susceptible to lethal propeller forces. On page 3.13-165, the DEIS summarizes as follows:

> "Impacts of a medium to high level of intensity could result from (fourth bulleted statement): potential injuries or mortalities from tug propeller shear forces when small young-of-year salmon or resident fishes are migrating in dense concentrations, particularly where barge traffic is passing through constricted channel segments of the river."

While some smolt would be susceptible, salmon smolt surveys conducted in 2015, that targeted narrow portions of the river, clearly show that salmon smolt numbers were low in all mid-channel samples collected. The majority of juvenile salmon were along main channel shorelines and in side channels in late May through early June and nearly absent from the river by July (Owl Ridge 2015a). Furthermore, Chinook, coho, and sockeye salmon captured in mid-channel areas were all large enough to avoid barges. Migration and use of mid channel habitats by other fish species is anticipated to be similar because the highly turbid surface waters of mid-channel habitats would not attract fish for rearing.

**FISH 2** While larval and age-0 fish could be present, literature presented in the DEIS indicates that mortality and injury of larval fish have not been consistently detected from barge propeller forces. Because barging would not typically commence until early June and because the vast majority of salmon smolt would not be present in mid-channel habitats, the overall potential for propeller energy induced injury and mortality to Kuskokwim River salmon would be negligible.

## Summary

**BARG 4** The overall effects summaries presented in Section 3.13.3.2.5, Summary of Impacts for Alternative 2, indicate that barge-related effects would be medium to high in intensity and potentially up to moderate overall. However, these impact levels, are not supported by the results of the effects analyses. Potential effects of barge wakes and propeller energy, as described in the context of resource presence in the main channel of the Kuskokwim River, would be negligible to minor.

**FISH 2** Wave energy would not be expected to strand fish, propeller energy impacts to smelt egg survival would be negligible, and propeller-induced injury and mortality would be negligible. No detectable effects on the Kuskokwim River fish population level would be anticipated.

## OTHER MINOR COMMENTS (BY PAGE IN DEIS)

## Owl Ridge Comment 3

**FISH 7** Page 3.13-40:

> "This also is consistent with field studies conducted in the Kuskokwim River during 2015 (May 15 to June 4 and June 19 to 25) where 80 percent of the fish collected in nearshore seine hauls were outmigrating juvenile salmon."

**FISH 7 cont.**

Comment: A reference is needed to support the above DEIS statement.

### Owl Ridge Comment 4

**FISH 2**

Page 3.13-43:

> "During 2015, rainbow smelt also spawned in late May but at two locations downriver from lower Kalskag, in narrower river segments with coarse gravels and at a deeper mean depth of 14.5 feet (range 8.7 to 23.4 feet) near the thalweg where barge traffic would travel (Owl Ridge 2015a)."

Comment: One of the spawning locations in 2015 was in a side channel behind an island remote from the main channel and not able to be affected by barge traffic. Text should be added to state that average depths for the other spawning location were below the depth expected to experience significant prop wash induced sediment displacement.

### Owl Ridge Comment 5

**FISH 7**

Page 3.13-61: The first paragraph discusses rearing habitats identified within the mainstem Kuskokwim River and references the Anadromous Waters Catalog as the source.

Comment: It should be noted here that references to rearing in the AWC are not necessarily based on fish use of habitats rather they are based on size and age classes of fish and their presence. As such, outmigrating smolts captured in a turbid river system would be cataloged as rearing, although they may solely be outmigrating, not rearing in a true biological context.

### Owl Ridge Comment 6

**FISH 9**

Page 3.13-66: Mercury Section. Summer and winter mercury concentrations in burbot are compared in the DEIS.

Comment: There is no indication whether metals analyses were conducted on a wet or dry weight basis. Wet weight basis metals concentrations would be expected to differ seasonally based on fish conditions and life history status at the time of collection, all of which can substantially alter fish body moisture content and hence metals concentrations. Standard percent moisture conversions are not necessarily accurate because of seasonal changes in moisture contents in fish. Dry weight basis concentrations are needed to accurately make these comparisons.

### Owl Ridge Comment 7

**WET 1**

Page 3.13-91: Third paragraph indicates that loss of "wetland functions related to capture and transfer of nutrients, suspended solids, metals or other soil constituents also would be adversely affected by indirect and direct effects to wetlands."

Comment: While the above-quoted statement is true, there is also some potential to reduce methylation of mercury and thereby to help mitigate mercury transfer to the biota.

### Owl Ridge Comment 8

FISH 9

Page 3.13-122: Fourth paragraph indicates that resident fish species may be more susceptible to mercury accumulation than anadromous species and that mining could increase total mercury.

Comment: Reduced stream side wetlands could further reduce the potential for methylation and help mitigate transfer to the biota.

### Owl Ridge Comment 9

FISH 14

Page 3.13-154: Third paragraph discusses potential issues at culverts and indicates that should blockages to culverts occur, they could erode stream channels and contribute to sedimentation on waters downstream until water conveyance and fish passage are properly restored.

Comment: Bridges are proposed for installation at all fish-bearing water crossings so fish passage would not be compromised by culverts.

### Owl Ridge Comment 10

FISH 2

Page 3.13-156: First paragraph suggest that overall impacts from the port site would be moderate.

Comment: An approximate 1,000-ft-long (3.5 acres below the ordinary high water line) facility on the Kuskokwim River would not have a moderate level of impact in the context of the entire Kuskokwim River and its aquatic resources.

### Owl Ridge Comment 11

FISH 14

Page 3.13-156: Fourth paragraph indicates that culvert blockages would obstruct fish passage until restored.

Comment: Culverts are not proposed for fish-bearing water crossings.

## REFERENCES

BGC Engineering, Inc. 2014. Numerical Hydrogeologic Model, Donlin Gold Project. Prepared for Donlin Gold, LLC. BGC Document No. ER-0011165.0029 A. 64 pp. July 18, 2014.

OtterTail Environmental, Inc. 2014. 2014 Aquatic biomonitoring report, Donlin Gold Project, 2004 through 2014 data compilation. Wheat Ridge, Colorado. 185 pp.

Owl Ridge Natural Resource Consultants, Inc. 2015a. Final Report: Kuskokwim River juvenile salmon investigation: 2014-2015. August 2015. Anchorage, Alaska. 71 pp.

Owl Ridge Natural Resource Consultants, Inc. 2015b. Final Report: Rainbow smelt spawning survey, Kuskokwim River, Alaska.2014-2015. August 2015. Anchorage, Alaska. 43 pp.

# Appendix A

## Container Loss Memo

# Memorandum

TO: Keith Gordon, Project Manager, USACE
FROM: Gene Weglinski, Senior Permitting Coordinator
CC: Bill Craig, AECOM
SUBJECT: Shipping Container Loss Statistics
DATE: May 17, 2016

**Background**

The World Shipping Council (WSC) is an industry group that represents the container shipping industry. WSC's members represent approximately 90 percent of container ship capacity internationally (WSC 2016). In 2011, the WSC surveyed its members in an effort to reasonably answer the question of how many containers are lost at sea annually (WSC 2011). Their results from the period between 2008 and 2013 showed an average of 546 containers lost at sea annually, not including catastrophic losses (more than 50 containers in one incident). The average annual loss of containers for the period was 1,679 containers when catastrophic losses were considered (WSC 2014). The WSC states that the industry carried approximately 120 million containers in 2013 (WSC 2014). Based on these statistics (including catastrophic losses), the annual losses represented approximately 0.0014 percent of containers shipped worldwide.

The WSC (2014) indicates that ongoing efforts to reduce losses continue and include requirements to verify container weights (so heavier containers do not crush lighter containers below), reducing the chance for shifting of materials within individual containers, and improving lashing equipment and methods.

The specifications of intermodal shipping containers are established by the International Standards Organization (ISO). Shipping containers come in different configurations but the most common for shipping dry goods are 20-foot or 40-foot units. In both cases, the maximum gross weight of a standard shipping container is 67,200 pounds (33.6 tons).

## Project-Related Numbers

The following discussion provides an estimate on the number of containers shipped to the Donlin Gold Project site both annually and over the life of the project. The estimate involves a series of assumptions as explained below.

The Donlin Gold Project Draft Environmental Impact Statement (DEIS) considers that the Donlin Gold Project will ship 115,000 tons of cargo annually with 85 percent being containerized and 15 percent as break bulk (loose). The maximum gross weight of a standard shipping container is 33.6 tons; a conservative assumption is that a single container will hold 30 tons. An added level of conservatism assumes that each container holds only 80 percent of those 30 tons. Using this assumption, each container would hold 24 tons or 71 percent of its maximum gross weight. The number of containers required based on these assumptions is summarized below:

- 115,000 Tons of material shipped annually (85% containerized, 15% break bulk)
- 97,750 Tons of containerized material shipped annually
- 5,000 Containers required annually to carry 97,750 tons of material (4,927 containers assuming each container is at 80% capacity)
- 0.07 Containers lost per year based on WSC loss statistics (0.0014 percent lost x 5,000 containers)
- 28 Years of operation (duration of shipments including cyanide and mercury)
- 140,000 Containers shipped over 28 years (using above assumptions)
- 2 Containers lost over life of operations (140,000 containers x 0.0014 percent lost)

Cyanide and Mercury-specific containers:

- 2,535 Tons of cyanide shipped annually (22 tons per ISO-tank container)
- 116 Containers of cyanide shipped annually
- 0.0016 Containers of cyanide lost annually[1] (116 containers x 0.0014 percent lost)
- 3,250 Containers of cyanide shipped over life of project
- 0.05 Containers of cyanide lost over life of project[1]
- 11 1-tonne mercury “pigs” shipped annually (assume containers shipped individually)
- 0.00015 Mercury containers lost annually[1]
- 308 1-ton mercury pigs shipped life of project (assume containers shipped individually)
- 0.004 Mercury containers lost over life of project[1]

[1] Assumes no special measures are made during shipment to ensure security of hazardous materials. In reality, hazardous materials would receive additional consideration in handling, loading, stacking, and transport, which would further reduce the likelihood of a container loss or spill.

## Summary

Container loss statistics presented by representatives of the world-wide shipping industry show that the likelihood of a container loss is very small (0.0014 percent of shipped containers are lost overboard). Donlin Gold would ship approximately 140,000 containers over the 28-year life of the project. Based on the container loss statistics, approximately 2 of the 140,000 shipped cargo containers would be expected to be lost over the life of the project.

Approximately 3,250 ISO tank containers of cyanide would be shipped during the life of the project. Assuming that no special handling measures would be taken to lower the potential for loss of a cyanide container, the statistics indicate that 0.0455 containers would be lost over the life of the project (0.0016 containers annually). To provide context, based on these container loss numbers and the proposed shipping rates for cyanide containers, the Donlin Gold Project would need to operate for approximately *600 years* to reach a volume of cyanide shipments where one container would be expected to be lost (70,000 containers).

The Donlin Gold project would ship approximately 11 1-tonne containers of mercury annually. While the loss rates are the same for any given container on a barge, because of the small number of shipments, the likelihood of a loss of a container of mercury is substantially smaller than the potential loss of a cyanide container with an estimated 0.004 mercury containers lost over the life of the project.

## References

World Shipping Council. 2016. Home Page. http://www.worldshipping.org/

World Shipping Council. 2014. Survey Results for Containers Lost at Sea – 2014 Update. http://www.worldshipping.org/industry-issues/safety/Containers_Lost_at_Sea_-_2014_Update_Final_for_Dist.pdf

World Shipping Council. 2011. Containers Lost at Sea. http://www.worldshipping.org/industry-issues/safety/containers_overboard__final.pdf

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Thursday, February 25, 2016 7:00:40 AM

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-----Original Message-----
From: Ron Doshier [mailto:RDoshier@steelfabak.com]
Sent: Thursday, February 18, 2016 2:43 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

To: U.S. Army Corps of Engineers Date: 16/Feb/2016

From: Ron Doshier

Subject: Donlin Gold EIS

After going over the DEIS it is very apparent that Donlin Gold has acted very professional and sincere with the information they have provided. This is a reflection of their core values and intent to be very transparent and responsible for best business and operating practices in their quest for developing a Safe and Environmentally Responsible Operation!

Any concerns regarding this project in it's infancy to full operations should be put to rest with the Alternative 2 proposed project. A failure to do so will only prolong the unnecessary burdens that the indigenous people of this region are experiencing. The Donlin Gold Project will help provide unity for
SER 2 The Kuskokwim Corporation (TKC) and Calista Corporation to manage their entitled land to generate profit that will benefit their shareholders and their descendants for generations to come.

Donlin Gold's proposed operations structure for the proposed project is quite impressive. It definitely shows integrated support from each and every operation to not only support the mining operation itself but includes infrastructure and capabilities to support the local communities as well. Benefits will provide "improved transportation and communications infrastructure" which will provide better support services which will lower the costs of these services as well as lower the costs of energy and goods. Donlin Gold's commitment to "Job Skills and Training" while on the job during the exploration and construction phases will prepare the workforce of up to and probably over 3,000 workers and could carry over to the operations phase. These jobs will not only benefit the local communities but will benefit ALASKA with jobs. This project's future work opportunities and Donlin Gold's commitment in
SER 13 supporting other organizations that offer job skill training will benefit the shareholders and the economic growth within their communities in ALASKA.

Donlin Gold has "Talked the Talk" with their EIS. Donlin Gold's analysis, conclusions, and proposal reflect Donlin's own published Core Values and that they have and can continue to "Walk the Walk"! I have reviewed the document and see that Donlin Gold has drafted a complete operations structure that is second to none to any "Safe and Compliant" operating practices that I have either been a part of or operated under. "Stellar" job Donlin!!

Donlin Gold's proposed project has responsible, transparent, and detailed operational guidelines for safe and compliant means of fluid transfer and spill response that meets and exceeds the regulations that have been created to help prevent oil from spilling or responding to a spill. The least amount of all oil spills happens when the fluid is in transit. Donlin Gold has created detailed operating procedures to

cover this. There are also regulations put in place to prevent the spilling of fluids and petroleum vapors while loading and unloading these fluids as well as a spill response plan. The goal of these regulations is to make sure that all the fluid is delivered equals the amount of fluid that was received. These regulations make sure that they do not have leaks in any equipment but if they do a responsible spill response plan is in place for quick cleanup. With this, Donlin Gold has addressed each and every requirement in their proposal.....and then some!

IDIT 2 The proposed pipeline design and build as in Alternative 2 will definitely have zero to insignificant impacts to the Iditarod National Historic Trail (INHT). As stated in Alternative 2 the construction of the pipeline is taking all possible impacts to the environment in account. Donlin has mitigated these concerns into their proposal.

Alaska's economic future is highly dependent on responsible extraction of its natural resources which creates infrastructure which in turns demands support and adds jobs. With this, I respectfully urge the governing bodies to allow Donlin Gold to move forward with NEW ALASKA Resource Development.

Sincerely and Respectfully,

Ronald R. Doshier

2730 Legacy Drive

Anchorage, AK 99516

Ronald R. Doshier

Business Development Manager

R.J.H. Inc. (dba STEEFAB)

2132 Railroad Avenue

Anchorage, AK 99501

USACE
RECEIVED
APR 27 2016
AK REGULATORY

April 22, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Re: Donlin Gold EIS

Dear Corps:

I am writing to express my support for the Donlin Gold mining project.

SER 5 The Donlin Mine project will be as important to the Kuskokwim villages as Red Dog Mine has been to the villages in NW Arctic. It will provide high paying jobs year round so our Alaska Native youth will be inspired to graduate from high school seek training and be able to support families and enjoy a career in their local communities.

The owners are working closely with local residents to meet their needs. Donlin Gold is developing the mine in a responsible manner protecting the environment; along with bringing new energy sources (natural gas) to interior Alaska that will help everyone reduce the cost of living and reduce the reliance on diesel fuel.

The local villages are considering forming a borough if Donlin becomes an operating mine and this will provide a new source of local property tax to improve our infrastructure. Kuspuk School District is in need of new and/or remodeled schools to protect the health of students, staff and parents, as well as improve academic learning. Many schools are currently facing closure due to low
SER 8 enrollment. If this mine is not developed people will continue to leave the region to pursue jobs elsewhere. A new regional training center could be built in Aniak if this mine is permitted.

As a life-long Alaskan (62 years) I support this mine and hope the mine is permitted!

Sincerely,

Karen Z. Doyle

Karen Ziemlak Doyle
1900 E. Porcupine Trail
Wasilla, AK 99654
kzdoyle11@gmail.com
907-232-8746

**From:** Sarah Obed
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Monday, April 25, 2016 8:59:10 AM
**Attachments:** image001.png
Doyon Support for Donlin EIS FINAL 4.25.2016.pdf

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Please see attached for Doyon's comments on Donlin EIS.

*Sarah E. Obed*
VP of External Affairs

Doyon, Limited
1 Doyon Place, Ste. 300
Fairbanks, Alaska 99701
Phone: 907-459-2092
Mobile: 907-799-0320
Blockedwww.doyon.com
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April 25, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

Submitted via email to: *POA.donlingoldeis@usace.army.mil*

Dear Mr. Gordon,

Thank you for providing Doyon, Limited ("Doyon") the opportunity to submit the following comments in response to the Donlin Gold Project Environmental Impact Statement ("EIS") process. This environmental review process is a matter of substantial importance to Doyon and its shareholders.

Doyon is one of the thirteen Native regional corporations established by Congress under the terms of the Alaska Native Claims Settlement Act ("ANCSA"), Pub. L. No. 92-203, 85 Stat. 688 (1971), *as amended*. Headquartered in Fairbanks, Doyon has more than 19,500 shareholders. Doyon is the largest private landowner in Alaska, with a land entitlement under ANCSA of more than 12.5 million acres. Doyon's lands extend from the Brooks Range in the north to the Alaska Range in the south. The Alaska-Canada border forms the eastern border and the western portion almost reaches the Norton Sound.

Doyon's mission is to continually enhance its position as a financially strong Native corporation in order to promote the economic and social well-being of its shareholders and future shareholders, to strengthen its Native way of life, and to protect and enhance its land and resources.

SER 2

The successful development of Donlin Mine is critically important to Doyon and its shareholders. Under the revenue-sharing provisions of section 7(i) of ANCSA, Doyon and its shareholders, and Alaska Natives throughout the State of Alaska, will share significantly in the economic benefits of the project. By way of example, in fiscal year 2014, NANA Regional Corporation reported received $143.2 million in net proceeds from the Red Dog Mine and distributed $93.7 million to other Alaska Native Corporations, Kikiktargruk Inupiat Corporation ("KIC"), and at-large shareholders. Since 1989, NANA has paid more than $705.5 million to other regions, KIC, and at-large stakeholders under sections 7(i) and 7(j) of ANCSA. The Economic Benefits of Alaska's Mining Industry, Alaska Miners

Association, Inc., January 2015, available at: http://www.agcak.org/NewsTidbits/MiningEconomicImpactBrochure4-3-15.pdf.

In enacting ANCSA, Congress highlighted the need to "provide for the real economic and social needs of Natives … with maximum participation by Natives in decisions affecting their rights and property." Alaska Native Corporations are for profit corporations, whose purpose is to provide benefits to Alaska Native shareholders. As the Ninth Circuit Court of Appeals has recognized, "Congress intended…that those Native corporations that did select land for its economic potential would be able to develop that land and to realize that potential".

Under ANCSA, Alaska Natives gave up claims to aboriginal lands in exchange for rights to select land in their traditional areas. Whereas most of Calista Corporation's lands were selected by the village corporations for subsistence resources, Calista and The Kuskokwim Corporation (TKC) selected Donlin Creek lands specifically for their mineral endowment and the potential to generate economic opportunities and employment in the region, together with other perceived benefits to Calista and TKC shareholders.

The Donlin project is expected to make substantial long-term contributions to the regional economy. During the projected 4-year construction period, a workforce of more than 3,000 would draw a collective annual payroll of roughly $375 million. During 27 plus years of operation, an average of approximately 900 (year-round) employees would receive a direct payroll of about $100 million per year. Additionally, an estimated $60 million of indirect and induced payroll would be generated (McDowell Group, 2012).

In closing, Doyon, Limited states support for Alternative 2 – "Donlin Gold's Proposed Action" of the Donlin Creek EIS to develop a goldmine in Southwest Alaska on land leased from Calista Corporation, an ANCSA corporation, as well as to develop the affiliated access road, natural gas pipeline, and other affiliated infrastructure.

Sincerely,

Aaron M. Schutt
President & CEO
Doyon, Limited

**From:** Bellion, Tara
**To:** Evans, Jessica
**Subject:** FW: Donlin Gold Draft EIS comment Please approve
**Date:** Tuesday, March 08, 2016 9:56:13 AM

---

-----Original Message-----
From: Curt Dufendach [mailto:cdufendach@deltaindustrial.com]
Sent: Saturday, March 05, 2016 1:26 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment Please approve

Please Approve the Donlin Gold Project ASAP for the following reasons:

The plan calls for ground breaking environmental care practices by mining companies that have a long history of good practices backed up by environmental studies that have been on going there since the mid 90's

Economic opportunity for one of the most economic depressed areas of in the state

Economic opportunity and cooperation with the local and regional native corporations.

Cooperation with the local native leadership for responsible care of the local way of life

SER 4

Large economic opportunity for the state of Alaska in a time when oil revenues have been reduced greatly. The state needs responsible development of the resources that we have. This mine represents a great opportunity for all of Alaska

Respectfully

Curt Dufendach

907-460-9350 (cell)

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sender and delete this message and any attachments. Unauthorized use of the information in this email may be a violation of the law.

**From:** Curt Dufendach
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Thursday, April 21, 2016 8:34:08 AM

SVE 1

Please approve the Donlin Gold EIS. It will have a large economic benefit for the whole state and for the Yukon Kusokwim region The plan is a good plan for responsible development of the resource with minimal environmental impact.

Thank you

Curt Dufendach
Delta Industrial Services
PO box 1109
Delta Jct. Ak.
99737

907-895-5053 (office)
907-460-9350 (cell)
907-895-6205 (fax)

**From:** Tom Durrant
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Gold.mine
**Date:** Sunday, November 29, 2015 4:11:41 PM

---

NSB 1 Really????Why not save this for America? Salmon are FIRST. THEY DO NOT COME BACK..

**From:** Hugh Dyment
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Wednesday, June 08, 2016 5:11:35 PM

I have been a resident of the Yukon Kuskokwm Delta for twenty-five years. All of that time has been teaching high school students in lower Kuskokwim area villages and Bethel.

SER 11

The proposed mine is the one source of hope that might students have who wish to remain in their ancestral homelands, have a source of income and participate in in traditional hunting, fishing and gathering subsistence activities.

PHL 3

The great majority of my students come from families dependent on federal and state welfare programs: State of Alaska and federal low income housing, Supplemental Nutrition Assistance Program (SNAP); home heating assistance; etc.

Just about the only jobs in Y-K Delta villages are government, i.e. school teachers, BIA funded tribal governmental positions, healthcare, etc. There are not enough of these jobs to employ the hundreds and hundreds, thousands really, of unemployed young people. The relationship may not be causal, but over the last twenty-five years there has been a terribly rise in both alcoholism and drug addition. Being unemployed and dependent on government assistance may have something to do with this scourge of multi-generation substance abuse and related family traumas.

SER 11

My brother-in-laws are successful subsistence hunters. They credit some of their success to the fact that they work seasonally or have wives that work in the local school and health clinic. It takes a significant amount of money to maintain the necessary equipment to be a successful hunter - boats, engines, snow mobiles, etc.

My nephew worked at Donlin during the exploration stages. His income benefitted himself, his extended family and the community of Toksook Bay. Because with his income he became a productive member of the community and self-confident. His income enabled the purchase a sea going skill and engine that he and his family used for subsistence marine mammal hunting. Any excess seals his extended family couldn't consume were gifted to other families in the community. None of this would of been possible without the income he made at Donlin Creek.

I believe that modern mining techniques and state/federal oversight are sufficient to allow Donlin to develop a mine safely barring the remote possibility of something catastrophic. We can not allow low probability/high impact possibilities to prevent economic development when that development means self-sufficiency for so many.

Thank you,

Hugh Dyment

| | |
|---|---|
| **From:** | Hugh Dyment |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, May 31, 2016 11:37:25 PM |

I have been a resident of the Yukon Kuskokwm Delta for twenty-five years. All of that time has been teaching high school students in lower Kuskokwim area villages and Bethel.

SER 11

The proposed mine is the one source of hope that might students have who wish to remain in their ancestral homelands, have a source of income and participate in in traditional hunting, fishing and gathering subsistence activities.

PHL 3

The great majority of my students come from families dependent on federal and state welfare programs: State of Alaska and federal low income housing, Supplemental Nutrition Assistance Program (SNAP); home heating assistance; etc.

Just about the only jobs in Y-K Delta villages are government, i.e. school teachers, BIA funded tribal governmental positions, healthcare, etc. There are not enough of these jobs to employ the hundreds and hundreds, thousands really, of unemployed young people. The relationship may not be causal, but over the last twenty-five years there has been a terribly rise in both alcoholism and drug addition. Being unemployed and dependent on government assistance may have something to do with this scourge of multi-generation substance abuse and related family traumas.

SER 11

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My nephew worked at Donlin during the exploration stages. His income benefitted himself, his extended family and the community of Toksook Bay. Because with his income he became a productive member of the community and self-confident. His income enabled the purchase a sea going skill and engine that he and his family used for subsistence marine mammal hunting. Any excess seals his extended family couldn't consume were gifted to other families in the community. None of this would of been possible without the income he made at Donlin Creek.

I believe that modern mining techniques and state/federal oversight are sufficient to allow Donlin to develop a mine safely barring the remote possibility of something catastrophic. We can not allow low probability/high impact possibilities to prevent economic development when that development means self-sufficiency for so many.

Thank you,

Hugh Dyment

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Bellion, Tara; Evans, Jessica; Smith, Neal |
| **Subject:** | FW: Donlin Gold DEIS comment deadline extension |
| **Date:** | Wednesday, April 13, 2016 8:31:32 AM |
| **Attachments:** | DEIS extension request, 4-11-16.pdf |
| **Importance:** | High |

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-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Wednesday, April 13, 2016 7:55 AM
To: Craig, Bill
Subject: FW: Donlin Gold DEIS comment deadline extension
Importance: High

-----Original Message-----
From: Gordon, Keith POA
Sent: Tuesday, April 12, 2016 6:45 AM
To: 'Craig, Bill' <bill.m.craig@aecom.com>
Subject: FW: Donlin Gold DEIS comment deadline extension
Importance: High

-----Original Message-----
From: Sarah Saunders [mailto:ssaunders@earthjustice.org]
Sent: Monday, April 11, 2016 12:22 PM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Cc: Peter Heisler <pheisler@earthjustice.org>
Subject: [EXTERNAL] Donlin Gold DEIS comment deadline extension
Importance: High

Dear Mr. Gordon,

Attached is a request for an extension of the Donlin Gold Project draft environmental impact statement comment deadline submitted by Earthjustice.

If you have any questions or concerns, please contact Peter Heisler at pheisler@earthjustice.org <mailto:pheisler@earthjustice.org> .

Thank you,

Sarah Saunders

Litigation Assistant/Administrative Coordinator

Earthjustice Alaska Office

441 W 5th Avenue, Suite 301

Anchorage, AK 99501

T: 907.792.7101

F: 907.277.1390

earthjustice.org <http://www.earthjustice.org/>

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EARTHJUSTICE

April 11, 2016

**VIA ELECTRONIC MAIL**

Keith Gordon
Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOA-RD-Gordon, P.O. Box 6898
JBER, AK 99506-0898
E: Keith.q.gordon@usace.army.mil

Dear Mr. Gordon:

NEP 1 We respectfully request an extension of the April 30, 2016, deadline to submit comments on the Draft Environmental Impact Statement (DEIS) prepared by the U.S. Army Corps of Engineers (Corps) for the Donlin Gold Project.[1] An extension would further the purposes of the National Environmental Policy Act (NEPA) by providing a full and fair opportunity for public involvement. It is particularly warranted by the scale of the proposed action, the length and scope of the DEIS, and several issues that have hindered meaningful engagement during the existing comment period. Some of the communities in the region have requested a six-month extension. We support and join that request.

NEP 1 One of NEPA's primary goals is to afford the public an opportunity to scrutinize information concerning the environmental consequences of proposed actions.[2] Federal agencies must "to the fullest extent possible . . . [e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment."[3] To that end, they are free to extend the time for comment on an environmental impact statement as they see fit.[4] An extension of the comment period on the DEIS would be especially appropriate, for the reasons discussed below.

The proposed action is a massive mining project that will have extensive, permanent impacts on the environment. In its current form, it involves: a 2-square-mile pit that would eventually fill with water and require water treatment in perpetuity;[5] a 2,240-acre waste rock

[1] U.S. Army Corps of Eng'rs, *EIS Schedule*, http://donlingoldeis.com/EISSchedule.aspx.
[2] *See* 40 C.F.R. § 1500.1(b).
[3] *Id.* § 1500.2(d).
[4] *See id.* § 1506.10(c), (d).
[5] U.S. Army Corps of Eng'rs, Donlin Gold Project Draft Environmental Impact Statement at 2-40 (Nov. 2015) (DEIS).

pile and 2,351-acre tailings impoundment;[6] 122 barge trips on the Kuskokwim River every summer during the mine's operations;[7] and a 315-mile-long natural gas pipeline requiring nine new air strips and numerous roads during construction.[8] Significant environmental consequences could include contamination of streams and rivers,[9] destruction of wetlands and fish and wildlife habitat,[10] interference with subsistence harvests by local communities,[11] and impairment of a substantial segment of the Iditarod National Historic Trail.[12] It is therefore crucial that the public have sufficient time to consider and develop opinions about the project.

NEP 1

The scale of the proposed action is reflected in the DEIS. The document contains more than five thousand pages of analysis, as well as twenty appendices prepared by the Corps and cooperating agencies. It covers a wide range of highly technical subjects, such as mining geochemistry, surface water and groundwater hydrology, water and air quality, and ecology and toxicology. Interested groups and individuals need time commensurate with the depth and breadth of the DEIS to absorb its contents, communicate with others affected by the project, and consult with experts.

Moreover, several factors have prevented stakeholders from utilizing the full length of the comment period to engage on the project. Earthjustice requested hard copies of the DEIS on December 1, 2015, but did not receive them until March. Further, while we appreciate the Corps' responsiveness to requests for sources cited in the DEIS, we were recently informed that the Corps would not be able to provide documents explaining why pipeline alternatives were rejected without a formal request under the Freedom of Information Act. We have now submitted that request and expect prompt disclosure of the documents; however, even with the most expeditious processing, the public would not have access to them until the current comment deadline is near or has passed.

NEP 1

We also note concern in the sled dog racing community that a new rule in the Iditarod Trail Sled Dog Race has limited mushers' ability to express their viewpoints on the Donlin Gold Project. The rule prohibits mushers from making public statements "injurious to" the race, including comments "disparaging to any of the sponsors," until 45 days after the race is complete.[13] One of the race sponsors is mine proponent Donlin Gold.[14] Because the race ended

[6] *Id.* at 2-30.
[7] *Id.* at 2-45.
[8] *Id.* at 2-58, 2-76, 2-98.
[9] *Id.* at 2-173.
[10] *Id.* at 2-175, 2-177 to 2-179.
[11] *Id.* at 2-184.
[12] *Id.* at 3.20-44 to 3.20-46.
[13] *See* Iditarod Trail Comm., Iditarod Trail International Sled Dog Race Official Rules 2016, at 16, http://d3r6t1k4mqz5i.cloudfront.net/wp-content/uploads/2011/12/2016-RACE-RULES-10-26-15.pdf?019e32.
[14] *See Sponsors*, Iditarod.com, http://iditarod.com/race/sponsors/.

NEP 1 on March 19, 2016,[15] mushers will feel constrained from submitting comments that might be deemed critical of the proposal until May 3, 2016. That date follows the close of the comment period, so mushers would be unable to meet the deadline. In any event, they deserve time before comments are due in which to influence public opinion on an issue that is salient to their interests: the proposed natural gas pipeline would lie in the vicinity of the Iditarod National Historic Trail for about 60 miles, crossing it 13 times.[16]

Other groups and local communities also seek more time to comment on the DEIS. For example, the Northern Alaska Environmental Center has submitted a request based on the concerns of stakeholders in the Kuskokwim River region, limitations on mushers' ability to comment, and the need to raise public awareness about the project.[17] The City of Bethel seeks a six-month extension in light of the magnitude of the proposed project, as well as the length of the DEIS.[18] Likewise, the Native Village of Napaimute asks for an additional six months to allow meaningful public involvement in the NEPA process.[19] We support these requests, which
NEP 1 underscore the fact that many of those who will be directly affected by the project view the current deadline as overly restrictive.

For the foregoing reasons, we respectfully request that you extend the comment deadline on the DEIS by six months. Thank you for your consideration of this request.

Respectfully submitted,

s/ Peter Heisler
Associate Attorney
Earthjustice

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[15] *See Current Race Standings*, Iditarod.com, http://iditarod.com/race/2016/standings/.
[16] DEIS at 3.15-13, fig. 3.15-2; *id.* at 3.16-19, tbl. 3.16-5.
[17] Letter from N. Alaska Envtl. Ctr., to Keith Gordon, Project Manager, U.S. Army Corps of Eng'rs (Apr. 2016).
[18] City of Bethel, Alaska, Resolution No. 16-05, at 1-2 (Feb. 9, 2016), http://www.cityofbethel.org/vertical/sites/%7B86032ACB-92B0-4505-919A-3F45B84FECD9%7D/uploads/Res._16-05_Review_Extention_For_Donlin_EIS.pdf.
[19] Native Vill. of Napaimute, Resolution No. 16-02, at 1 (Feb. 17, 2016), http://napaimute.org/wp-content/uploads/2016/02/2-18-RES-16-02-DEIS-EXTENSION.pdf.

| | |
|---|---|
| **From:** | Peter Heisler |
| **To:** | donlingoldeis, POA; Newman, Sheila M POA |
| **Cc:** | Tom Waldo; Sarah Saunders |
| **Subject:** | [EXTERNAL] Earthjustice Comments on Donlin Gold Project Draft EIS |
| **Date:** | Tuesday, May 31, 2016 6:18:22 PM |
| **Attachments:** | Earthjustice Comments on Donlin Gold Project Draft EIS.pdf |

Dear Ms. Newman,

Please find attached Earthjustice's comments on the Donlin Gold Project Draft Environmental Impact Statement, submitted on behalf of Northern Alaska Environmental Center, Alaska Community Action on Toxics, Earthworks, Center for Biological Diversity, Cook Inletkeeper, Friends of Alaska National Wildlife Refuges, Kachemak Bay Conservation Society, and Sierra Club. We previously submitted a DVD containing sources in support of these comments.

Please let me know if you have any difficulty accessing the attached letter or the supporting documents.

Thank you,

Peter Heisler
Associate Attorney
Earthjustice Alaska Office
441 West 5th Avenue, Suite 301
Anchorage, Alaska 99501
T: 907-792-7104
F: 907-277-1390
earthjustice.org

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EARTHJUSTICE

May 31, 2016

**VIA ELECTRONIC MAIL**

Sheila Newman
U.S. Army Corps of Engineers, Alaska District
CEPOA–RD–SA
P.O. Box 6898
JBER, AK, 99506–0898
E: POA.donlingoldeis@usace.army.mil

Dear Ms. Newman,

Earthjustice submits these comments on behalf of Northern Alaska Environmental Center (Northern Center), Alaska Community Action on Toxics, Earthworks, Center for Biological Diversity, Cook Inletkeeper, Friends of Alaska National Wildlife Refuges, Kachemak Bay Conservation Society, and Sierra Club. The Northern Center is a grassroots environmental organization that promotes conservation of the environment and sustainable resource stewardship in Interior and Arctic Alaska through advocacy and education. Alaska Community Action on Toxics is a statewide nonprofit public interest environmental health and justice research and advocacy organization dedicated to protecting environmental and community health. Earthworks is a nonprofit organization dedicated to protecting communities and the environment against the adverse effects of hard rock mining. The Center for Biological Diversity is a national, nonprofit conservation organization with more than one million members and online activists dedicated to the protection of endangered species and wild places. Cook Inletkeeper is a community-based nonprofit working to protect the Cook Inlet watershed and the life it sustains. The Friends of Alaska National Wildlife Refuges promote the conservation of all Alaska National Wildlife Refuges through understanding and appreciation, assisting the U.S. Fish and Wildlife Service, and through outreach to decision makers. Kachemak Bay Conservation Society seeks to protect the environment of the Kachemak Bay region and greater Alaska by encouraging sustainable use and stewardship of natural resources through advocacy, education, information, and collaboration. The Sierra Club is a national nonprofit organization with 64 chapters and over 625,000 members, including nearly 1,500 members in Alaska, dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. This letter is in addition to any separate comment letters these groups may submit.

We appreciate the opportunity to comment on the draft environmental impact statement (DEIS) prepared by the U.S. Army Corps of Engineers (Corps) for the Donlin Gold Project. The comments also pertain to Donlin Gold, LLC's (Donlin Gold) application for a permit under

Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (included as Appendix J to the DEIS) and the Bureau of Land Management's (BLM) preliminary analysis of subsistence impacts under Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) (included as Appendix N to the DEIS).

The proposed action is an open-pit, hard rock gold mine of a scale rarely seen in Alaska, or indeed the world.[1] It involves an eventual two-square-mile open pit that would fill with water requiring treatment in perpetuity,[2] a 2,240-acre waste rock pile and 2,351-acre tailings impoundment,[3] 122 barge trips on the Kuskokwim River every summer during operations,[4] and a 315-mile-long natural gas pipeline requiring nine new air strips and numerous roads during construction.[5] Significant environmental consequences could include the contamination of streams and rivers,[6] destruction of wetlands and fish and wildlife habitat,[7] interference with subsistence harvests by local communities,[8] and impairment of a substantial segment of the Iditarod National Historic Trail (INHT, or "the Trail").[9]

In these comments, we address several areas of the proposal that warrant additional study and discussion under the National Environmental Policy Act (NEPA) and other statutes. These issues include:

- ***The pit lake.*** The Corps must fully and accurately disclose the ecological risks posed by the pit lake, the changes in mine-site hydrology that result from it, and the details of Donlin Gold's financial assurances for perpetual water treatment.

NEP 6

- ***Mine-site water management.*** The Corps should explain how the proposed action comports with New Source Performance Standards for mining waste discharges into streams and wetlands under the Clean Water Act.

- ***The tailings dam.*** The Corps must completely analyze the risk of a tailings dam failure and account for the findings of an expert panel on the recent, catastrophic tailings dam breach at the Mount Polley mine in British Columbia, Canada.

[1] *See Donlin Gold Project*, Northern Alaska Environmental Center, http://northern.org/programs/clean-water-mines/hardrock-mines-in-interior-and-arctic-alaska/donlin-creek-project (last visited Apr. 22, 2016); *Donlin Gold Project*, Gound Truth Trekking, http://www.groundtruthtrekking.org/About/ (last visited Apr. 22, 2016).
[2] U.S. Army Corps of Engineers, Donlin Gold Project Draft Environmental Impact Statement at 2-11, 2-40, 2-141 (Nov. 2015) (DEIS).
[3] *Id.* at 2-30.
[4] *Id.* at 2-45, Tbl. 2.3-8.
[5] *Id.* at 2-58, 2-76, 2-98 to 2-99.
[6] *Id.* at 2-173.
[7] *Id.* at 2-175, 2-177 to 2-179.
[8] *Id.* at 2-184, Tbl. 2.3-44.
[9] *Id.* at 3.20-44 to 3.20-46.

- ***Subsistence.*** The Corps should objectively describe potential impacts to subsistence and address the apparent discrepancy between its own conclusions and the findings of BLM under Section 810(a) of ANILCA.

- ***Wetlands.*** The Corps must present a more definite picture of the effects of the proposed action—as well as other alternatives—on wetlands and explain how those impacts would comport with regulations established under the Clean Water Act.

- ***The Iditarod National Historic Trail.*** The Corps should canvass the entire range of the pipeline's impacts on the INHT, thoroughly study alternatives that would avoid impacts to the Trail, explain how granting a right-of-way would be consistent with the State of Alaska's agreements with the federal government and the state's land-management plans, and complete the process prescribed by Section 106 of the National Historic Preservation Act (NHPA) before rendering a permitting decision.

NEP 6

- ***Scope.*** The Corps must thoroughly address the potential effects of the construction of a cargo terminal in Bethel and the possible future expansion of the mine.

- ***Climate change.*** The Corps should fully and fairly discuss all of the alternatives' contributions to climate change and explain how climate change could alter the project's environmental impacts.

Each of these topics requires additional analysis before the Corps signs a record of decision. Consistently with NEPA's purpose and commands, we urge the agency to prepare a supplemental environmental impact statement (SEIS), allow public comment on the SEIS, and fully disclose the environmental consequences of all reasonable alternatives in a final environmental impact statement (FEIS).

PIT LAKE

Upon mine closure, the open pit is predicted to fill with water from groundwater recharge, surface runoff, and pumping from the tailings storage facility, creating a "pit lake."[10] The surface water of the lake would not meet applicable water quality standards and would require treatment in perpetuity.[11] Pumping would also be required to prevent the lake from overflowing.[12] Given the scale and permanence of this feature, the Corps must thoroughly discuss its potential impacts in the FEIS and seriously consider the risks before rendering a permitting decision.

[10] DEIS at 2-40.
[11] *Id.*; *id.* at 2-141.
[12] *Id.*

I. THE DEIS DOES NOT FULLY DISCLOSE THE ECOLOGICAL RISKS POSED BY THE PIT LAKE.

The DEIS does not adequately address the possible effects of exposure to pit-lake contaminants. In lieu of discussing such impacts on terrestrial mammals, the DEIS quotes extensively from an ecological risk assessment (ERA) prepared by a consultant and included as an appendix.[13] The analysis of impacts on birds is similarly cursory: "The magnitude of impact of environmental contamination from birds coming into contact with the . . . pit lake is low because the exposure is expected to be low."[14] NEPA demands more.[15]

WILD 5

Even if the DEIS thoroughly discussed the pit lake's possible effects on birds and other wildlife, it would nonetheless rely on flawed analysis. The ERA evaluates the effects of several chemicals of potential concern in the pit lake individually, but not in combination.[16] This approach underestimates the risks of contamination. To capture cumulative effects of multiple stressors, the Environmental Protection Agency (EPA) recommends constructing response relationships for each stressor and combining them, or analyzing responses to the entire set of stressors.[17] Whatever approach is ultimately selected, however, NEPA requires that an EIS contain high-quality, accurate scientific analysis, and that any shortcomings in the data or models it relies on be disclosed at the outset.[18] The ERA for the pit lake does not meet this standard,[19] and the DEIS fails to acknowledge its limitations.

The DEIS also understates ecological risks by incompletely analyzing the possibility of pit-lake overturn. When the water in a mine pit lake mixes partially or completely, fish kills and other catastrophic events may result.[20] The typical cause of such mixing is extreme weather,[21] but other factors such as the temperature of inputs to the lake may also influence the stability of

WAQ 9

[13] *See id.* at 3.12-38 to 3.12-39; *see also id.* at 3.12-7 to 3.12-9.
[14] *Id.* at 3.12-154.
[15] *Cf. Sierra Club, Inc. v. Austin*, 82 F. App'x 570, 572 (9th Cir. 2003) (NEPA requires a "'hard look'" at environmental impacts of proposed major federal actions).
[16] *See* DEIS App. S at 27 (PDF 387) ("Lower and upper bound [toxicity reference values] were derived for each individual receptor and chemical combination.").
[17] *See* Environmental Protection Agency (EPA), Guidelines for Ecological Risk Assessment at 85 (Apr. 1998).
[18] *See Lands Council v. Powell*, 395 F.3d 1019, 1031-32 (9th Cir. 2004) (citing 40 C.F.R. §§ 1500.1(b), 1502.22).
[19] The ERA does not assess the risks to fish because "persistent fish populations are not proposed to be added, nor expected to be present in the pit lake given the proposed barriers to fish entry into the pit lake." DEIS App. S at 30 (PDF 390). This assumption ignores the potential for fish dispersal from other water bodies, as well as the fact that runoff from the American Creek watershed would flow into the pit lake, *see* DEIS at 3.5-87.
[20] *See* B. Boehrer & M. Schultze, *On the Relevance of Meromixis in Mine Pit Lakes*, 7th Int'l Conference on Acid Rock Drainage 200 (2006).
[21] *See id.* at 207.

stratification.[22] The DEIS notes that a modeling run in which the pit lake mixed completely produced severely degraded surface water quality in which virtually all contaminants exceeded applicable standards even 99 years after mine closure.[23] It thus observes that "maintaining a permanently stratified pit lake" would be "importan[t] to treatment costs."[24] Although a simulation in which the lake was subjected to 125-mile-per-hour winds over two days did not show overturn, the DEIS admits that wind is only "one possibility" of the physical forcing that could cause complete mixing.[25] The DEIS does not discuss other potential causes or indicate how Donlin Gold intends to maintain pit-lake stratification. Furthermore, the ERA does not evaluate impacts to wildlife from complete mixing.[26] The Corps should remedy these deficiencies in the FEIS.

WAQ 9

WILD 5

## II. THE DEIS DOES NOT ADEQUATELY DISCUSS CHANGES TO MINE-SITE HYDROLOGY DUE TO THE MINE PIT AND PIT LAKE.

Agencies must "insure the professional integrity, including scientific integrity, of the discussions and analyses in [EISs]."[27] An agency contravenes this requirement by using a model that produces obviously inaccurate results or that incorporates unreasonable assumptions.[28] Ultimately, in relying on a flawed scientific analysis, an agency fails to provide a "full and fair" discussion of the proposed action's environmental effects.[29]

GRD 6

The DEIS does not adequately discuss the effects of pit dewatering or the formation of the eventual pit lake on surface water. The DEIS's modeling of groundwater flows during pit dewatering artificially limits the reach of drawdown by treating the surrounding bedrock as undifferentiated and relatively non-conductive.[30] It also improperly isolates Crooked Creek from the impacts of dewatering by assuming that the alluvium there is highly conductive and does not store much groundwater.[31] Furthermore, the effects of dewatering could extend well beyond the predicted drawdown zone if thrust faults that intersect the pit have long-scale permeability damage zones[32]; that data is not present in the DEIS or supporting documents.[33] The DEIS also

GRD 4

GRD 1

GRD 3

GRD 1

[22] *See generally* D. N. Castendyk & J. G. Webster-Brown, *Sensitivity Analyses in Pit Lake Prediction, Martha Mine, New Zealand 1: Relationship Between Turnover and Input Water Density*, 244 Chemical Geology 42, 50 (2007).
[23] *See* DEIS at 3.7-127 to 3.7-128 & Tbl. 3.7-35.
[24] *Id.* at 3.7-127.
[25] *Id.* App. H at H-41.
[26] *See generally id.* App. S.
[27] 40 C.F.R. § 1502.24.
[28] *See Earth Island Inst. v. U.S. Forest Serv.*, 351 F.3d 1291, 1300-02 (9th Cir. 2003).
[29] *See Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964-65 (9th Cir. 2005) (quoting 40 C.F.R. § 1502.1).
[30] *See* T. Myers, Technical Memorandum: Review of the Draft Environmental Impact Statement for the Donlin Gold Project at 5 (May 11, 2016) (Myers Memo).
[31] *See id.*; *see also id.* at 30, 33-34.
[32] *See id.* at 11-12; *see also id.* at 41.

GRD 1 potentially understates the pit lake's effects on stream flow post-closure by assuming that backfill is already saturated.[34] In light of these potential impacts, we support one expert's recommendation that the Corps consider an alternative in which the pit would not extend into a several-hundred-foot buffer along Crooked Creek.[35]

PAA 27

GRD 16 We hereby incorporate by reference the May 11, 2016, technical memorandum prepared by Tom Myers ("Myers Memo")[36] and ask that the Corps and cooperating agencies respond fully to those comments as if set out in its entirety in this letter.

## III. THE DEIS FAILS TO EXPLAIN HOW DONLIN GOLD'S PROPOSED FINANCIAL ASSURANCES WOULD ENSURE FUNDING FOR THE PERPETUAL TREATMENT OF PIT-LAKE WATER.

The DEIS states that Donlin Gold would establish a "Post-Reclamation and Closure Maintenance Trust Fund" to provide adequate funding for perpetual treatment and post-closure monitoring of pit-lake water.[37] It does not discuss this issue further, instead appending a memorandum by Donlin Gold regarding the company's proposed financial assurances.[38] Because the avoidance of long-term environmental effects depends on a perpetual source of funding, the FEIS must disclose the methodology for calculating the final amount to be contributed to the trust fund.

BER 7

An EIS that entirely omits information about reclamation and water treatment plans may be held invalid.[39] According to Donlin Gold's memo, the Alaska Department of Environmental Conservation (ADEC) sometimes considers a draft integrated waste management plan (IWMP), which may include a range of cost estimates for long-term post-closure water treatment, at the draft EIS stage[40]—although that does not appear to be the case here.[41] The memorandum also points out that the public will have an opportunity to comment on the draft IWMP during

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[33] Where information relevant to reasonably foreseeable significant adverse impacts is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," agencies must include that information in the EIS. 40 C.F.R. § 1502.22(a). If the information cannot be obtained, agencies must note that the information is incomplete or unavailable, explain its relevance, summarize existing credible scientific evidence, and evaluate impacts based on theoretical approaches or research methods generally accepted in the scientific community. *Id.* § 1502.22(b).

[34] *See* Myers Memo at 38-39.

[35] *See id.* at 8. An EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a).

[36] *See supra* note 30.

[37] DEIS at 2-40.

[38] *See generally id.* App. A.

[39] *Cf. Cady v. Morton*, 527 F.2d 786, 796 (9th Cir. 1975) (concluding that an EIS's discussion of proposed reclamation plans was adequate because it included sufficient data and analysis).

[40] DEIS App. A at 2, 3.

[41] The most recent draft IWMP was prepared in 2012 and does not address financial assurances. *See* Donlin Gold, Integrated Waste Management Plan (July 2012).

ADEC's review of the document.[42] Regardless, if the DEIS does not present this relevant information, the public will not have an opportunity to evaluate and comment on potential long-term impacts of the proposed action before the Corps renders its decision, defeating NEPA's purposes.[43]

Donlin Gold's memorandum offers no accounting of the amount of funding needed to guarantee perpetual water treatment at the pit lake. It states that, "[t]o make the trust fund self-sustaining and able to cover annual post-closure costs, a total of approximately $73 million dollars [*sic*] is required to be in place at the time of mine closure."[44] The memorandum provides no breakdown of costs or any other explanation as to how it arrived at that amount.[45] This omission is particularly concerning because, as the memorandum acknowledges, regulations or guidelines implementing Alaska's statutory trust fund language have not been developed.[46] Additionally, estimating future replacement and operating costs can be difficult.[47] Without knowing the basis for Donlin Gold's cost estimate, it is impossible for the public to evaluate the possible long-term environmental consequences of the project.

Donlin Gold's memorandum does mention a few assumptions underlying the amount of initial funding required for the trust fund at mine closure, but these assumptions only heighten the need to disclose detailed cost calculations. For example, it states that "[c]osts for long-term post closure activities were estimated out to 200 years after closure," a time period "sufficient to demonstrate that the post-closure trust fund can be self-sustaining in perpetuity."[48] This assumption is plainly invalid because the DEIS predicts that water treatment will be required in perpetuity. The memorandum also indicates that the trust fund's post-closure growth was calculated using targeted returns for the Alaska Permanent Fund, and that annual cost inflation was calculated using a five-year average of the Anchorage consumer price index.[49] It is unclear how those metrics will be directly relevant to the growth of the trust fund and the costs of operating a water treatment plant in southwest Alaska. Indeed, "changing either the inflation rate or the rate for return-on-investment by a single percentage point will cause a huge change on the required" amount of initial funding.[50] A buffer for steep economic declines, dramatic changes in energy costs, unexpected impacts from climate change or weather events, lake overturn, and other unforeseen challenges inherent in a large, complex system should also be built into the estimate. In sum, the public needs a more detailed explanation of the calculations and

BER 7

[42] DEIS App. A at 4.
[43] *See* 40 C.F.R. § 1502.1 (requiring that EISs "provide full and fair discussion of significant environmental impacts" of the proposed action).
[44] DEIS App. A at 7.
[45] *See id.*
[46] *See id.* App. A at 3.
[47] *See* D. M. Chambers, A Position Paper on Perpetual Water Treatment for Mines at 1 (June 2007) (Chambers Position Paper).
[48] DEIS App. A at 7.
[49] *Id.*
[50] Chambers Position Paper at 1.

BER 7 assumptions underlying Donlin Gold's proposed financial assurances before it can meaningfully comment on the project's potential effects.

WATER MANAGEMENT

The mine as proposed in all alternatives fails to comply with the Clean Water Act. As a new project, the mine will be required to comply with New Source Performance Standards, which set strict limits on discharges of any mine drainage to waters of the United States[51] and prohibit any discharges of process wastewater except for excess precipitation.[52]

The mine site is interlaced with streams and wetlands that are "waters of the United States" subject to the Clean Water Act.[53] Within these waters, Donlin Gold proposes to construct or create, among other things, two ore pits, numerous pit dewatering wells, a waste rock pile, two contact water ponds, a tailings pond, a seepage recovery system, numerous freshwater diversions, a freshwater impoundment, and ultimately a pit lake that will never meet
CWA 3 water quality standards and will require treatment in perpetuity.[54] All would be on an enormous scale in a complex geologic and hydrologic system.[55]

Even if everything runs perfectly as planned, the project envisions extensive runoff and seepage. For example, there would be two contact water dams to collect runoff from the waste rock piles, but they would be unlined and may be expected to seep into the pit and mingle with other mine drainage.[56] Even the lined tailings storage facility is expected to require a seepage collection pond, diversion ditches, and wells.[57] Upon closure, the wastewater from the mine will be permanently stored in an unlined, two-mile-long contaminated pit lake, fed by groundwater and surface water runoff, where American Creek and other waters are currently located.[58]

Given the size and complexity of the project and its hydrology, there are significant risks that the mine's systems will not function as planned. For example, the water treatment facilities
WAQ 10 could be overwhelmed during pit dewatering if surrounding bedrock is more conductive than expected, or post-closure if a large storm inundates the pit lake.[59] Water in the pit lake could
GRD 6 also flow through deep bedrock and contaminate surface water.[60] Regarding waste rock storage, PAA 14

[51] 40 C.F.R. § 440.104(a).
[52] *Id.* § 440.104(d).
[53] *See id.* § 122.2 (defining "*Waters of the United States or waters of the U.S.*").
[54] DEIS at 2-8 to 2-9, 2-27, 2-40, 2-141.
[55] *See supra* p. 2; *see generally* Myers Memo.
[56] DEIS at 2-26.
[57] *Id.* at 2-30.
[58] *Id.* at 2-11, 2-30, 2-40, 2-141.
[59] *See* Myers Memo at 4, 18-19, 22, 23; *see also id.* at 35 (noting that, if deep bedrock is more permeable than assumed, required pit dewatering could be doubled). The Corps should provide more information on bedrock conductivity if it is not exorbitantly costly to obtain. *See* 40 C.F.R. § 1502.22(a).
[60] *See* Myers Memo at 17.

PAA 14

there is a "significant probability" that a shallow aquifer will "short circuit seepage from the waste rock dump to Crooked Creek,"[61] an eventuality the model used in the DEIS cannot simulate.[62] As the Myers Memo asserts, the "only effective mitigation would be to avoid [waste rock facility] seepage by having a liner under the waste rock."[63] We urge the Corps to give greater consideration to such an option, which it rejected simply because "[t]here is no environmental benefit from installing a liner under the [waste rock facility]."[64]

CWA 5

The DEIS raises serious questions about the project's compliance with the Clean Water Act and does not adequately disclose how this complex system would do so. It includes this sweeping statement: "Although the water within the mine facilities would not be considered waters of the State of Alaska or waters of the U.S., and are not subject to regulation under the Clean Water Act or the [Alaska Pollutant Discharge Elimination System] permitting program, potential receiving waters downstream of the mine are subject to Clean Water Act regulations."[65]

There is no basis for the assertion that water within the mine facilities is not "waters of the United States" and is exempt from the Clean Water Act. Nothing in the statute, the regulations, or any agency policies exempts mines from the Act.

The only exception that could be applicable to some mine components is one for "waste treatment systems."[66] While, for example, the Corps and EPA might make a determination that a properly designed tailings storage facility would qualify as a "waste treatment system" under the rule defining "waters of the United States," the entire mine plainly would not.

As a general rule, it should not be permissible to deem an existing jurisdictional water to be a waste treatment system. To do so defeats the point of the Clean Water Act. The legislative history of the Act observes that "[t]he use of any river, lake, stream or ocean as a waste treatment system is unacceptable."[67] The exemption for waste treatment systems in the current definition of "waters of the United States" is not consistent with the Clean Water Act and was not properly adopted.[68]

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[61] *Id.* at 4, 5, 24-26.
[62] *See id.* at 5-6.
[63] *Id.* at 26. In comments on the DEIS, EPA also recommended that "all [waste rock facilities] containing acid-generating rock be lined to prevent infiltration into groundwater." U.S. Army Corps of Engineers, Donlin PDEIS – Agency and Applicant Comments Elevated to the Corps at 3, 4 (July 30, 2015) (Agency & Applicant Comments); *see also id.* at 26, 27.
[64] *See* DEIS App. C at C-51, Tbl. C-10. An EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a).
[65] DEIS at 3.7-146.
[66] 40 C.F.R. § 122.2, *Waters of the United States or Waters of the U.S.*, (2)(i).
[67] S. Rep. No. 92-414, at 7 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3674.
[68] *See Puget Soundkeeper All., et al. v. McCarthy, et al.*, No. 2:15-cv-01342 (W.D. Wash., filed Aug. 20, 2015).

The original exclusion for waste treatment systems made clear, appropriately, that this exception applied only to manmade systems not originally created in or from impoundment of waters of the United States.[69] Shortly thereafter, in 1980, EPA temporarily suspended this sentence due to concerns about its effect on existing systems, but explained:

> EPA intends promptly to develop a revised definition and to publish it as a proposed rule for public comment. At the conclusion of that rulemaking, EPA will amend the rule, or terminate the suspension.[70]

That was 36 years ago, but neither EPA nor the Corps has completed the promised rulemaking. Even when revising the definition of "waters of the United States" last year, EPA and the Corps continued the suspension and refused to address comments on it as beyond the scope of the
CWA 5 proposed rule.[71] The time to correct this omission has long passed.

Neither EPA nor the Corps has adopted any clear or consistent position as to the proper criteria for defining a waste treatment system.[72] They have applied the concept on an ad hoc basis, often without acknowledging it.

That approach is unacceptable, particularly for a project as big and with as many threats to aquatic resources as the Donlin mine. Before deeming any portion of the project to be an exempt "waste treatment system," EPA and the Corps should undertake the rulemaking promised in 1980, adopting clear guidelines specifying the appropriate criteria for a waste treatment system. They should further document exactly how any portion of the Donlin project would qualify as a waste treatment system under those guidelines and how the rest of the project would comply with New Source Performance Standards, water quality standards, and other requirements of the Clean Water Act. All of this should be disclosed in an SEIS subject to public comment.

TAILINGS DAM

I. THE DEIS'S ANALYSIS OF A TAILINGS DAM FAILURE IS INCOMPLETE AND INSUFFICIENT.

DAM 3

The DEIS offers a very limited assessment of a tailings dam failure, as it only evaluates a spill scenario caused by a partial tailings dam failure that releases 2.6 million cubic yards of

[69] *See* 45 Fed. Reg. 33,290, 33,424 (May 19, 1980); *see also* 40 C.F.R. § 122.2, *Waters of the United States or Water of the U.S.*, (2)(i).
[70] 45 Fed. Reg. 48,620 (July 21, 1980).
[71] 80 Fed. Reg. 37,054, 37,097, 37,114 (June 29, 2015).
[72] *See*, *e.g.*, Letter from R. Hanmer, EPA, to P. Kelly, U.S. Army Corps of Engineers (May 8, 1989); Memorandum from L. Wilcher, EPA, to C. Findley, EPA (Oct. 2, 1992); Memorandum from D. Regas, EPA, to R. Smith, EPA (May 17, 2004); Letter from B. Grumbles, EPA, to J. Woodley, U.S. Army Corps of Engineers (March 1, 2006).

water or a mixture of water and tailings into Anaconda Creek.[73] A failure of the tailings dam would likely be much larger and could have catastrophic effects on people and natural resources, but the Corps did not assess those effects in the DEIS. The Corps contends that the spill scenarios in the DEIS reflect "a representative example of the types of spills that could occur, and do not represent the 'worst case' possibilities."[74] As explained below, however, a much larger spill is reasonably foreseeable and, therefore, NEPA requires the Corps to examine the effects of such a spill in the FEIS.

NEPA requires a "hard look" analysis of the environmental impacts of low-probability high-consequence events[75] unless the probability of the event is "infinitesimal."[76] Stated differently, NEPA requires an agency to disclose the environmental consequences of a potential harmful event unless the chance of its occurrence is "remote and speculative," even if there is a "reasonable assurance" that the event will not occur.[77] "Only if the harm in question is so 'remote and speculative' as to reduce the effective probability of its occurrence to zero may the agency dispense with the consequences portion of the analysis."[78] Here, the harm from a much larger tailings dam failure is reasonably foreseeable and must be analyzed.[79]

"Among the world's estimated 3,500 tailings dams the failure rate is roughly 10 times greater than the water dam failure rate, with an 'average' tailings dam having an estimated

DAM 3

[73] DEIS at 3.24-3.
[74] *Id.* at 3.24-1.
[75] *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Comm'n*, 449 F.3d 1016, 1030-32 (9th Cir. 2006) (concluding risk of terrorist attack was not so "remote and highly speculative" as to evade NEPA's obligation to consider the potential environmental effects).
[76] *Ground Zero Ctr. for Non-Violent Action v. U.S. Dep't of the Navy*, 383 F.3d 1082, 1090 (9th Cir. 2004) (finding NEPA analysis not required where risk is "between one and 100 million and one in one trillion").
[77] *New York v. Nuclear Regulatory Comm'n*, 681 F.3d 471, 478-79, 482 (D.C. Cir. 2012).
[78] *Id*. at 482; *cf. Ground Zero Ctr. for Non-Violent Action*, 383 F.3d at 1090 (holding NEPA did not require analysis of consequences of an event where probability of event was "infinitesimal," between a one in one million or one in one trillion chance only if a one in 100 million threshold event occurred).
[79] By way of illustration, prior to the *Deepwater Horizon* exploration drilling disaster, the Bureau of Ocean Energy Management consistently refused to conduct catastrophic oil spill risk and impacts analyses during its NEPA review processes, claiming such an event was not reasonably foreseeable. *See* Council on Environmental Quality, Report Regarding the Mineral Management Service's National Environmental Policy Act Policies, Practices, and Procedures As They Relate to Outer Continental Shelf Oil and Gas Exploration and Development at 27 (Aug. 16, 2010) ("The agency did not [formerly] deem a catastrophic spill . . . to be a reasonably foreseeable impact."). Following that disaster, the agency was widely criticized and is now conducting that review when analyzing proposed projects. *Id.* ("Since [the Deepwater Horizon spill on] April 20, 2010, that assumption will be revised, and BOEM will take steps to incorporate catastrophic risk analysis going forward.")

failure chance of ~0.1% every year."[80] In 2001, the International Commission of Large Dams and the United Nations Environmental Program concluded that, "on average, one major tailings dam incident occurs each year, although that figure doubled between 1995 to 2001."[81] In the ten years following that report, the failure rate of tailings dams remained at roughly one failure every eight months, or about three failures every two years.[82] In fact, failure rates increased dramatically in the early 2000s, matched only by statistics from the early to mid-1930s.[83] Historically, most tailings dam failures worldwide have occurred at operating mines and 39 percent of such failures have occurred in the United States.[84] More recently, experts have concluded that despite a recent decline in the total number of failures, "the 100 years of [tailing storage facilities] failures shows an emerging and pronounced trend since 1960 toward a higher incidence of 'Serious' and 'Very Serious' failures. That is, the consequence of loss is becoming increasingly greater."[85]

When tailings dams fail, they typically release on average between 20 and 40 percent of the tailings.[86] Not surprisingly, there appears to be a direct, if not linear relationship between the tailings outflow from a tailings dam as compared to the volume of tailings stored at the dam at the time of the failure.[87] One study found that for a significant portion of tailings dam failures, "29% for pre-2000 cases and 40% for post-2000 cases . . . dam failures released up to 0.5 x $10^6$ $m^3$of tailings into the environment."[88] The study concluded that:

> [U]sually about one-fifth of the contained volume is released. Even such volumes are sufficient to cause extensive damage to life, property, and health. For example, 0.5 x 106 $m^3$ of released tailings

DAM 3

[80] A. Mattox *et al*., *Understanding Dam Failure*, Ground Truth Trekking (Feb. 22, 2016), http://groundtruthtrekking.org/Issues/OtherIssues/understanding-dam-failure.html.
[81] G. Gavett, *Tailings Dams: Where Mining Waste Is Stored Forever*, Frontline (July 30, 2012), http://www.pbs.org/wgbh/frontline/article/tailings-dams-where-mining-waste-is-stored-forever/; *see also* International Commission of Large Dams, Tailings Dams: Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences, Bulletin 121, 19-20, 68, Fig. 2 (2001).
[82] D. M. Chambers, Long-term Risk of Tailings Dam Failure, 13 Alaska Park Science - 2 at 4-5 (Chambers Tailings Dam Failure Analysis).
[83] M. Davies, *Tailings Impoundment Failures: Are Geotechnical Engineers Listening?*, Geotechnical News at 32 (Sept. 2002); *see also* WISE Uranium Project, Chronology of Major Tailings Dam Failures (Mar. 18, 2016), (WISE Uranium Project providing a list of major failures from 1960-2016).
[84] Chambers Tailings Dam Failure Analysis at 5.
[85] L. N. Bowker & D. M. Chambers, The Risk, Public Liability, & Economics of Tailings Storage Facility Failures at 1 (Jul. 21, 2015).
[86] A. Dalpatram, Estimation of Tailings Dam Break Discharges, Workshop on Dam Break Analysis at PDF 7 (Aug. 24-26, 2011) (volume of tailings released).
[87] *Id.* at 8, Fig. 4.
[88] S. Azam & Q. Li, *Tailings Dam Failures: A Review of the Last One Hundred Years*, Geotechnical News at 52 (Dec. 2010).

> are enough to drown about 1200 North American style single-family homes.[89]

Here, the Corps' analysis of a tailings dam failure is grossly insufficient. The proposed tailings storage facility for the Donlin mine would have the capacity to store 568 million tons of tailings,[90] which is approximately 355 million cubic yards.[91] Thus, under the "usual" failure scenario, 71 million cubic yards of tailings (20 percent of 355 million) would be released. A more severe failure could mean 142 million cubic yards would be released (40 percent of 355 million). Yet the DEIS fails to examine any of these scenarios.

DAM 3

The consequences of this failure are stark. The DEIS examines the impacts from a release of 2.6 million cubic yards of water and tailings that covers approximately 1,700 acres.[92] As an initial matter, the DEIS offers no explanation for the agency's decision to examine a failure that only releases 0.73 percent of the tailings. Indeed, as explained above, contemporary research reveals that the typical volume of material released from tailings dam failings is increasing, not decreasing. If that release was, by way of illustration, 71 million cubic yards, then, based on the spill-coverage ratio outlined in the DEIS, the area affected would be more than 46,000 acres, resulting in substantial harm to nearby communities and widespread environmental damage, including, but not limited to, erosion, deposition of tailings, long-term water quality degradation and habitat loss, and adverse impacts of fish and aquatic resources. By grossly understating the size of a realistic tailings dam failure, the DEIS presents an inaccurate and incomplete assessment of the impacts, necessary alternatives, and mitigation measures. These failings must be addressed in the FEIS.

## II. THE PROJECT AND THE FEIS MUST ACCOUNT FOR THE FINDINGS FROM THE MOUNT POLLEY EXPERT PANEL.

"[O]ne important ingredient of an EIS is the discussion of steps that can be taken to mitigate adverse environmental consequences."[93] "An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective."[94]

MIT 29

Here, the DEIS's treatment of the mitigation measures associated with the best practices for the performance of the tailings dam ranges from paltry to non-existent. Most notably, the DEIS provides virtually no discussion of the findings in the Independent Expert Engineering Investigation and Review Panel's (Mount Polley Expert Panel) Report on Mount Polley Tailings

[89] *Id.*
[90] DEIS at 2-30.
[91] This is based on a conservative assumption of 1.6 metric tons per cubic meter for tailings at closure (based on 100 pounds per cubic foot).
[92] *Id.* at 3.24-49, 3.24-88.
[93] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989).
[94] *S. Fork Band Council of W. Shoshone of Nev. v. U.S. Dep't of the Interior*, 588 F.3d 718, 727 (9th Cir. 2009).

Storage Facility Breach.[95] The Corps should require the Donlin tailings facility to be modified to reflect these findings and, at a minimum, must account for these findings in assessing the impacts of tailings storage by reducing the risk of a dam failure.

The Mount Polley Expert Panel identified practices that reflect best available technology regarding tailings management,[96] including:

> 1. Elimination of surface water from the impoundment.
>
> 2. Promotion of unsaturated conditions in the tailings with drainage provisions.
>
> 3. Achievement of dilatant conditions throughout the tailings deposit by compaction.[97]

The Panel specifically concluded that "Mount Polley has shown the intrinsic hazards associated with dual-purpose impoundments storing both water and tailings."[98]

The report states pointedly, "The Panel firmly rejects any notion that business as usual can continue."[99] Unfortunately, the Donlin Gold Project as proposed in the DEIS is a business-as-usual mine, employing the very same longstanding technologies and practices that the Panel found unacceptable.

MIT 29

In light of these findings, the Corps should modify the project to eliminate, or at least minimize, water and saturation conditions at the tailings storage facility.[100] The FEIS also needs

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[95] *See generally* Independent Expert Engineering Investigation and Review Panel, Report on Mount Polley Tailings Storage Facility Breach (Jan. 30, 2015) (Mount Polley Report).

[96] In comments on the DEIS, EPA noted that "[t]he independent engineering evaluation for the Mount Polley mine incident highlighted the importance of using Best Available Technology (BAT) in designing tailing storage facilities," and recommended "a rigorous evaluation of the [tailings storage facility] options to ensure that BAT is considered in the EIS, which could minimize the environmental effects from a catastrophic tailings dam failure." Agency & Applicant Comments at 122-23. The Corps should have addressed this issue in the DEIS, *see* DEIS at 3.24-31 (observing merely that the tailings dam design was "evaluated in comparison to the Mount Polley Tailings dam" and "is considered a relatively robust dam design"), and it must do so before permitting the mine.

[97] Mount Polley Report at 121.

[98] *Id*.

[99] *Id.* at 118.

[100] EPA commented that, "[i]n light of the recent Mount Polley Mine Independent Review Panel Recommendations, the DEIS should also consider an alternative [tailings storage facility] and Dam design that is different from Donlin's proposed action." Agency & Applicant Comments at 12-13.

MIT 29 to evaluate the impacts caused by any tailings dam failure to adhere to the Mount Polley expert recommendations.

SUBSISTENCE

Subsistence is among the most important concerns for the communities that would be affected by the mine. It is therefore essential that the FEIS fully disclose potential impacts to subsistence in a straightforward way and explain how the information presented is consistent with the conclusions of other federal agencies. For the reasons discussed below, the DEIS fails to do so.

I. THE DEIS FAILS TO EXPLAIN THE APPARENT DISCREPANCY BETWEEN ITS ASSESSMENT OF SUBSISTENCE IMPACTS AND BLM'S FINDINGS UNDER ANILCA SECTION 810(A).

SUB 21 NEPA regulations require that agencies "make every effort to disclose and discuss at appropriate points in the [DEIS] all major points of view on the environmental impacts of the alternatives."[101] They further instruct that agencies "shall discuss at appropriate points in the [FEIS] any responsible opposing view which was not adequately discussed in the [DEIS] and shall indicate the agency's response to the issues raised."[102] If an FEIS fails to disclose and respond to expert opinions contradicting its conclusions, it may be held invalid.[103]

Confusingly, the Corps presents two separate subsistence analyses—its own, in the body of the DEIS, and BLM's, in an appendix—without explaining their relationship to each other and without synthesizing their conclusions. The DEIS lays out the three types of impacts BLM considers when ascertaining whether a project may significantly restrict subsistence uses under Section 810(a) of ANILCA,[104] and the DEIS follows this scheme in assessing potential impacts.[105] Yet it fails to anticipate BLM's conclusions or reconcile its rating of impacts as mostly minor[106] with BLM's finding of significant restriction. The FEIS should acknowledge this apparent discrepancy and explain how the Corps and BLM can reach seemingly inconsistent conclusions as to subsistence impacts.

[101] 40 C.F.R. § 1502.9(a).
[102] *Id.* § 1502.9(b).
[103] *See, e.g.*, *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1167-68 (9th Cir. 2003).
[104] *See* DEIS at 3.21-127.
[105] *See, e.g.*, *id.* at 3.21-138 to 3.21-148 (using headings reflecting the types of impacts BLM considers).
[106] *See id.* at 3.21-183 to 3.21-185, Tbl. 3.21-23.

## II. THE DEIS DOES NOT ADEQUATELY DISCUSS THE PROJECT'S IMPACTS ON SUBSISTENCE.

The DEIS's discussion of the project's impacts on subsistence is inadequate for at least three reasons. First, it omits information relevant to current subsistence activities in the Kuskokwim River watershed without satisfactorily explaining those omissions. Second, it gives short shrift to potential consequences for subsistence of the transportation and pipeline components of the project. Third, it skews the analysis of potential subsistence impacts by overemphasizing the potential benefits of the project.

### A. The DEIS omits information about current subsistence activities without a satisfactory explanation.

NEPA requires that agencies "succinctly describe the environment of the area(s) to be affected . . . by the alternatives under consideration."[107] The descriptions should be long enough to allow the reader to understand the effects of the alternatives.[108]

SUB 4

In discussing areas that may experience subsistence impacts, the Corps has chosen to use profiles of selected communities in the region,[109] but it also presents harvest data from other, non-representative communities.[110] The DEIS acknowledges that no community harvest data are available for Telida or Medfra[111]; it omits similar data for Georgetown and Napaimute even though those communities were apparently surveyed[112]; and it states that data on the subsistence practices of Atmautluak and Kasigluk are unavailable.[113] It also relies on studies that used different methodologies to estimate community harvest levels without fully explaining what those differences are or why they exist.[114] The lack of this baseline data, as well as undisclosed

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[107] 40 C.F.R. § 1502.15.
[108] *See id.*
[109] *See* DEIS at 3.21-15. Such an approach may be permissible when describing aspects of the environment within a particular area. *See W. Watersheds Project v. BLM*, 552 F. Supp. 2d 1113, 1128 (D. Nev. 2008) (concluding that the agency could use a representative species when describing a land-management district). It is questionable, however, whether the Corps may limit its description to only some areas, as the regulations specifically contemplate that agencies may need to describe multiple affected areas. *See* 40 C.F.R. § 1502.15.
[110] *See* DEIS at 3.21-18 to 3.21-20, Tbl. 3.21-1 (upper Kuskokwim subregion); *id.* at 3.21-29 to 3.21-31, Tbl. 3.21-3 (central Kuskokwim subregion); *id.* at 3.21-67 to 3.21-69, Tbl. 3.21-9 (lower-middle Kuskokwim subregion); *id.* at 3.21-80 to 3.21-82, Tbl. 3.21-12 (lower Kuskokwim subregion).
[111] *See id.* at 3.21-18.
[112] *See id.* at 3.21-28.
[113] *Id.* at 3.21-66.
[114] *See id.* at 3.21-16.

SUB 4 inconsistencies in collection methods,[115] raises questions about the completeness of the DEIS's discussion of potential impacts on subsistence.[116]

B. The DEIS omits information essential to a reasoned choice among the alternatives.

Once agencies have described the environment affected, they must thoroughly discuss the potential consequences of the proposed action and alternatives.[117] Where information relevant to reasonably foreseeable significant adverse impacts is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," agencies must include that information in the EIS.[118] If the information cannot be obtained, agencies must note that the information is incomplete or unavailable, explain its relevance, summarize existing credible scientific evidence, and evaluate impacts based on theoretical approaches or research methods
SUB 4 generally accepted in the scientific community.[119]

Essential information about the potential subsistence impacts of the project's transportation and pipeline components is missing from the DEIS. It notes that "there is no formal scientific research for the Kuskokwim River" on disturbance of terrestrial mammals by barge traffic,[120] instead relying on conflicting anecdotal evidence[121] to conclude that impacts would be of low intensity "with the effect that subsistence hunters may not see animals for some time following a barge passage, and may be displaced to alternative portions of their use area."[122] The DEIS similarly does not discuss the potential behavioral disturbance in fish that may result from increased barge traffic.[123] It fails to note potential disruptions to subsistence activities[124] from pipeline-construction activities such as airplane and helicopter traffic.[125] Given that moose,

[115] Agencies are required to "identify any methodologies used" in preparing an EIS. 40 C.F.R. § 1502.24. The Corps has not fully satisfied this requirement here.
[116] *Cf. Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 866 (9th Cir. 2004) (opining that an assessment of adverse impacts, based in part on a faulty assumption about existing operating conditions, "does not inspire any confidence that the Corps took the hard look that [courts] require").
[117] *See* 40 C.F.R. § 1502.16.
[118] *Id.* § 1502.22(a).
[119] *Id.* § 1502.22(b).
[120] DEIS at 3.21-155.
[121] *Id.*
[122] *Id.* at 3.21-157; *see also id.* at 3.21-166 ("Local residents have expressed differing opinions about the effect of increased barge traffic on moose in the riparian environment, and therefore on potential displacement of their moose hunting in this zone as they have done historically.").
[123] *See id.* at 3.21-156 (noting that behavioral disturbance as a potential subsistence impacts but not discussing); *see also id.* at 3.13-130 to 3.13-153 (discussing behavioral disturbance such as avoidance behavior only from elevated turbidity levels).
[124] *See id.* at 3.21-169.
[125] *See id.* at 3.12-44.

other large terrestrial mammals, and Chinook salmon are important subsistence resources,[126] information about these animals' responses to disturbance is essential to a reasoned choice among the alternatives. The Corps must either include this information in the FEIS or make the unobtainability findings NEPA requires.[127]

The DEIS also relies heavily on anecdotal evidence of potential socio-cultural impacts on subsistence.[128] While the use of such evidence may be permissible in certain situations, the information must be "sufficient to sharply define the issues and provide a clear basis for choice among options."[129] Furthermore, agencies should "make explicit reference . . . to the scientific and other sources relied upon for conclusions in [an EIS]."[130] The Corps assessed potential socio-cultural issues partly based on unidentified "Alaska studies of subsistence" and "international studies of mine impacts on indigenous people (especially in Canada)."[131] Other sources include workshops and interviews of local residents.[132] The result is a collection of widely divergent views on topics such as changes in population, cultural composition of communities, and employment and income.[133] These predictions about the socio-cultural effects of the project on subsistence are not grounded in social science and do not provide a clear basis for a choice among alternatives.

SUB 4

C. The DEIS fails to present an accurate picture of subsistence impacts because it overemphasizes the potential benefits of the project and minimizes harmful effects.

"Under NEPA, agencies must disclose both positive and negative anticipated impacts of a proposed action."[134] An EIS may be held invalid, however, if it improperly skews the analysis in favor of beneficial effects.[135] Here, the Corps places too much weight on the ways in which the project could improve subsistence, while minimizing or ignoring potential harms.

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The DEIS frequently highlights the expected benefits of the project for subsistence, simultaneously downplaying serious concerns about possible harms. For example, it notes that:

[126] *Id.* at 3.12-46, 3.21-156, 3.21-157, 3.21-166.
[127] *See* 40 C.F.R. § 1502.22.
[128] *See* DEIS at 3.21-128.
[129] *Citizens' Comm. to Save Our Canyons v. Krueger*, 513 F.3d 1169, 1180 (10th Cir. 2008).
[130] 40 C.F.R. § 1502.24; *see also Nat'l Audubon Soc'y v. Dep't of the Navy*, 422 F.3d 174, (4th Cir. 2005) (citing this provision for the proposition that "NEPA demands more than 'anecdotal evidence.'").
[131] DEIS at 3.21-128.
[132] *See id.*
[133] *See id.* at 3.21-128 to 3.21-134.
[134] *W. Watersheds Project v. BLM*, 971 F. Supp. 2d 957, 974 (E.D. Cal. 2013).
[135] *Cf. Laguna Greenbelt, Inc. v. U.S. Dep't of Transp.*, 42 F.3d 517, 528-29 (9th Cir. 1994) (holding that an EIS that presented both positive and negative effects in a consistent way did not violate NEPA).

- Although dust emissions from construction and operation of the mine could be deposited on berries, most berry picking takes place elsewhere.[136] BLM, however, notes that "[a]reas important to Crooked Creek for berry picking would be directly affected by the mine, and adjacent areas would potentially be contaminated with dust emissions containing various particulate materials from ore processing, maintaining haul roads and access roads."[137]

- The mine site could have major effects on fish and aquatic resources in the Crooked Creek drainage, but "Getmuna Creek and Bell Creek and the lower reaches of Crooked Creek, where most salmon escapement and production in the drainage occurs, would experience negligible impacts."[138] While direct impacts on fish in larger water bodies might be unnoticeable, discharges from the mine could alter aquatic food webs there and "affect salmon and resident fish populations important to subsistence."[139]

- Closure and reclamation of the mine site would have *positive* effects on habitat and wildlife because previously disturbed areas would return to their natural states and the contaminated pit lake "would become a new area of standing water that could attract wildlife and migratory birds."[140] BLM's analysis presents a more sobering picture: "After mine closure, the pit lake would fill with untreated water (containing mine site reagents, traces of sodium cyanide, traces of mercury suppressant and insoluble sulfide-mercury particles, autoclave discharge, and human waste) that could be toxic to fish and wildlife."[141]

SUB 12

- Although out-migration due to employment at the mine was "of considerable concern" to interview respondents and "generated a wide variety of responses," some respondents thought that good jobs would lead residents to stay, others said the outcome would depend on the person and the situation, and "fewer respondents were willing to predict that people would simply leave." Only a positive response is quoted, skewing the discussion of this vital issue.[142]

- The habitat and subsistence areas affected by the mine access road, airstrip, and port site would be relatively small.[143] Regardless of the relative proportions of subsistence areas affected, however, BLM observes that many villages could face consequences, from Crooked Creek to the mouth of the Kuskokwim River.[144]

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[136] DEIS at 3.21-139.
[137] *Id.* App. N at 10-11.
[138] *Id.* at 3.21-140.
[139] *Id.* App. N at 11.
[140] *Id.* at 3.21-141.
[141] *Id.* App. N at 11.
[142] *See id.* at 3.21-150.
[143] *Id.* at 3.21-155; *id.* at 3.21-156.
[144] *Id.* App. N at 11.

- The parts of subsistence areas affected by the pipeline would also be relatively small, and wintertime construction would allow access to subsistence resources.[145] Again, however, BLM notes that construction and operation of the pipeline could affect subsistence in numerous villages.[146] It concludes that construction activities "would cause a redistribution of moose, caribou and furbearers, and affect access to subsistence use areas and availability of subsistence resources."[147]

SUB 12 The one-sidedness of the discussion of subsistence impacts in the DEIS—in stark contrast to BLM's analysis under ANILCA Section 810(a)—does not serve NEPA's purpose of facilitating a reasoned choice among alternatives, including the no-action alternative.

The DEIS also completely ignores the potential long-term effects of the mine access road on competition for scarce subsistence resources. It characterizes the effect of transportation facilities on competition for subsistence resources as low-intensity because most of the construction workforce would be local residents, and non-local workers would likely move out of the region once facilities are constructed.[148] Yet it does not discuss how the mine access road, which is expected to remain in place post-closure for reclamation and monitoring,[149] could increase competition. This is a key omission, as local residents in the vicinity of the *pipeline* expressed "major concern" that construction-related infrastructure would "enhance[] opportunities for non-locals to access the area."[150] The Corps should address the same potential increase in competition from the mine access road.

## III. BLM'S CONCLUSIONS UNDER ANILCA SECTION 810(A) ARE JUSTIFIED AND WOULD NOT WARRANT GRANTING A RIGHT-OF-WAY WITHOUT FURTHER ANALYSIS.

SUB 21 In its preliminary analysis of subsistence impacts under Section 810(a) of ANILCA,[151] BLM found that each of the alternatives discussed in the DEIS could significantly restrict subsistence.[152] Through ANILCA, Congress intended to "provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so."[153] BLM's preliminary analysis largely comports with that purpose. Given the subsistence impacts disclosed in the DEIS, however, further assessment of subsistence impacts would be needed to make the determinations necessary before granting a right-of-way.

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[145] *See id.* at 3.21-179.
[146] *See id.* App. N at 11.
[147] *Id.*
[148] *See id.* at 3.21-167 to 3.21-168.
[149] *See* DEIS at 3.21-157; *see also id.* at 3.21-167 (noting a potential positive effect on access to subsistence resources from local use of the mine access road).
[150] *Id.* at 3.21-179.
[151] 16 U.S.C. § 3120(a).
[152] *See* DEIS App. N at 14 (Alternative 2), 16-17 (Alternative 3A), 19 (Alternative 3B), 21 (Alternative 4), 22 (Alternative 5A), 23 (Alternative 6A), 24 (the cumulative case).
[153] 16 U.S.C. § 3101(c).

A. BLM's evaluations and findings under ANILCA Section 810(a) are legally sound and well supported.

*1. Evaluations*

ANILCA requires that federal agencies, before permitting any use, occupancy, or disposition of public lands, evaluate (1) its effect on subsistence uses and needs; (2) the availability of other lands for the purposes sought to be achieved; and (3) other alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes.[154] Evaluations (2) and (3) are especially important because, unlike evaluation (1), they are not reflected in other findings. "ANILCA require[s] [agencies] to consider reasonable alternatives to a proposed action."[155] BLM's preliminary analysis likely satisfies the statute in these respects, but it would benefit from additional information in the FEIS.

Regarding the availability of other lands, approximately 31 percent of the proposed pipeline right-of-way would be located on BLM-managed lands, in discontinuous segments from milepost (MP) 168 to MP 310.[156] BLM notes that the right-of-way was selected to optimize economic and environmental considerations such as length and avoidance of hazards, wetlands, the INHT, and Alaska Native allotments.[157] Yet "[n]o detailed analysis of alternative routes to avoid BLM-management lands is available."[158] Along these lines, the agency observes that non-BLM-managed lands are potentially available within 5 miles of the pipeline from MP 169 to MP 204, but that geotechnical and wetlands analyses for these areas are lacking.[159] Additional information about the feasibility and environmental consequences of routes through these non-federal lands in the FEIS could bolster BLM's analysis under ANILCA Section 810(a). Ultimately, however, the pipeline will likely have to cross at least some BLM-managed lands.[160]

PAA 15

The third evaluation calls for an analysis of alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes.[161] BLM does not specifically discuss any such alternatives, instead generally referring to the section of the DEIS that lists alternatives not carried forward for analysis.[162] Whether or not this treatment is adequate under ANILCA, its brevity is understandable given the dearth of analysis of non-pipeline alternatives in the DEIS. For example, the DEIS lists an option in which the mine's ore throughput would be reduced to

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[154] *Id.* § 3120(a).
[155] *Alaska Wilderness Recreation Tourism Ass'n v. Morrison*, 67 F.3d 723, 731 (9th Cir. 1995) (citation omitted).
[156] DEIS App. N at 13.
[157] *Id.* App. N at 14.
[158] *Id.*
[159] *Id.*
[160] *See id.*
[161] 16 U.S.C. § 3120(a).
[162] *See* DEIS App. N at 14.

30,000 tons per day, making construction of the pipeline uneconomic.[163] Despite the additional benefits of a longer, more-constant period of employment in the region, the DEIS eliminates the
PAA 15 alternative due to increased diesel barging.[164] Without a more detailed discussion of impacts of this and other non-pipeline options, it is unclear why the Corps rejected them.[165] To satisfy NEPA and facilitate the ANILCA evaluations, the Corps should provide a more detailed discussion of non-pipeline options in the FEIS and fully explain the reasons for not carrying them forward as alternatives.

*2. Findings*

ANILCA also prohibits agencies from permitting any use of public lands that would "significantly restrict subsistence uses" without first following certain procedures and making
SUB 21 specific determinations.[166] To ascertain whether a significant restriction would result from a use of public lands, BLM considers (1) reduction in the availability of subsistence resources caused by a decline in the population or abundance of harvestable resources; (2) reduction in the availability of subsistence resources caused by alteration of their distribution, migration patterns,

[163] *Id.* App. C at C-43, Tbl. C-7.

[164] *Id.* Similarly, the DEIS rejects an option generally to eliminate the pipeline because the resultant higher level of barging "is considered infeasible." *Id.* App. C at C-79, Tbl. C-22. A memorandum by URS dated January 6, 2014 concludes that a reduced-throughput alternative without a pipeline would be logistically feasible, although it "does not appear to present opportunities for impact reduction." Memorandum from T. Brelsford & B. Craig, URS, to D. Kuhle & K. Gordon, U.S. Army Corps of Engineers at 4 (Jan. 6, 2014). A responding memorandum by Northern Economics states that "the reduced mill throughput option without a natural gas pipeline would not justify a decision to construct the mine," based on experience at other mines. Memorandum from P. Burden, Northern Economics, to T. Brelsford & B. Craig, URS at 3 (Feb. 3, 2014). The Corps should acknowledge and resolve these differences of opinion if it insists on not carrying forward a reduced-throughput option in the FEIS.

[165] *Cf. 'Ilio'ulaokalani Coal. v. Rumsfeld*, 464 F.3d 1083, 1095, 1098 (9th Cir. 2006) (noting that "[t]he existence of reasonable but unexamined alternatives renders an EIS inadequate," and that the Army's decision not to consider conducting activities outside Hawaii "was never explained or justified and foreclosed alternatives that could have been consistent with the Army's stated mission"). In an October 30, 2013 letter, Donlin Gold urged the Corps to reverse its initial decision to analyze the reduced-throughput option as an alternative in the DEIS. *See* Letter from R. Enos, Environmental and Permitting Manager, Donlin Gold, to D. Kuhle, U.S. Army Corps of Engineers at 1 (Oct. 30, 2013). The letter points out that a lower-throughput option would not provide maximum economic benefits to the landowners and mineral rights owners, consistently with the purpose and need of the proposal. *Id.* at 2. The Corps has since acknowledged that the purpose and need statement, *see* DEIS at 1-9, should not have included private economic benefits to Donlin Gold and Native Corporation shareholders. Furthermore, the Corps' decision whether to carry forward an alternative for analysis should not depend on the degree of profitability for the project proponent.

[166] 16 U.S.C. § 3120(a).

or location; and (3) limitations on access to subsistence resources.[167] BLM's use of these three considerations is legally permissible, and the agency may reserve a "no significance" finding for situations where there would be no reductions or only slight reductions of resources or access.[168] Furthermore, BLM correctly relied on information in the DEIS in conducting its analysis under ANILCA Section 810(a).[169] It properly considered cumulative impacts[170] from other activities in the region and does not limit its analysis to pipeline impacts.[171]

BLM concludes in its preliminary analysis that the proposed action could significantly restrict subsistence near the mine site, along the Kuskokwim River, and adjacent to the pipeline right-of-way.[172] The following effects contributed to that finding, and, as noted, each is supported by information in the DEIS:

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- Mine activities, including ore trucks in the mine, trucks on the port road, drilling, blasting, power generation, and port-site activity, would likely change the distribution of wildlife species important to subsistence, such as moose, caribou, and furbearers.[173]

- Areas important to Crooked Creek for berry picking would be affected by the mine, with adjacent areas potentially being contaminated by dust emissions.[174]

- Water released from the mine during operations could affect salmon and resident fish populations important to subsistence and alter the aquatic food web in Crooked Creek and the Kuskokwim River.[175]

- Post-closure, runoff from the tailings storage facility and the pit lake could contaminate fish resources important to subsistence in Crooked Creek and the Kuskokwim River.[176]

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[167] DEIS App. N at 2.
[168] *See Kunaknana v. Clark*, 742 F.2d 1145, 1151-52 (9th Cir. 1984).
[169] *Cf. Alaska Wilderness Recreation & Tourism Ass'n*, 67 F.3d at 731 (faulting agency for failing to reconsider alternatives in an EIS in order to satisfy both NEPA and ANILCA).
[170] *Cf. Te-Moak Tribe of W. Shoshone of Nev. v. U.S. Dep't of the Interior*, 608 F.3d 592, 602 (9th Cir. 2010) ("NEPA requires that where several actions have a cumulative environmental effect, this consequence must be considered in an EIS." (internal quotation marks and citations omitted)).
[171] *Cf. Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 895 (9th Cir. 2002) (concluding that the agency had not impermissibly segmented NEPA review of an action so as to minimize environmental consequences).
[172] *See* DEIS App. N at 14.
[173] *Id.* App. N at 10; *see also id.* at 3.21-138 to 3.21-139.
[174] *Id.* App. N at 10; *see also id.* at 3.21-139.
[175] *Id.* App. N at 11; *see also id.* at 3.13-89.
[176] *Id.* App. N at 11; *see also id.* at 3.7-156 to 3.7-160; *id.* at 3.13-90.

- During pipeline construction, clearing of the right-of-way, trenching, drilling, and other disturbances would cause a redistribution of moose, caribou, and furbearers and limit access to and availability of subsistence resources.[177]

- During operations, the Farewell airstrip could increase competition for subsistence resources.[178]

- Barging on the Kuskokwim River would interfere with subsistence fishing and harm salmon and resident fish populations.[179]

- A release of diesel fuel from a barge would affect fish and water birds on the Kuskokwim River—including Chinook salmon and migratory birds—and would have major impacts on subsistence resources.[180]

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- A release of cyanide from a barge would kill all organisms used for subsistence at very low concentrations and could have major effects on the aquatic ecosystem.[181]

- A release of mercury from a barge would increase the chronic exposure of fish and other aquatic organisms.[182]

- A partial tailings dam failure would reduce access to subsistence resources and contaminate fish and wildlife habitat.[183]

Both individually and collectively, these impacts support a finding that the project "may significantly affect" subsistence uses.[184]

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[177] *Id.* App. N at 11; *see also id.* at 3.21-169 to 3.21-179.
[178] *Id.* App. N at 11; *see also id.* at 3.21-179 to 3.21-180.
[179] *Id.* App. N at 11; *see also id.* 3.21-155 to 3.21-157; *id.* at 3.21-159 to 3.21-167.
[180] *Id.* App. N at 12; *see also id.* at 3.24-195.
[181] *Id.* App. N at 13; *see also id.* at 3.24-195 to 3.24-196.
[182] *Id.* App. N at 13; *see also id.* at 3.24-196.
[183] *Id.* App. N at 13; *see also id.* at 3.24-197.
[184] The findings for the other action alternatives are also based on information in the DEIS. *Compare id.* App. N at 16 (discussing liquefied natural gas release under Alternative 3A), *id.* App. N at 17-18 (discussing diesel releases from the pipeline and barges under Alternative 3B), *id.* App. N at 20 (discussing the extended mine access road under Alternative 4), *id.* App. N at 23 (discussing cumulative effects), *with id.* at 3.24-198 (discussing liquefied natural gas release under Alternative 3A), *id.* at 3.24-198 to 3.24-199 (discussing diesel releases from the pipeline and barges under Alternative 3B), *id.* at 3.21-190 (discussing the extended mine access road under Alternative 4), *id.* at 4-51 to 4-52 (discussing cumulative effects).

B. The DEIS does not support the determinations that BLM must make under ANILCA Section 810(a) in order to grant a right-of-way.

Once BLM finds that a right-of-way over public lands could significantly restrict subsistence uses, the right-of-way may be granted only if the agency determines that: (a) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands; (b) the right-of-way will involve the minimal amount of public lands necessary to accomplish the purposes of the right-of-way; and (c) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from the right-of-way.[185] For the reasons discussed below, the information presented in the DEIS does not support any of these findings.

*1. Necessary*

When deciding whether a particular use of public lands is "necessary, consistent with sound management principles for the utilization of public lands,"[186] agencies must follow policy directives established in their organic statutes.[187] The Federal Land Policy and Management Act requires BLM to "manage the public lands under principles of multiple use and sustained yield, in accordance with . . . land use plans."[188] Land use plans, in turn, must "use and observe the principles of multiple use and sustained yield" and "give priority to the designation and protection of areas of critical environmental concern."[189] These principles will therefore govern BLM's determination whether a right-of-way over public lands for the pipeline is "necessary" under ANILCA.

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The pipeline would traverse BLM's Ring of Fire and Southwest planning areas.[190] The agency's management plan for the Ring of Fire planning area allows rights-of-way for gas pipelines, with stipulations for "[c]ontrol or prevention of damage to the environment" and "[p]rotection of subsistence resources and the user's access to those resources."[191] It identifies an overall goal of "[p]rovid[ing] a balance between land use (Rights-of-Way, permits, leases and sales) and resource protection which best serves the public at large."[192] The management plan for the Southwest planning area allows rights-of-way "on a case-by-case basis."[193]

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[185] *See* 16 U.S.C. § 3120(a)(3).
[186] *Id.* § 3120(a)(3)(A).
[187] *See Hoonah Indian Ass'n v. Morrison*, 170 F.3d 1223, 1227 (9th Cir. 1999).
[188] 43 U.S.C. § 1732(a).
[189] *Id.* § 1712(c)(1), (3).
[190] *See* DEIS at 1-11 to 1-12.
[191] *See id.* at 1-11; *see also* Bureau of Land Management (BLM), Ring of Fire Approved Plan at 12 (Mar. 2008) (Ring of Fire RMP).
[192] Ring of Fire RMP at 7.
[193] *See* DEIS at 1-12; *see also* BLM, Management Framework Plan: Southwest Planning Area at 19 (Nov. 1981) (Southwest MFP).

The management plan for the Southwest planning area designates the Kuskokwim River area as an area of critical environmental concern because of its importance as nesting habitat for bald eagles, golden eagles, osprey, and gyrfalcons.[194] The DEIS notes that bald and golden eagle nests were found along the proposed pipeline corridor, and that power lines pose a threat of electrocution, but it does not discuss other impacts on these species, or osprey and gyrfalcons.[195] BLM is also considering designating an area of critical concern in lands currently managed under the Southwest plan where sheefish spawn.[196] Sheefish are an important subsistence resource for several communities in the region, and some have reported that they are already becoming scarce.[197] BLM notes that "[s]heefish spawning grounds have very specific needs and occur in small numbers on the Kuskokwim River. . . . Because of this, the habitat in and around the existing spawning grounds needs to be protected, to allow for future productivity of the species."[198] It concludes that "[a]ny disturbance of this area could impact the sheefish population on the entire Kuskokwim River,"[199] and that "[a]n impact to this spawning habitat could severely affect sheefish spawning leading to a decline in sheefish spawning success and survival throughout the Kuskokwim River."[200] The DEIS suggests that wintertime construction of the pipeline could harm sheefish eggs but does not describe the potential effects in any depth.[201] Nor does it depict whitefish harvest locations for McGrath, Nikolai, and Takotna, presenting only salmon harvest locations.[202] These data might be relevant to BLM's determination whether the use of public lands for the pipeline is consistent with sound management principles.

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In sum, a number of environmental considerations will factor into BLM's determination whether a right-of-way is "necessary, consistent with sound management principles" under ANCILA. The DEIS does not provide sufficient information for BLM to conclude that it is.

*2. Minimal amount of public lands*

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BLM also cannot grant a right-of-way unless it determines that that use will involve the minimal amount of public lands necessary to accomplish its purposes.[203] The focus is on minimizing the area of public lands needed to achieve the goals of the use, rather than

[194] Southwest MFP at 2.
[195] *See* DEIS at 3.12-159 to 3.12-160.
[196] *See* BLM, Bering Sea – Western Interior Resource Management Plan: Areas of Critical Environmental Concern: Report on the Application of the Relevance and Importance Criteria at 33-38 (Apr. 2015) (BSWI ACEC Report).
[197] *See* J. M. Van Lanen, D. Runfola & D. Koster, Whitefish Trends on the Upper Kuskokwim River: Ethnographic Overview and 2012-2013 Nonsalmon Fish Harvests, Nikolai and Lime Village, Alaska at 34, Fig. 3-4, 47, 49, 103, Fig. 4-5, 109, Fig. 4-7, 131, Fig. 4-15 (2015).
[198] BSWI ACEC Report at 33.
[199] *Id.* at 34.
[200] *Id.* at 37.
[201] *See* DEIS at 3.13-161.
[202] *See id.* at 3.21-173, Fig. 3.21-61.
[203] *See* 16 U.S.C. § 3120(a)(3)(B).

minimizing impacts on subsistence.[204] Although it is not apparent from the face of the statute, agencies must balance land-management objectives when making this determination; they need not reject all but the smallest use.[205]

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The DEIS does not evaluate in detail alternative pipeline routes that would avoid public lands, although BLM has identified a few possibilities.[206] Without additional analysis of alternative routes, BLM cannot reasonably determine that the proposed pipeline uses the minimum amount of public lands necessary to accomplish its purposes.

*3. Reasonable steps to minimize adverse impacts*

ANILCA requires that BLM deny rights-of-way across public lands unless reasonable steps will be taken to minimize subsistence impacts that result from that use.[207] The DEIS lists several measures that would reduce the project's adverse effects on subsistence, including a no-

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hunting policy for employees at work sites, public communication programs about construction activities and barge traffic, and design features such as double-hulled barges.[208] It also notes standard permit conditions and best management practices that could reduce impacts to subsistence, though such plans have yet to be developed.[209] The Corps, together with BLM, should develop a much more rigorous set of requirements to minimize subsistence impacts before BLM makes the determinations necessary for a right-of-way to be granted.

WETLANDS

Wetlands provide a number of important ecological functions and values.[210] These functions and values include fish and wildlife habitat, water quality improvement, flood storage, and many other benefits.[211] It is therefore critical that the DEIS present a full picture of the project's potential impacts on wetlands and related aquatic ecosystems, one which will enable the Corps to fulfill its obligations under Section 404 of the Clean Water Act. For the reasons discussed below, the DEIS fails to do so.

[204] *See Hoonah Indian Ass'n*, 170 F.3d at 1229-30.
[205] *See id.* at 1229.
[206] *See* DEIS App. N at 14.
[207] *See* 16 U.S.C. § 3120(a)(3)(C).
[208] DEIS at 3.21-182.
[209] *See id.*
[210] *See generally* EPA, Wetland Functions and Values, https://www.epa.gov/sites/production/files/2016-02/documents/wetlandfunctionsvalues.pdf.
[211] *Id.* at 2.

I. THE DEIS DOES NOT ADEQUATELY DISCUSS THE PROJECT'S IMPACTS ON WETLANDS.

NEPA requires that environmental impact statements (EISs) discuss, in detail, the environmental impacts of both the proposed action and alternatives.[212] The description of environmental consequences "forms the scientific and analytic basis for the comparisons" of alternatives,[213] and a decision may be ruled invalid where the EIS supporting it does not present a sufficiently detailed statement of environmental impacts and alternatives.[214] The DEIS's discussion of the project's impacts on wetlands falls short in several regards.

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The Corps relies on Donlin Gold's assessment of wetlands functions, putting off its own assessment until the FEIS has been published.[215] This reliance is misplaced, given that the Corps has recognized that Donlin Gold's methodology is not intended for use in Alaska.[216] The Corps has also deferred functional assessment of wetlands for Alternative 4, which will be performed "if the alternative is carried forward for analysis in the Final EIS."[217] Presenting key information about an alternative for the first time in the FEIS does not serve the purposes of NEPA.[218]

The DEIS also ignores certain wetlands impacts because of a lack of data. For example, under Alternative 3B, the DEIS depicts as unknown wetland classifications in much of the area adjacent to the diesel pipeline segment near Tyonek.[219] That information could be important to assessing the pipeline's effects on estuaries there.[220] Similarly, the DEIS does not attempt to quantify the indirect wetlands impacts of Alternative 5A, which includes the dry-stack tailings facility; instead, it simply lists the impacts as greater than those of the preferred alternative.[221] Wetland mapping of the Dalzell Gorge pipeline route under Alternative 6A did not include camps, access roads, airstrips, and material sites used during construction because siting information is unavailable.[222] And, for all alternatives, the DEIS omits the long-term effects on wetlands of a lower equilibrium groundwater level at the mine site post-closure due to a lack of detail in the model.[223] If incomplete information relevant to reasonably foreseeable significant

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[212] 42 C.F.R. § 4332(2)(C)(i), (iii); 40 C.F.R. § 1502.16(d).
[213] 40 C.F.R. § 1502.16(d).
[214] *See Lands Council v. Powell*, 395 F.3d 1019, 1027 (9th Cir. 2004).
[215] *See* DEIS at 3.11-7.
[216] *See id.* App. M at 5.
[217] *Id.* at 3.11-5.
[218] *See Lands Council*, 395 F.3d at 1027 ("Congress wanted each federal agency spearheading a major federal project to put on the table, for the deciding agency's and for the public's view, a sufficiently detailed statement of environmental impacts and alternatives so as to permit informed decision making.").
[219] *See* DEIS at 3.11-51, Fig. 3.11-13H.
[220] *See id.* at 3.11-124.
[221] *See id.* at 3.11-147, Tbl. 3.11-58; *see also id.* at 3.11-138 (noting simply that "[p]otential indirect effects from fugitive dust could be increased during operations under Alternative 5A").
[222] *See id.* at 3.11-141.
[223] *See id.* at 3.11-73.

adverse impacts is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the Corps must include that information in the EIS.[224] The omissions identified above are significant, and the Corps has not adequately evaluated such impacts using alternative methods.[225]

CWA 5 It is also unclear from the DEIS how many acres of wetlands will be affected. The Corps acknowledges that it has required Donlin Gold to use a different methodology than the company originally used to determine the extent of the project's impacts on wetlands and other waters of the United States.[226] Thus, the acreage is "expected to drop" from about 10,000 acres to about 7,000 acres.[227] Although the text of the DEIS appears to use the lower number,[228] Donlin Gold's proposed compensatory mitigation plan in Appendix M confusingly assumes wetlands impacts are still closer to 10,000 acres.[229] Depending on the number of acres and the significance of the projected impacts under the new methodology, the additional analysis may be necessary before the Corps renders a permitting decision.[230]

## II. THE DEIS DOES NOT EXPLAIN HOW THE PROPOSED FILLING OF WETLANDS WOULD BE CONSISTENT WITH GUIDELINES ESTABLISHED UNDER THE CLEAN WATER ACT.

The Clean Water Act limits the Corps' authority to issue permits for the discharge of fill material into wetlands.[231] Specifically, Section 404(b)(1) of the Clean Water Act requires the

CWA 4 Corps to apply guidelines established by EPA to restore and maintain the integrity of aquatic ecosystems.[232] The Corps' regulations state that a permit will be denied if the proposed discharge would not comply with the 404(b)(1) guidelines.[233]

Under these guidelines, "degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts."[234] Discharging fill material in wetlands often destroys habitat and vegetation, degrades water

[224] 40 C.F.R. § 1502.22(a).
[225] *See id.* § 1502.22(b).
[226] *See* DEIS App. J, Reader Letter; *see also id.* App. M at 5.
[227] *See id.* App. J, Reader Letter.
[228] *See id.* at 3.11-58, Tbl. 3.11-14 (indicating a wetlands impact area of 6,966.7 acres).
[229] *See id.* App. M. at 9, Tbl. 3-3 (listing wetlands impacts as 9,757.9 acres).
[230] *See* 40 C.F.R. § 1502.9(c)(1)(ii) (requiring a supplemental EIS if there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts").
[231] *See* 33 U.S.C. § 1344(a), (b), (d); *see also id.* § 1362(7) (defining "navigable waters" as "waters of the United States"); 33 C.F.R. § 328.3(a)(1), (5), (6) (defining "waters of the United States" to include waters that may be used in interstate commerce, tributaries of such waters, and wetlands adjacent to those tributaries and waters).
[232] *See* 33 U.S.C. § 1344(b)(1); 40 C.F.R. § 230.1(a).
[233] 33 C.F.R. § 323.6(a).
[234] 40 C.F.R. § 230.1(d).

quality, and diminishes wetlands' capacity to store floodwater and shield upland areas from erosion.[235] "Fundamental to [the 404(b)(1)] Guidelines is the precept that . . . fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact."[236]

CWA 4 Discharging fill material into wetlands violates the 404(b)(1) guidelines when (1) there is a practicable alternative that would have less adverse effect on wetlands; (2) the proposed filling would significantly degrade the aquatic ecosystem; or (3) the proposed filling does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem.[237] In applying these criteria, the Corps must make detailed factual determinations as to the potential environmental effects of the proposed filling,[238] and it must indicate whether the project complies with the 404(b)(1) guidelines in the record of decision based on the FEIS.[239] For the reasons discussed below, the analysis contained in the DEIS fails to demonstrate that the proposed filling would comply with the 404(b)(1) guidelines.

A. <u>The DEIS does not indicate whether or how the proposed action is the least environmentally damaging practicable alternative (LEDPA).</u>

The 404(b)(1) guidelines prohibit filling of wetlands and other aquatic ecosystems "if there is a practicable alternative to the proposed discharge which would have less adverse impact."[240] An alternative is practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."[241]

CWA 4 Where the activity in question does not require access or proximity to special aquatic sites such as wetlands, practicable alternatives that would not affect such sites—and therefore would be less harmful—are presumed to be available unless clearly demonstrated otherwise.[242] Under standard operating procedures, the Corps analyzes alternatives under the 404(b)(1) guidelines as part of its discussion of alternatives in an EIS.[243]

The Corps has not explicitly proposed a finding that Alternative 2 would be the least environmentally damaging practicable alternative (LEDPA). On the contrary, it has determined

[235] *Id.* § 230.41(b).
[236] *Id.* § 230.1(c).
[237] *See id.* § 230.12(a)(3)(i)-(iii).
[238] *See id.* §§ 230.11, 230.12(b).
[239] *See* 33 C.F.R. § 325.2(a)(6); *see also* DEIS at 1-13. Although the DEIS suggests that its analysis of compliance with the 404(b)(1) guidelines will be "in addition to the Final EIS," DEIS at 1-13, it elsewhere notes that the alternatives discussed in the DEIS were developed in part to "assure compliance with the requirements of the 404(b)(1) Guidelines," *id.* at 2-1.
[240] 40 C.F.R. § 230.10(a).
[241] *Id.* § 230.10(a)(2).
[242] *See id.* § 230.10(a)(3).
[243] *See* U.S. Army Corps of Engineers, Memorandum for Commanders, Major Subordinate Commands and District Commands Re: Updated Standard Operating Procedures for the U.S. Army Corps of Engineers Regulatory Program at 20 (2009).

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that the basic purpose of the project—producing gold from ore reserves—is not water-dependent, and it acknowledges that that determination creates a presumption that practicable alternatives less damaging to wetlands exist.[244] The DEIS fails to rebut the presumption.[245] Although the Corps did consider a few options that would have lesser impacts on wetlands than the proposed action,[246] it never coherently explains how the project in its current configuration qualifies as the LEDPA.[247] Given the scale of the project's potential impacts on wetlands, the Corps must conduct a more thorough analysis of alternatives that may qualify as the LEDPA.[248] It should correct this deficiency in the FEIS.

B. The DEIS does not describe how the project's impacts on wetlands would not significantly degrade those ecosystems.

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Under the 404(b)(1) guidelines, the Corps may not permit discharges of fill material that will "cause or contribute to significant degradation" of wetlands.[249] Examples of effects contributing to significant degradation include loss of fish and wildlife habitat or loss of wetlands' capacity to filter water.[250] The extent and duration of the impacts on wetlands, as well as the wetlands' uniqueness, are relevant considerations.[251] If the Corps finds that the project would significantly degrade wetlands, it may issue a permit conditioned on minimization of, or compensation for, impacts.[252] However, inadequacies in plans for minimization or compensation[253] may invalidate the decision to allow discharge.[254]

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[244] *See* DEIS at 1-10.

[245] *Cf. Greater Yellowstone Coal. v. Flowers*, 321 F.3d 1250, 1262 n.12 (10th Cir. 2003) ("[U]nder the [Clean Water Act], it is not sufficient for the Corps to consider a range of alternatives to the proposed project: the Corps must rebut the presumption that there are practicable alternatives with less adverse environmental impact.").

[246] *See* DEIS App. C at C-24, Tbl. C-3 (reducing mine access road to one lane in wetlands); *id.* App. C at C-50, Tbl. C-10 (commingling the waste rock facility and the tailings storage facility); *id.* App. C at C-79, Tbl. C-22 (eliminating the pipeline).

[247] *Cf. Nw. Bypass Grp. v. U.S. Army Corps of Eng'rs*, 470 F. Supp. 2d 30, 44-45 (D.N.H. 2007) (noting that the Corps had evaluated the practicability and impacts to wetlands of several different routes in approving the construction of a road).

[248] *Cf. Greater Yellowstone Coal.*, 359 F.3d at 1271-73 (citing 40 C.F.R. § 230.6(b) and concluding that the Corps' level of effort and documentation in determining the LEDPA sufficed because the project at issue would eliminate only 1.45 acres of wetlands).

[249] 40 C.F.R. § 230.10(c).

[250] *See id.* § 230.10(c)(3).

[251] *See Bering Strait Citizens for Responsible Res. Dev. v. U.S. Army Corps of Eng'rs*, 524 F.3d 938, 949 (9th Cir. 2008).

[252] *See City of Olmstead Falls, Ohio v. EPA*, 435 F.3d 632, 637-38 (6th Cir. 2006); *Ohio Valley Envtl. Coal. v. U.S. Army Corps of Eng'rs*, 674 F. Supp. 2d 783, 790 (S.D. W. Va. 2009).

[253] *See infra* pp. 32-33 (identifying deficiencies in the DEIS's discussion of minimization of wetlands impacts); *infra* pp. 35-36 (identifying issues with Donlin Gold's compensatory mitigation plan).

The DEIS does not address the "significant degradation" finding that the Corps must make under the 404(b)(1) guidelines. That omission is significant because a positive finding would elevate the importance of the mitigation measures proposed in the DEIS. Indeed, where
CWA 4 the Corps' decision to issue a permit relies on a NEPA document, flaws in the underlying analysis may call into question the Corps' finding that the project would not result in significant degradation of wetlands.[255] The Corps should explain how the proposed mitigation would avoid significant degradation of wetlands, and it must account for any differences between the FEIS and the DEIS regarding impacts to these ecosystems.[256]

C. Alternative 2 does not include all appropriate and practicable measures to minimize potential impacts to wetlands.

The 404(b)(1) guidelines prohibit issuance of a permit "unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem."[257] Subpart H of the guidelines provides examples of actions the Corps might take to minimize adverse effects,[258] which courts have viewed as the "correct factors" for the Corps to consider when making its determination.[259] They include limiting the
MIT 21 solid or liquid components of material to be discharged, using lined containment areas to reduce leaching of chemicals, and capping contaminated material in place with clean material, among other things.[260]

The Corps has largely deferred any action to minimize impacts on wetlands at this point, noting that minimization is part of a separate mitigation process that is "commonly not completed at the time of release of the Draft EIS for public review."[261] Thus, the DEIS notes: "The layout of major mine facilities was designed to minimize wetland impacts . . . . The 404(b)(1) analysis will document the steps taken to minimize wetlands impacts."[262] Likewise, transportation infrastructure would be located "along ridge tops whenever possible to minimize wetlands . . . impacts."[263] These proposed design features would apparently *avoid* actions directly in wetlands where possible, an important first step in decreasing harms to aquatic

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[254] *See All. to Save the Mattaponi v. U.S. Army Corps of Eng'rs*, 606 F. Supp. 2d 121, 134 (D.D.C. 2009).
[255] *See Friends of the Earth v. Hall*, 693 F. Supp. 904, 945-46 (W.D. Wash. 1988).
[256] *Cf. Sierra Club v. U.S. Army Corps of Eng'rs*, 614 F. Supp. 1475, 1495-96, 1517 (S.D.N.Y. 1985) (holding arbitrary the Corps' decision to issue a landfill permit where its conclusions about impacts on a fishery differed dramatically from those in a draft EIS).
[257] 40 C.F.R. § 230.10(d).
[258] *See id.*
[259] *Sierra Club v. U.S. Army Corps of Eng'rs*, No. Civ.A. 05-1724JAP, 2005 WL 2090028, at *17 (D.N.J. Aug. 29, 2005).
[260] *See* 40 C.F.R. §§ 230.71(b), 230.72(a)(2) & (b).
[261] DEIS at 5-1. The DEIS goes on to say that mitigation measures will be included as they become available, *id.*, although it is unclear where those measures will be presented.
[262] *Id.* at 5-11, Tbl. 5.2-1.
[263] *Id.* at 5-13, Tbl. 5.2-1.

ecosystems. Other supposed minimization measures also focus on avoidance or are too vague to satisfy the 404(b)(1) guidelines.[264] Yet the 404(b)(1) guidelines additionally require minimization of the effects of unavoidable filling. When the Corps undertakes a complete analysis under Section 404(b)(1), it will be important to provide an additional opportunity for comment on substantial changes to the project necessary to minimize impacts on wetlands.

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D. The DEIS omits the factual determinations necessary to reach a conclusion that the proposed action complies with the 404(b)(1) guidelines.

In order to conclude that the proposed discharge complies with the 404(b)(1) guidelines, the Corps must make a number of detailed factual determinations.[265] These determinations include effects on substrates, water circulation and chemistry, turbidity, contamination, and aquatic ecosystems—including cumulative and secondary effects on ecosystems.[266] For each of these types of effects, the Corps must address specific impacts or explain why it was not able to do so.[267]

The DEIS does not make the detailed factual determinations required by the 404(b)(1) guidelines. Instead, it simply lists "placement of fill in wetlands" as one consequence of construction and notes that "filling within the Waste Rock and Tailings Storage facilities would occur throughout the active life of the mine."[268] It does not explain how filling would specifically alter wetland characteristics, instead vaguely discussing a range of construction impacts together:

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> Excavation, filling, and clearing of wetlands and waters in the American Creek, Snow Gulch, Omega Gulch, Anaconda Creek, and Crooked Creek watersheds would alter or remove their capacity to provide hydrologic, biogeochemical, and biological functions. Construction-related disturbances could alter wetland modification of groundwater functions (recharge and discharge), and would decrease storm and floodwater storage and modification of stream flow functions by decreasing the wetlands' potential to dissipate energy and reduce peak flows. Between 10 and 35 percent of the mine site study area wetlands that are rated high for any of these hydrologic functions would be altered by mine construction. These altered hydrologic functions would extend to the streams connected to or downstream from the affected wetlands. A total of 42 miles of streams would be

[264] *See id.* at 3.11-77 (listing various best management practices and closure standards); *see also id.* at 3.11-91 (similar list for transportation facilities); *id.* at 3.11-114 to 3.11-115 (similar list for pipeline); *id.* at 3.11-119 to 3.11-120 (overview list).
[265] 40 C.F.R. § 230.11.
[266] *Id.* § 230.11(a)-(e), (g)-(h).
[267] *See Ohio Valley Envtl. Coal. v. Aracoma Coal Co.*, 556 F.3d 177, 200-01 & n.19 (4th Cir. 2009); *Sierra Club v. U.S. Army Corps of Eng'rs*, 464 F. Supp. 2d 1171, 1215-16 (M.D. Fla. 2006).
[268] DEIS at 3.11-56 to 3.11-57; *see also* 3.11-94 (listing "conversion of wetlands to uplands due to filling" as one potential effect of pipeline construction).

> directly affected by construction, including 29 miles of perennial streams and 13 miles of intermittent streams.[269]

This explanation falls far short of the site-specific impact analysis required by NEPA. In one short discussion, it blends an array of direct and indirect impacts from discharges of fill material and other construction-related activities, concluding vaguely that they could "alter" various functions in thousands of acres of wetlands. It is impossible to tell what activities would cause what kinds of impacts, in what ways the various functions would be "altered," or what the environmental consequences of those alterations would be. The DEIS's quantitative estimates of wetlands impacts are similarly imprecise, indicating only numbers of acres affected by wetland function.[270] The 404(b)(1) guidelines require more, and the Corps must include this additional analysis in the FEIS.[271]

Along the same lines, the DEIS insufficiently assesses the cumulative impacts of filling. The Corps limited its analysis of cumulative impacts to "the close vicinity of the project footprint" and identified only a few activities that "have removed some wetlands and introduced or spread invasive species."[272] While it is possible that there are no other discharges that would compound the proposed filling, the Corps must "collect information and solicit information from other sources about the cumulative impacts on the aquatic ecosystem."[273] There is no indication that the Corps did so.[274] Moreover, the DEIS's discussion of cumulative impacts on wetlands does not consider effects on other aquatic ecosystems, as required by the 404(b)(1) guidelines.[275] The Corps should provide a more complete assessment of the cumulative impacts of the discharge of fill material in the FEIS.

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[269] *Id.* at 3.11-59 (citations omitted); *see also id.* at 3.11-82 (similar discussion of wetland impacts from construction of transportation facilities); *id.* at 3.11-99 (similar discussion of wetland impacts from pipeline construction).

[270] *See id.* at 3.11-62, Tbl. 3.11-15; *see also id.* at 3.11-84, Tbl. 3.11-25 (similar table for transportation facilities); *id.* at 3.11-101, Tbl. 3.11-32 (similar table for pipeline construction).

[271] To the extent that analyses of other alternatives rely on the analysis for Alternative 2, they are equally deficient. *See id.* at 3.11-121 to 3.11-122, 3.11-124, 3.11-130, 3.11-141. Where they do address different wetlands impacts, they likewise fail to provide the detailed consideration of the effects of filling required by the 404(b)(1) guidelines. *See id.* at 3.11-126, 3.11-130, 3.11-136, 3.11-138, 3.11-141.

[272] *Id.* at 4-38.

[273] 40 C.F.R. § 230.11(g)(2).

[274] *Cf. Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs*, 351 F. Supp. 2d 1232, 1257 (D. Wyo. 2005) (faulting the Corps for not collecting and soliciting information on the cumulative effects of the proposed action on non-wetland aquatic ecosystems).

[275] *See* 40 C.F.R. § 230.11(g)(2); *see also Wyo. Outdoor Council*, 351 F. Supp. 2d at 1256 ("[T]he Corps failed to evaluate the cumulative effect of [the proposed action] on non-wetland aquatic environments, particularly those downstream waters that might feel . . . secondary effects.").

## III. DONLIN GOLD'S COMPENSATORY MITIGATION PLAN DOES NOT SATISFY APPLICABLE REGULATORY REQUIREMENTS.

Donlin Gold has developed a "conceptual Compensatory Mitigation Plan" to offset unavoidable impacts to wetlands.[276] The Corps intends to select specific compensatory mitigation measures in the record of decision and approved permit.[277]

Under EPA regulations, developed jointly with the Corps, "[w]hen evaluating compensatory mitigation options, the [Corps] will consider what would be environmentally preferable," taking into account "the likelihood for ecological success and sustainability," as well as "the location of the compensation site relative to the impact site and their significance within the watershed."[278] "In general, the required compensatory mitigation should be located in the same watershed as the impact site."[279] Donlin Gold's proposed plan is problematic for a number of reasons, and the Corps should require more-rigorous compensatory mitigation before issuing a permit.

Donlin Gold proposes to use mitigation bank credits to compensate for some of the project's unavoidable wetlands impacts.[280] Such credits may only be used when permitted impacts are located within the service area of an approved mitigation bank.[281] Although the
MIT 7 pipeline would traverse the service areas of two approved mitigation banks—the Su-Knik Mitigation Bank and the Pioneer Reserve LLC Mitigation Bank[282]—the validity of credits issued by the former has been called into question.[283] The only mitigation bank that contains the mine site within its service area, the Chuilnuk Bank, has apparently not yet been approved. Donlin Gold cannot reliably use credits from the Su-Knik and Chuilnuk Banks to offset wetlands impacts.

The compensatory mitigation plan also identifies an in-lieu fee program, sponsored by the Conservation Fund, that offers credits in some regions of the state.[284] As with mitigation banks, in-lieu fee programs can only provide credits for impacts located within their service areas.[285] The program's service area contains the mine site, but it is not selling credits while it is

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[276] DEIS at 5-33.
[277] *Id.*
[278] 40 C.F.R. § 230.93(a)(1); *see also* 33 C.F.R. § 320.4(r)(2) ("[A]ll mitigation will be directly related to the impacts of the proposal" and "appropriate to the scope and degree of those impacts.").
[279] 40 C.F.R. § 230.93(b)(1).
[280] DEIS App. M at 12-13.
[281] 40 C.F.R. § 230.93(b)(2).
[282] *See* DEIS App. M at A-2 to A-3, Figs. 1-2 (showing service areas).
[283] *See Walther v. United States*, No. 3:15-cv-0021-HRH, 2015 WL 6872437, at *3 (D. Alaska Nov. 9, 2015) (noting that Pioneer Reserve, L.L.C. alleged that Su-Knik's banking credits were invalid).
[284] *See* DEIS App. M at 13.
[285] 40 C.F.R. § 230.93(b)(3).

undergoing an audit.[286] Obviously, the Corps cannot include credits from this program in a permit until the audit is complete.

Finally, the permittee-responsible mitigation (PRM) measures proposed in the compensatory mitigation plan raise a number of concerns. One of the PRM projects Donlin has carried forward is "Pit Lake Development," which it suggests would create aquatic habitat in the form of lakes and wetlands.[287] The plan for that project acknowledges that "[t]he lake cannot be fully functional because the lake will not meet state water quality standards will not have fish [*sic*], and the lake will take time to have wetland fringes and develop an organic biomass."[288] Indeed, according to the pit-lake ERA, "development of a littoral and riparian zone is expected to be minimal" because of changing water levels.[289] Yet the pit lake, if approved as a PRM project, would provide a significant number of credits in supposedly creating 250 acres of wetlands.[290] Because the quality of the water in the pit lake is a problem in its own right,[291] and because the habitat created would be insubstantial, the Corps should not treat it as a substitute for degraded or destroyed wetlands.

Other PRM proposals are also dubious. Donlin Gold seeks a ten percent "bonus" on
MIT 7 wetlands credits for educating local communities about waste management and the value of wetlands in the ecosystem.[292] Similarly, it asks for ten percent extra credit for developing a manual on how to restore tailings storage facilities to wetlands.[293] Another of its proposals entails "educat[ing] the local governments on how to run and operate the local landfills and encourag[ing] the removal of derelict recyclable goods from the watershed," and it seeks a bonus for that program as well.[294] While such educational efforts are laudable, it is doubtful whether they actually compensate for the destruction of wetlands.[295] Out-of-kind PRM projects of this sort should only be considered as a last resort and should not be allowed to constitute such a substantial portion of the mitigation plan.[296]

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[286] DEIS App. M at 13.
[287] *See id.* App. M at 15-16 & Tbl. 5-4.
[288] *Id.* App. M, C.9 at 4.
[289] *See id.* App. S at 9 (PDF 369).
[290] *See id.* App. M, C.9 at 2.
[291] *See supra* pp. 3-5.
[292] DEIS App. M, C.2 at 2, 6; *id.* App. M, C.4 at 5.
[293] *Id.* App. M., C.6 at 5.
[294] *Id.* App. M., C.5 at 1-3.
[295] *See* R. C. Gardner, *Money for Nothing? The Rise of Wetland Fee Mitigation*, 19 Va. Envtl. L.J. 1, 21-22 (2000).
[296] *See* 40 C.F.R. § 230.93(b)(6).

IDITAROD NATIONAL HISTORIC TRAIL

Congress designated the INHT when it enacted the National Parks and Recreation Act of 1978.[297] The INHT "commemorates a 2,300-mile system of winter trails that first connected ancient Alaska Native villages, opened up Alaska for the last great American gold rush, and now plays a vital role for travel and recreation in modern day Alaska."[298] The pipeline's impacts on the INHT are of paramount importance to Trail users. Indeed, the Iditarod Historic Trail Alliance (IHTA), a statewide nonprofit organization dedicated to advancing the knowledge, appreciation, and enjoyment of the Trail,[299] recently adopted a resolution formally expressing its concerns about potential impacts of the pipeline on the INHT.[300] It is therefore critical that the DEIS fully address these consequences, analyze possible alternatives with reduced impacts, and explain how a right-of-way for the pipeline comports with state and federal law.

I. THE DEIS UNDERSTATES THE PIPELINE'S IMPACTS ON THE INHT AND FAILS TO CONSIDER A REASONABLE RANGE OF ALTERNATIVE PIPELINE ROUTES.

The IHTA's resolution states that the pipeline's impacts to the INHT "are not adequately identified or conveyed in a complete and concise manner that allows for an understanding of the scope and scale of the cumulative adverse impacts to the [INHT] during construction, operations, and reclamation phases in the DEIS."[301] It further calls on the Corps to "re-examine the DEIS and require an alternative that re-routes the pipeline to avoid impacts to the INHT and preserve its historical, cultural and scenic qualities."[302] By presenting a limited description of the pipeline's impacts on the INHT and failing to consider a reasonable range of alternative pipeline routes, the DEIS violates NEPA.

PAA 32

A. The DEIS understates the pipeline's impacts on the INHT.

An EIS must "provide full and fair discussion of significant environmental impacts."[303] Where the information in an EIS is "so incomplete or misleading that the decisionmaker and the public [cannot] make an informed comparison of the alternatives, revision of an EIS may be necessary to provide a reasonable, good faith, and objective presentation of the subjects required

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[297] *See* Pub. L. No. 95-625, § 551(4), (9), 92 Stat. 3467, 3511-12, 3513 (1978); *see also* 16 U.S.C. § 1244(a)(7).
[298] *Iditarod National Historic Trail*, BLM, http://www.blm.gov/ak/st/en/prog/nlcs/iditarod.html (last visited May 24, 2016).
[299] *About Us*, Iditarod Historic Trail Alliance, http://www.iditarod100.org/about-us.html (last visited May 24, 2016).
[300] *See* Iditarod Historic Trail Alliance, Resolution 16-01 at 1-2 (Apr. 12, 2016).
[301] *Id.* at 2.
[302] *Id.*
[303] 40 C.F.R. § 1502.1.

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by NEPA."[304] NEPA regulations also require that agencies "identify any methodologies used" to assess environmental impacts.[305]

The DEIS obscures the pipeline's consequences for the INHT. In its analysis of impacts on recreation, the DEIS indicates that the pipeline would be collocated with the INHT (i.e., the Trail would be within 100 feet of the pipeline corridor) for 4 miles and would be proximate to

IDIT 10

the INHT (i.e., the Trail would be within 1,000 feet of the pipeline corridor) for 10.5 miles, crossing the Trail 13 times.[306] This segmented approach greatly understates the true impacts. A figure in the section of the DEIS on land-use impacts reveals that the pipeline would be in the vicinity of the INHT for about 60 miles.[307] The pipeline's repeated crisscrossing of the Trail for 60 miles is a significant impact to the historical and recreational qualities of the Trail, which is lost in the arbitrary 1,000-foot "proximate" analysis. The DEIS should expand its definition of proximity to capture the full range of potential impacts to the INHT.

IDIT 6

Moreover, the DEIS misleadingly minimizes the impacts of shoofly roads used during construction of the pipeline on the Trail. In comments on a preliminary version of the DEIS, BLM pointed out that shoofly roads would frequently have permanent effects, "irretrievably alter" the Happy River Steps stretch of the INHT, and degrade the recreation experience in combination with other construction activities.[308] The Corps agreed with BLM's observations and promised to redraft its analysis accordingly,[309] yet the DEIS does not reflect these concerns.[310] The FEIS must include a full and fair discussion of the impacts of shoofly roads on the INHT.

IDIT 7

The DEIS also fails adequately to disclose the impacts on visibility during construction. It concludes that construction-related activities could be seen by winter recreationists where the Trail crosses the viewshed of the right-of-way.[311] Yet it does not identify the portions of the INHT that would be affected by construction activities, instead referring the reader to two photosimulations of the cleared right-of-way.[312] These simulations do not depict impacts of

[304] *Native Ecosystems Council*, 418 F.3d at 965 (quoting *Animal Def. Council v. Hodel*, 840 F.2d 1432, 1439 (9th Cir. 1988), *amended by* 867 F.2d 1244 (9th Cir. 1989)).
[305] 40 C.F.R. § 1502.24; *see also id.* (suggesting that agencies discuss methodology in an appendix).
[306] DEIS at 3.16-19, Tbl. 3.16-5.
[307] *See id.* at 3.15-13, Fig. 3.15-2.
[308] *See* Agency & Applicant Comments at 52-53; *see also id.* at 55 (noting that "the area within one mile of the Happy River Steps is proposed to contain an 86 acre airfield, a 16.8 acre construction camp, a similar size material excavation site, two [horizontal directional drilling] construction workspaces, a water extraction site, and [a] 1.64 mile shoofly road, all bisected by the 150 foot wide construction [right-of-way]"); *id.*at 77 (describing visual impacts near the Happy River Steps).
[309] *See id.* at 52-53, 55.
[310] *See* DEIS at 3.16-17 to 3.16-18.
[311] *Id.* at 3.17-58.
[312] *See id.*; *see also id.* at 3.17-46 to 3.17-47, Figs. 3.17-23A, 3.17-23B.

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construction infrastructure, which the DEIS vaguely describes as "moderate visual contrast of straight lines, cubic forms, and variable textures of camp facilities, airstrips, material sites, and pipeline storage yards against the contiguous open forests of the surrounding landscape."[313]

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Furthermore, as BLM notes in its comments, the analysis of impacts on visual resources does not consider wintertime views, when recreational use of the Trail is at its highest[314]; does not adequately consider effects on aerial views[315]; improperly assumes that the pipeline is the vantage point, rather than the Trail[316]; and selects key observation points that only infrequently see use.[317] The DEIS should provide the details of its viewshed analysis and present a fuller picture of potential construction-related impacts on views from the INHT.

B. The DEIS fails to consider a reasonable range of alternative pipeline routes.

An EIS must also "inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[318] The alternatives section is the "heart of the [EIS]."[319] It must "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[320] "The existence of a viable but unexamined alternative renders an [EIS] inadequate."[321]

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The DEIS refused to consider in detail any pipeline options that might have lesser impacts on the INHT relative to the proposed action.[322] Most importantly, it summarily rejected the Kichatna River Valley route because of greater surface disturbance, more wetlands impacts and river crossings, and significant additional costs, among other things.[323] The specifics of these considerations are not disclosed in the DEIS,[324] and the reasons given do not support the

[313] *Id.* at 3.17-58; *see also* Agency & Applicant Comments at 73 (BLM comments calling on the Corps to depict off-highway vehicle trails and construction impacts in photosimulations).
[314] *See* Agency & Applicant Comments at 63-64.
[315] *See id.* at 65-66.
[316] *See id.* at 66-67.
[317] *See id.* at 67-69.
[318] 40 C.F.R. § 1502.1.
[319] *Id.* § 1502.14.
[320] *Id.*
[321] *Or. Nat. Desert Ass'n v. BLM*, 625 F.3d 1092, 1100 (9th Cir. 2008) (quoting *Westlands Water Dist. v. U.S. Dep't of the Interior*, 376 F.3d 853, 868 (9th Cir. 2004)).
[322] *See* DEIS at 2-195 to 2-196, Tbl. 2.4.4 (PL-2, 3, 16, 26).
[323] *Id.* App. C at C-75, Tbl. C-21.
[324] *See* 40 C.F.R. § 1502.41(a); *cf. Citizens for Smart Growth v. Dep't of Transp.*, 669 F.3d 1203, 1213 (11th Cir. 2012) (upholding EIS that discussed the environmental effects and costs of rejected alternatives).

conclusion that this route was unworthy of analysis in the DEIS.[325] Indeed, many of the disadvantages of the Kichatna River Valley route also apply to the Dalzell Gorge route, which the Corps included as an alternative in the DEIS.[326] In contrast to the Dalzell Gorge alternative,[327] the Kichatna River Valley option has a significant advantage over any of the alternatives considered: it greatly reduces impacts to the INHT.[328] This enormous advantage should have been weighed against the stated disadvantages of the route after considering the impacts in detail, rather than simply rejecting the route out of hand. As discussed below, this is particularly true in light of the command in the NHPA to consider alternatives that avoid impacts

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[325] BLM proposed this option at a meeting to develop alternatives in August 2013. *See* URS, Alternatives Meeting Notes at 19-20 (Aug. 28-29, 2013). In a December 2013 letter to the Corps, BLM expressed its view that the Kichatna River Valley route is reasonable and warrants full analysis in the EIS. *See* Letter from A. Bittner, BLM, to D. Kuhle, U.S. Army Corps of Engineers at 2 (Dec. 6, 2013). Donlin Gold soon thereafter produced an internal memorandum concluding that the option did not meet the Corps' alternative-screening criteria because of greater surface disturbance and impacts to wetlands and streams, pipeline integrity issues, and significant additional costs, among other things. Memorandum from J. Fueg, Donlin Gold, LLC, to N. Enos, Donlin Gold, LLC at 1, 5 (Dec. 19, 2013). Yet an independent review by the Corps' consultant concluded that there was no "decisive element of technical and logistical feasibility or environmental footprint that would readily lead to dismissal." Memorandum from B. Craig & T. Brelsford, URS, to D. Kuhle & K. Gordon, U.S. Army Corps of Engineers at 4 (Jan. 30, 2014). A subsequent review of additional analysis by Donlin Gold found increased impacts to wetlands and river channels, as well as increased exposure to geohazards, along the Kichatna River Valley route. *See* B. Craig & T. Brelsford, URS, to D. Kuhle & K. Gordon, U.S. Army Corps of Engineers at 7 (Apr. 9, 2014). Nevertheless, it acknowledged BLM's concerns about the proposed action's impacts to the INHT and did not make a recommendation as to whether to carry the Kichatna River Valley option forward. *See id.* On May 6, 2014, the Corps rejected the option as unreasonable, based on the impacts identified by Donlin Gold. *See* D. Kuhle, U.S. Army Corps of Engineers, Memorandum for the Record at 1-3 (May 6, 2014). In sum, BLM viewed the Kichatna River Valley route as a reasonable alternative, and the Corps' independent consultant agreed that the alternative could have been carried forward in the DEIS. Eliminating it from consideration was therefore arbitrary.

[326] *See* DEIS at 2-171, Tbl. 2.3-44 (noting "[m]ore medium intensity impacts from doubled length of high-risk unstable slopes through the AK Range portion of the pipeline route" under Alternative 6A); *id.* at 2-176, Tbl. 2.3-44 (noting that, under Alternative 6A, "[d]irect impacts to wetlands would increase by 98 acres compared to Alternative 2"); *cf. Se. Alaska Conservation Council v. Fed. Highway Admin.*, 649 F.3d 1050, 1057-59 (9th Cir. 2011) (holding that an agency's decision to eliminate an alternative when other alternatives could have been rejected for the same reasons was arbitrary).

[327] *See* DEIS at 2-181, Tbl. 2.3-44 (noting that Alternative 6A would affect more of the INHT than Alternative 2).

[328] *Cf. Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038-39 (9th Cir. 2008) (holding that an EIS that failed to consider "different means for addressing" a problem did not "allow for a real, informed choice").

PAA 32 to historic properties. NEPA demands that the Kichatna River Valley alternative be carried forward in the EIS.[329]

II. GRANTING A RIGHT-OF-WAY FOR THE PIPELINE WOULD BE INCONSISTENT WITH THE STATE OF ALASKA'S AGREEMENTS WITH BLM AND ADNR'S LAND USE PLANS.

Because the entire length of the pipeline in the vicinity of the INHT is on state lands, the Alaska Department of Natural Resources (ADNR) will have to decide whether to issue a right-of-way for the pipeline.[330] Based on information presented by the DEIS, it is questionable whether ADNR may lawfully do so.

A. Granting a right-of-way for the pipeline would be inconsistent with the State of Alaska's agreements with BLM.

LAND 13 BLM finalized a comprehensive management plan (CMP) for the INHT in 1986.[331] The CMP's goal was for the federal government "to initiate cooperative management of the [INHT], so that eventually the State of Alaska and a coalition of volunteer organizations may assume the major portion of the management responsibility for the Trail system."[332] Thus, the State of Alaska entered into a memorandum of agreement with BLM over the INHT in 1987, in which it agreed "to manage, according to the laws, regulations, and policies directing each [state] agency or department, INHT segments and historic sites identified in the CMP in a manner which protects and interprets their historic values."[333]

A pipeline would significantly impair the historic values of the Trail in violation of the CMP. The DEIS acknowledges that the pipeline would have "[p]ermanent" impacts of "[m]edium" intensity over an "[e]xtended" geographic area, in an "[i]mportant" context.[334] The pipeline would run alongside the Trail segment from Skwentna to Farewell Lake,[335] which includes the priority sites of the Rohn River Roadhouse and Pioneer Roadhouse.[336] The DEIS concludes that the pipeline "would result in both direct temporary construction-related impacts

[329] *See* 40 C.F.R. § 1502.14(a) (providing that an EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives"); *Pac. Coast Fed'n of Fishermen's Ass'ns v. Blank*, 693 F.3d 1084, 1099 (9th Cir. 2012) ("We review an agency's range of alternatives under a 'rule of reason' standard." (citation and some internal quotation marks omitted)).
[330] DEIS at 1-41, Tbl. 1.10-2; *id.* at 3.15-12.
[331] *See generally* BLM, The Iditarod National Historic Trail Seward to Nome Route: A Comprehensive Management Plan (1986) (CMP).
[332] *Id.* at Introduction; *see also id.* at 6; *id.* at 65-66.
[333] Memorandum of Agreement Between State of Alaska and Bureau of Land Management, U.S. Department of the Interior Concerning the Iditarod National Historic Trail, AK-974-MU8-INHT-03 at 2 (1987).
[334] DEIS at 3.20-46, Tbl. 3.20-13.
[335] *See id.* at 3.15-13, Fig. 3.15-2.
[336] CMP at 88.

and longer-term indirect impacts to the cultural setting [of the INHT] through effects to visual resources."[337] It recognizes the Rohn Roadhouse as a "Significant Viewpoint[]."[338] On the whole, these significant impacts do not comport with the CMP's requirement to "protect[] . . . [the] historic values" of the INHT.[339]

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B. Granting a right-of-way for the pipeline would not be consistent with ADNR's land use plans.

ADNR has adopted plans for the management of state lands within its jurisdiction. The Susitna Matanuska Planning Area and the Kuskokwim Planning Area contain the length of the INHT that would lie in the vicinity of the proposed pipeline. Regarding the "Iditarod Race Trail,"[340] the plans for both areas state:

> No permanent structures or equipment should be placed in the trail corridor if they could adversely affect the trail experience or access along the trail. Where necessary, trail crossings may be permitted to allow access to lands on both sides of the trail. Crossings should be limited to a few discrete areas rather than scattered crossings in many places along the trail.[341]

LAND 13

The pipeline, as proposed, would violate the prohibitions against both "permanent structures" and "scattered crossings in many places." The pipeline would cross the Trail 13 times over the span of 60 miles, significantly compromising the historic character of the Trail.[342] In addition, at least three above-ground mainline valves would be located along the length of the

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[337] DEIS at 3.20-39.

[338] *Id.* at 3.20-24.

[339] CMP at Introduction. Granting a right-of-way may also contravene the requirement that the trail administrator permit only those uses of a trail that will not "substantially interfere with the nature and purposes of the trail." 16 U.S.C. § 1246(c). BLM has suggested that an agency might have to determine whether the proposed use of the INHT would constitute a "substantial interference." *See* Agency & Applicant Comments at 92-93. The DEIS, however, dismisses this possibility because the portions of the Trail that would be affected by the pipeline are on state lands. *See* DEIS at 3.20-5. It is far from clear that the statutory requirement is so limited, and the Corps and BLM must address this issue before approving the project. For the reasons discussed above, the proposed pipeline very likely would substantially interfere with the nature and purposes of the INHT.

[340] Each plan also has guidelines for managing the Iditarod National Historic Trail System, including "trails and historic sites" located within the planning area. *See* Alaska Department of Natural Resources (ADNR), Susitna Matanuska Area Plan at 2-56 (2011) (Susitna Matanuska Area Plan); ADNR, Kuskokwim Area Plan at 2-60 (1988) (Kuskokwim Area Plan). The plans indicate that the INHT system will be managed consistently with the memorandum of agreement between the state and BLM. *See* Susitna Matanuska Area Plan at 2-56; Kuskokwim Area Plan at 2-60.

[341] Susitna Matanuska Area Plan at 2-55; Kuskokwim Area Plan at 2-60.

[342] DEIS at 3.16-19, Tbl. 3.16-5.

pipeline in the vicinity of the INHT.[343] They would remain for the decades of operation and potentially longer.[344] The pipeline's multiple crossings of the INHT and its long-term above-ground facilities make granting a right-of-way inconsistent with ADNR's area plans.

LAND 13

III. THE CORPS MUST COMPLETE THE PROCESS PRESCRIBED BY NHPA SECTION 106 BEFORE SIGNING A RECORD OF DECISION.

Under Section 106 of the NHPA, the Corps will have to complete an assessment of the pipeline's impacts on historic resources (including the INHT), attempt to resolve adverse effects on those resources, and consider alternatives that would avoid adverse effects before issuing a permit.[345] The DEIS suggests that this process has only recently been initiated. Nonetheless, the Corps should document its conclusions under NHPA Section 106 in the FEIS, including its assessment of alternatives that would reduce harms to the INHT and other historic resources.

Section 106 of the NHPA requires agencies involved in an "undertaking" that needs a federal permit to determine whether the undertaking has the potential to affect historic properties.[346] Both the INHT and specific sites along the Trail qualify as "historic properties," i.e., "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior."[347] The DEIS acknowledges that the INHT is eligible for inclusion in the National Register of Historic Places.[348] The 1986 CMP also lists the Skwentna Roadhouse and Rohn River Roadhouse—both located on the portion of the Trail that could be affected by the pipeline—as "Level 1 Sites" to be evaluated for nomination to the National Register of Historic Places.[349] Therefore, the Corps must complete the Section 106 process before permitting the mine.

NHPA 2

Under NHPA Section 106, agencies must identify historic properties, assess adverse effects on these properties, and attempt to resolve the effects in consultation with state and tribal historic preservation offices.[350] As part of their efforts to resolve adverse effects, agencies must "develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties"[351] and "provide an opportunity for members of the public to express their views on resolving adverse effects."[352] Furthermore,

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[343] *See id.* at 2-69, Tbl. 2.3-15.
[344] *See id.* at 2-128 to 2-129.
[345] *See id.* at 3.20-4; *see also* 36 C.F.R. Part 800.
[346] *See* 36 C.F.R. § 800.3(a); *see also id.* § 800.16(y) (defining "undertaking").
[347] *Id.* § 800.16(l)(1).
[348] DEIS at 3.20-21, 3.20-23, Tbl. 3.20-1; *see also id.* at 3.20-37 to 3.20-39, Tbl. 3.20-8.
[349] CMP at 56, 58, Tbl. 5. The Rohn Roadhouse Safety Cabin has apparently since been added to the Register. *See Rohn Roadhouse Safety Cabin*, Alaska.org, http://www.alaska.org/detail/rohn-roadhouse-safety-cabin.
[350] *See* 36 C.F.R. §§ 800.4-800.7.
[351] *Id.* § 800.6(a).
[352] *Id.* § 800.6(a)(4).

agencies should "ensure that preparation of . . . an EIS and record of decision (ROD) includes appropriate scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects."[353] If the Section 106 process has not been properly carried out when an agency permits an undertaking, its decision may be held invalid.[354]

NHPA 2 The DEIS raises questions about the Corps' compliance with NHPA Section 106. It states that the Corps, as lead federal agency, has begun to prepare a "programmatic agreement" (PA) among the Corps, the State Historic Preservation Office, the Advisory Council on Historic Preservation, BLM, local governments, and Alaska Native tribes and organizations.[355] The PA will "provide agencies with a framework for completing the Section 106 framework in a phased manner," including "identification and evaluation of cultural resources, consultation, and mitigation of effects."[356] This description does not mention the NHPA's requirement to consider alternatives—which reinforces NEPA's parallel command—and the Corps must consider options that would avoid impacts to historic properties such as the INHT.[357] It has not yet satisfied this requirement[358]; it must do so before permitting the mine, and it should document its compliance with NHPA Section 106 in the FEIS.[359]

SCOPE

NEPA requires that EISs analyze actions connected with or cumulative to the proposed action.[360] Although agencies have discretion to define the scope of the environmental review, "connected or cumulative actions must be considered together to prevent an agency from dividing a project into multiple 'actions,' each of which individually has an insignificant environmental impact, but which collectively have a substantial impact."[361] The Corps has improperly limited the scope of the DEIS by neglecting two actions related to the project.

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[353] *Id.* § 800.8(a)(3).
[354] *See* 54 U.S.C. § 306108; *Mont. Wilderness Ass'n v. Connell*, 725 F.3d 988, 1005, 1010 (9th Cir. 2013).
[355] DEIS at 3.20-6.
[356] *Id.* at 3.20-33.
[357] 36 C.F.R. § 800.6(a).
[358] *See supra* pp. 39-41.
[359] *See* 36 C.F.R. § 800.8(a)(3). As part of documenting its compliance with the NHPA, the Corps should more accurately describe potential impacts on the INHT's cultural values. Comments by BLM point out that the DEIS "severely understates the adverse impacts to the [INHT]" and improperly focuses on visual, rather than cultural, resources. *See* Agency & Applicant Comments at 107-110. We support these comments and urge the Corps to provide a more appropriate discussion of cultural impacts to the INHT in the FEIS.
[360] *See* 40 C.F.R. § 1508.25(a)(1), (2).
[361] *Wetlands Action Network v. U.S. Army Corps of Eng'rs*, 222 F.3d 1105, 1118 (9th Cir. 2000), *abrogated on other grounds by Wilderness Soc'y v. U.S. Forest Serv.*, 630 F.3d 1173 (9th Cir. 2011) (citation and some internal quotation marks omitted).

## I. THE DEIS DOES NOT ADEQUATELY DISCUSS THE CONNECTED ACTION OF CONSTRUCTING AND OPERATING THE BETHEL CARGO TERMINAL.

Connected actions are those actions that are closely related to the proposed action and are automatically triggered by it or depend on it for their justification.[362] Courts use an "independent utility test" to determine whether multiple actions are so closely connected that they must be considered in a single EIS.[363] The question is whether the two projects would have taken place without each other.[364] "When one of the projects might reasonably have been completed without the existence of the other, the two projects have independent utility and are not 'connected' for NEPA's purposes."[365]

The DEIS does not adequately discuss the consequences of the connected action[366] of developing the Bethel port. The expansion would involve a new 16-acre cargo terminal,[367] as well as an 850-foot-long bulkhead extending 150 feet into the Kuskokwim River.[368] An unidentified third party would "determine what additional storage space and waterfront
NEP 6 structures, if any, would be required to accommodate demand."[369] The DEIS notes a number of effects from the construction and operations of the cargo terminal in Bethel, such as: placement of sand, gravel, and riprap behind the ends of the sheetpile;[370] increased runoff and erosion and altered river flow;[371] loss of 2.9 acres of wetlands;[372] "minimal[]" effects on subsistence from construction and operations,[373] including displacement of a "small portion" of fishing area; and a "slight increase" in surface traffic.[374] These descriptions do not fully disclose the impacts of such a major facility. For example, the DEIS indicates that the bulkhead would alter flow in the river, but it ignores potential impacts of increased flow on Oscarville, which is situated on a

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[362] *See* 40 C.F.R. § 1508.25(a)(1).
[363] *See Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 969 (9th Cir. 2006).
[364] *Id.*
[365] *Id.* (citation omitted).
[366] This development would occur as a direct result of the construction of the mine, and the mine as proposed could not exist without it. *See* DEIS at 2-48 ("A 16-acre cargo terminal would likely need to be constructed in Bethel to receive barges."); *id.* at 3.23-11 (noting that the Bethel port is "the only area in the region" for loading and unloading bulk petroleum, storing boats and barges, and preparing them for the shipping season); *see also id.* at 2-48 to 2-49 ("Since [construction and operation of the Bethel cargo terminal] would be a connected action for the proposed Donlin Gold Project, the environmental effects are evaluated in [the DEIS] as indirect effects.").
[367] *Id.* at 2-48.
[368] *Id.* at 3.5-101.
[369] *Id.* at 2-48.
[370] *Id.* at 3.2-71.
[371] *Id.* at 3.5-101.
[372] *Id.* at 3.11-89.
[373] *Id.* at 3.21-156.
[374] *Id.* at 3.23-21.

NEP 6

slough immediately downstream of the bulkhead.[375] It also fails to respond to serious concerns expressed by the Bethel Native Corporation about the bulkhead's consequences for subsistence, simply noting that "[a]dditional discussion between the permit applicant and the Corps is underway regarding the potential hydrological effects."[376] The Corps should provide more analysis in the FEIS.

## II. THE DEIS FAILS TO ADDRESS THE CUMULATIVE EFFECTS OF A POSSIBLE EXPANSION OF THE MINE.

Even where two actions are not "connected," an agency must discuss them in the same EIS if they will have cumulatively significant effects.[377] A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."[378] Projects do not need to be finalized to be reasonably foreseeable.[379] Rather, "NEPA requires that an EIS engage in reasonable forecasting. Because speculation is . . . implicit in NEPA, [courts] must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."[380]

NEP 6

The Corps does not address the potential impacts of expanding the mine. The only "past, present, and reasonably foreseeable" mineral exploration and mining the DEIS considers are projects undertaken by other parties at different sites.[381] In a recent presentation for investors, however, Donlin Gold co-owner NOVAGOLD notes that there are "[g]ood prospects to discover meaningful deposits outside [the] current mine footprint," and that "[r]eserves and resources are contained within just 3 km of an 8 km long trend."[382] These statements plainly reveal that expansion of the mine site is a "reasonably foreseeable" action that would have cumulative effects on the region. The Corps should have addressed these impacts in the DEIS.

[375] *See id.* at 3.5-101; U.S. Army Corps of Engineers, Erosion Information Paper – Oscarville, Alaska at 1-2 (Mar. 2008) (noting that Oscarville "reported bank erosion on the Kuskokwim River and Oscarville Slough").
[376] DEIS at 3.21-159.
[377] *See* 40 C.F.R. § 1508.25(a)(2); *Morongo Band of Mission Indians v. FAA*, 161 F.3d 569, 579-81 (9th Cir. 1998).
[378] 40 C.F.R. § 1508.7.
[379] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1078 (9th Cir. 2011).
[380] *Id.* at 1079 (internal quotation marks and citation omitted).
[381] *See* DEIS at 4-5, Tbl. 4.2-1.
[382] NOVAGOLD, 2016 First Quarter & Project Update at 12 (Apr. 2016).

CLIMATE CHANGE

Global warming is the most pressing environmental problem of our time, and nowhere are its effects more visible than in Alaska.[383] While extracting and processing gold ore is not an inherently climate-polluting activity, Donlin Gold proposes to do so at an unparalleled scale, using a highly energy-intensive method.[384] The project could thus emit over one million tons of greenhouse gases every year.[385] Its design will have to anticipate—and its effects would likely be exacerbated by—a shifting climate.[386] Moreover, communities and ecosystems that are already struggling to adapt to climate change are especially vulnerable to environmental harms.[387] It is therefore imperative that the FEIS thoroughly discuss both (I) the project's contribution to climate change and (II) the ways in which climate change could alter the project's other impacts.[388]

I. THE DEIS DOES NOT ADEQUATELY ADDRESS THE PROJECT'S CONTRIBUTION TO CLIMATE CHANGE.

NEPA requires agencies to discuss cumulative impacts, i.e., "the incremental impact[s] of the action when added to other past, present, and reasonably foreseeable future actions."[389] "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[390] Climate impacts fit this description well because they are caused by the incremental additions of greenhouse gases to the atmosphere from numerous sources.[391] An EIS must therefore address the proposed action's and alternatives' contribution to

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[383] *See Climate Impacts in Alaska*, EPA, https://www3.epa.gov/climatechange/impacts/alaska.html (last visited May 23, 2016) (noting that Alaska has experienced more than twice the warming that the rest of the United States has in the past 60 years).
[384] *See* DEIS at 3.26-26.
[385] *Id.*
[386] *See generally id.* at 3.26-24 to 3.26-61.
[387] *See* DEIS at 3.19-12.
[388] *See* Council on Environmental Quality, Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews at 2 (2014) (CEQ Guidance) ("[A]nalyzing the proposed action's climate impacts and the effects of climate change relevant to the proposed action's environmental outcomes can provide useful information to decisionmakers and the public."); *see also id.* at 3 (noting that agencies should consider both the proposed action's potential effects on climate change and the implications of climate change for the proposed action's impacts).
[389] 40 C.F.R. § 1508.7.
[390] *Id.*
[391] *See Ctr. for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1216-17 (9th Cir. 2008) ("The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."); *cf. Massachusetts v. EPA*, 549 U.S. 497, 524 (2007).

climate change.[392] Rather than predicting particular effects, however, the Council on Environmental Quality (CEQ) recommends that agencies use projected greenhouse gas emissions as a proxy.[393] Doing so allows agencies to "present the environmental impacts of the proposed action in clear terms and with sufficient information to make a reasoned choice between the no-action and proposed alternatives and mitigations."[394]

A. The DEIS does not fully assess the proposed action's contribution to climate change.

*1. The project's emissions*

NEPA requires that agencies discuss not only a proposed action's environmental effects, but also their significance.[395] Comparing the proposed action's greenhouse gas emissions to global emissions is "not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations" because it "does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make relatively small additions to global atmospheric [greenhouse gas] concentrations that collectively have huge impact."[396] Instead, CEQ recommends that agencies use applicable federal, state, tribal, or local goals for greenhouse gas emissions reductions as a frame of reference.[397]

CLIM 12

The DEIS rates the magnitude of climate impacts as a percentage of statewide greenhouse gas emissions.[398] An impact receives a rating of "high" only if it amounts to more than ten percent of the emissions of the entire State of Alaska in 2005.[399] This system is misleading for two reasons. First, it minimizes the project's impacts by comparing them to statewide emissions more than ten years ago, when emissions were at an all-time high.[400] The FEIS should compare impacts to a more recent point of reference. Second, as noted, statewide emissions do not provide a meaningful comparator for an individual project's contributions to cumulative climate effects. As a possible alternative, the Mitigation Advisory Group of the Governor's Climate Change Sub-Cabinet developed a series of recommendations which, if implemented, would reduce statewide emissions of greenhouse gases by 11.7 million metric tons

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[392] *Ctr. for Biological Diversity*, 538 F.3d at 1217.
[393] CEQ Guidance at 8.
[394] *Id.* at 8-9.
[395] *See* 40 C.F.R. § 1502.16(a), (b).
[396] CEQ Guidance at 9.
[397] *Id.* at 14.
[398] *See* DEIS at 3.26-24, Tbl. 3.26-8.
[399] *Id.*
[400] *Compare id.* at 3.26-26 (asserting that most recent data on carbon-dioxide equivalent emissions for the State of Alaska are only available for 2005, when emissions totaled 52.1 million metric tons), *with* Alaska Department of Environmental Conservation, Alaska State Greenhouse Gas Emissions Inventory at 14 ex. 5 (2015) (showing statewide carbon-dioxide equivalent emissions of 54.64 and 43.04 million metric tons in 2005 and 2010, respectively).

in 2025.[401] During operations, the project would cancel out approximately 16 percent of these savings.[402]

Another approach to assessing the significance of climate impacts is using the social cost of carbon. Developed by a federal interagency working group, the social cost of carbon is an estimate of the monetized damages from an incremental increase in carbon emissions in a given year, which includes—but is not limited to—climate-related changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.[403] According to CEQ guidance, "[w]hen an agency determines it appropriate to monetize costs and benefits, then . . . the Federal social cost of carbon . . . offers a harmonized, interagency metric that can provide decisionmakers and the public with some context for meaningful NEPA review."[404] Although NEPA does not require a cost-benefit analysis, where an agency chooses to quantify the economic advantages of the proposed action, it is arbitrary to ignore the social cost of carbon emissions.[405]

The DEIS anticipates several economic benefits from the project, including: $1.2 billion in construction labor, with $940 million in payroll going to Alaska construction-industry workers[406]; $5.2 billion in expenditures on construction materials and equipment, with $1.7
CLIM 12 billion going to Alaska suppliers[407]; $390 million in wages generated statewide through multiplier effects during construction[408]; $2.7 billion total payroll during operations, with $1.7 billion going to Alaska residents[409]; about $14 billion in expenditures on materials and services during operations, with $9.8 billion spent in Alaska[410]; $18.7 billion in profits over the life of the project, with $1.5 billion in royalties going to Calista Corporation[411]; $250,000 in annual lease payments to regional corporations that own lands crossed by the pipeline[412]; $40 million in

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[401] *See* Alaska Climate Change Strategy's Mitigation Advisory Group Final Report: Greenhouse Gas Inventory and Forecast and Policy Recommendations Addressing Greenhouse Gas Reduction in Alaska at 1-9 to 1-10 & Tbl. 1-1 (2009).
[402] *See* DEIS at 3.26-27, Tbl. 3.26-9, 3.26-29, Tbl. 3.26-10, 3.26-31, Tbl. 3.26-11.
[403] Interagency Working Group on Social Cost of Carbon, U.S. Government, Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866 at 2 (July 2015 revision).
[404] CEQ Guidance at 16.
[405] *See High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014) (noting that the agency had estimated the revenues, royalties, payroll, and local payment for goods and services that would be forgone under the no-action alternative but failed to account for the costs of carbon emissions).
[406] DEIS at 3.18-35, 3.18-37.
[407] *Id.* at 3.18-38.
[408] *Id.* at 3.18-39.
[409] *Id.*
[410] *See id.* at 3.18-41.
[411] *Id.*
[412] *Id.* at 3.18-42.

wages generated statewide through multiplier effects during operations[413]; $337 million in oil and gas property tax during construction and operations of the pipeline[414]; $701.4 million and $536.9 million in state corporate income tax and state mining tax, respectively, over the life of the project[415]; and $1.5 billion in federal income tax from the project.[416] In contrast, the DEIS states that "[t]he amount of greenhouse gas emissions from implementation of Alternative 2 is not likely to create socioeconomic effects from climate change."[417] Given that expected damages from each ton of carbon dioxide emitted are available in the form of the social cost of carbon, and that the mine site alone could emit nearly two million tons of carbon-dioxide equivalent annually,[418] the FEIS should monetize the project's potential climate-related harms.

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Aside from its assessment of the significance of the project's greenhouse gas emissions, the DEIS also fails to account for certain sources of emissions. Permafrost, for example, contains about twice as much carbon as the atmosphere and could accelerate climate change through a positive feedback cycle of warming and melting.[419] The DEIS observes that the project area largely contains warm, discontinuous permafrost,[420] and that this type of permafrost is particularly susceptible to surface thaw as ground temperatures increase.[421] It refers the reader to the section on air quality for estimates of greenhouse gas emissions resulting from permafrost degradation in the project area,[422] but that section contains no such information.[423] The FEIS must discuss the quantity of greenhouse gases that could be emitted from permafrost due to the project, as well as cumulative effects of permafrost degradation throughout the region.

*2. Related emissions*

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In addition to estimating a proposed action's direct contributions to climate change, agencies must analyze its indirect effects.[424] These effects include "emissions from activities that have a reasonably close causal relationship to the [proposed] action, such as those that may

[413] *Id.*
[414] *Id.* at 3.18-43.
[415] *Id.* at 3.18-45.
[416] *Id.*
[417] *Id.* at 3.18-49.
[418] *See id.* at 3.26-27, Tbl. 3.26-9.
[419] *See* E. A. G. Schuur *et al.*, *Climate Change and the Permafrost Carbon Feedback*, 520 Nature 171, 171 (2015); K. Schaefer *et al.*, *The Impact of the Permafrost Carbon Feedback on Global Climate*, 9 Envtl. Res. Letters 1, 2 (2014); *see also* DEIS at 3.26-20 (acknowledging that melting permafrost can give off greenhouse gases, and that permafrost stores almost twice the amount of carbon presently in the earth's atmosphere).
[420] DEIS at 3.26-17.
[421] *Id.* at 3.26-18.
[422] *Id.* at 3.26-40.
[423] *See id.* at 3.8-1 to 3.8-78. Section 3.8.2.4 includes the only mention of permafrost, but merely refers the reader back to section 3.26.
[424] *See* 40 C.F.R. § 1508.8(b) (defining indirect effects as those that are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable").

occur as a predicate for the agency action (often referred to as upstream emissions) and as a consequence of the agency action (often referred to as downstream emissions)."[425] For example, an EIS for an open-pit mine might need to analyze the downstream effects of using the resource, as well as various upstream effects.[426] Agencies must also assess the emissions of connected actions.[427]

The DEIS falls short in describing related emissions. It notes that emissions from the Bethel Port facility, admittedly a connected action,[428] are considered project emissions but are not disclosed because information is not available.[429] Similarly, it contemplates leaving electrical power facilities intact[430] and maintaining the pipeline after the mine closes,[431] yet it does not discuss the emissions that could result from continuing to operate the natural gas power plant.[432] Several upstream emissions go unmentioned as well, such as those caused by generating the electricity used at the pipeline compressor station[433] and by extracting natural gas.[434] Finally, the DEIS disregards potential emissions from a pipeline rupture or leak,[435] even

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[425] CEQ Guidance at 11.
[426] *See id.* at 12.
[427] *See* 40 C.F.R. § 1508.25 (defining connected actions as those that are "closely related and therefore should be discussed in the same impact statement").
[428] *See* DEIS at 2-48 to 2-49.
[429] *Id.* at 3.26-29, Tbl. 3.26-10 n.a.
[430] *Id.* at 2-41 ("When the electrical power demand no longer requires an operational power plant, the power plant, substations, overhead power lines, and associated facilities would be removed from the site, unless it is agreed upon by the land owner to keep them.").
[431] *Id.* at 2-128.
[432] *See id.* at 3.26-27 (discussing greenhouse gas emissions from the mine site during closure); 3.26-30 (discussing greenhouse gas emissions from the pipeline during closure).
[433] *See id.* at 3.26-30 ("The compressor station . . . would be powered by electricity; therefore, it would not have combustion causing GHG emissions."). *But see id.* at 3.8-62 ("Indirect air quality impacts associated with the operations phase of the natural gas pipeline component would occur at the Beluga power plant, due to increase in electricity generation required to power the compressor station.").
[434] *See id.* at 3.26-26 to 3.26-27 (failing to mention extraction-associated emissions as an indirect source); *see also id.* App. B at 90 (noting concerns, raised during scoping, about the use of hydraulic fracturing to extract natural gas for the project). Hydraulic fracturing can release much more methane—a potent greenhouse gas—than conventional methods of extraction. *See, e.g.*, R. W. Howarth, R. Santoro & A. Ingraffea, *Methane and the Greenhouse-Gas Footprint of Natural Gas from Shale Formations*, 106 Climatic Change 679, 685 (2011).
[435] *See* DEIS at 3.26-24 ("The effects of project-related spills . . . on climate change are considered not applicable."); *see also id.* at 3.24-20 (noting that about 2 pipeline incidents are expected to occur over the life of the project but that, "[b]ecause of the unlikelihood and negligible impacts of escaped natural gas to the environment, that scenario is not discussed in this analysis").

CLIM 12 though recent experience shows that natural-gas releases are not uncommon and can have major climate impacts.[436] The FEIS should fully discuss these foreseeable emissions.

B. The DEIS fails to disclose the emissions of the alternatives and explore options that would decrease emissions.

Under NEPA, agencies must "rigorously explore and objectively evaluate all reasonable alternatives," giving each of them "full and meaningful consideration."[437] According to CEQ:

> [I]f a comparison of . . . alternatives based on [greenhouse gas] emissions, and any potential mitigation to reduce emissions, would be useful to advance a reasoned choice among alternatives and mitigations, then an agency should compare the levels of [greenhouse gas] emissions caused by each alternative—including the no-action alternative—and mitigations to provide information to the public and enable the decisionmaker to make an informed choice.[438]

CLIM 3 One type of alternative an agency should consider to reduce greenhouse gas emissions is using renewable energy.[439] If an agency ignores an alternative that is reasonably related to the project's purpose, its NEPA analysis may be held invalid.[440]

The DEIS does not compare the alternatives' greenhouse gas emissions sufficiently to inform the Corps and the public. The underlying technical analysis of air quality impacts apparently assumes that the power plant generator and almost all other mine-site combustion sources will run on diesel fuel rather than liquefied natural gas (LNG).[441] Thus, the absolute impacts of Alternative 2 are not presented, and only the emission reductions from various changes in project design can be quantified. For example, the DEIS notes that using LNG-power haul trucks at the mine site under Alternative 3A would reduce emissions by about 64,000 tons of carbon-dioxide equivalent as compared to Alternative 2, without disclosing what the actual

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[436] *See* E. Ponsot, *California Natural Gas Leak Just One of Thousands Across Country*, PBS (Jan. 18, 2016), http://www.pbs.org/newshour/updates/california-natural-gas-leak-just-one-of-thousands-across-country/; J. Warrick, *California Gas Leak Was the Worst Man-Made Greenhouse-Gas Disaster in U.S. History, Study Says*, Wash. Post (Feb. 25, 2016), https://www.washingtonpost.com/news/energy-environment/wp/2016/02/25/california-gas-leak-was-the-worst-man-made-greenhouse-gas-disaster-in-u-s-history-study-says/.

[437] *Ctr. for Biological Diversity*, 538 F.3d at 1217 (internal quotation marks and citations omitted).

[438] CEQ Guidance at 19-20.

[439] *See id.* at 20.

[440] *See Ctr. for Biological Diversity*, 538 F.3d at 1219.

[441] *See* Air Sciences Inc., Air Quality Impacts Analysis Report: Donlin Gold Project, Alaska, App. A at 82-83 (2015). *Compare id.* App. A at 82 (using a conversion factor of 73.96 kg $CO_2$/MMBtu), *with* EPA, Emission Factors for Greenhouse Gas Inventories at 1 (2015) (showing conversion factors in the range of 73-75 kg $CO_2$/MMBtu for distillate fuel oils vs. 53.06 kg $CO_2$/MMBtu for natural gas).

emissions of either alternative would be.[442] Even more problematically, the climate-related advantages of Alternative 2 over Alternative 3B (diesel pipeline) are obscured by assuming diesel use in both alternatives; the DEIS simply notes that, under Alternative 3B, there would be "increased [greenhouse gases] from combustion of diesel in the mine site combustion equipment."[443] The FEIS should present greenhouse gas emissions under all the alternatives, and it should clearly identify the source of that information.

CLIM 3 Further, the Corps eliminated from consideration, without a satisfactory explanation, options that would have reduced the project's climate impacts. For example, it rejected wind power and run-of-the river hydroelectricity, supposedly because such technologies are infeasible at the scale necessary to power the mine.[444] Yet the DEIS does not explain why these and other renewable energy options, perhaps used in combination, could not provide at least some of the power the mine needs. It simply states that "other power alternatives remain infeasible to produce a portion of the power supply, especially considering the proposed action would provide natural gas to the site."[445] It also omits efficiency measures from the design features most important to reducing climate impacts.[446] Under NEPA, agencies must discuss "[e]nergy requirements and conservation potential of various alternatives and mitigation measures"[447]; this discussion is required even where a particular technique offers only a partial solution to the problem.[448] By disregarding options and design features that would reduce the project's greenhouse gas emissions, the Corps violates NEPA's command to consider reasonable alternatives.

## II. THE DEIS DOES NOT EXPLAIN HOW CLIMATE CHANGE WOULD ALTER THE PROJECT'S IMPACTS.

CLIM 1 NEPA requires that an EIS describe the environment that would be affected by the proposed action.[449] "The current and expected future state of the environment without the proposed action represents the reasonably foreseeable affected environment that should be described based on available climate change information, including observations, interpretive

[442] *See* DEIS at 3.26-49. Other differences in emissions from the proposed action that could be quantified are not. *See, e.g.*, *id.* at 3.26-54 ("Alternative 4 [Birch Tree Crossing Port] would have a slight increase in GHG emissions during operations of the transportation facilities when compared to Alternative 2.").
[443] *Id.* at 3.26-51. Elsewhere the DEIS states that using natural gas in the power plant and other machinery at the mine site would reduce greenhouse gas emissions by about 9.6 million metric tons over the life of the mine, but it is unclear how it calculated this figure. *See id.* at 3.26-47.
[444] DEIS App. C at C-67, Tbl. C-20. The Corps apparently did not consider solar energy, *see id.*, even though this option was raised in scoping comments, *see id.* App. C at C-5, Tbl. C-1.
[445] *Id.* App. C at C-68, Tbl. C-20.
[446] *See id.* at 3.26-47.
[447] 40 C.F.R. § 1502.16(e).
[448] *See Nat'l Wildlife Fed'n v. NMFS*, 235 F. Supp. 2d 1143, 1154-55 (W.D. Wash. 2002) (citing *Nat. Res. Def. Council, Inc. v. Morton*, 458 F.2d 827, 836 (D.C. Cir. 1972)).
[449] *See* 40 C.F.R. § 1502.15.

assessments, predictive modeling, scenarios, and other empirical evidence."[450] Depending on anticipated conditions, full NEPA review may disclose climate-related hazards and thus reveal more-resilient alternatives that should be considered.[451] In addition, communities and ecosystems that are already experiencing climate-related stresses may be more susceptible to environmental harms.[452] The Corps must therefore explain how climate change could exacerbate the project's impacts.

A. The DEIS disregards or downplays climate-related hazards.

Studies analyzing daily precipitation in Alaska generally indicate that extreme precipitation events will increase in frequency and intensity over the coming decades.[453] The frequency of these outlier events may respond more to warming than the frequency of average precipitation events because the atmosphere can hold exponentially greater amounts of moisture as temperatures rise.[454] Recent experience shows that abnormally high levels of precipitation and ensuing flooding can destroy waste dumps, seepage capture systems, and mine access roads; cause impoundments to overflow and dams to be breached; and push water treatment costs over-budget or cause releases of untreated water.[455] These impacts underscore the need to plan for worst-weather events throughout a project's lifetime and closure.[456]

The DEIS notes that dams at the mine site and the seepage recovery system were designed to accommodate maximum runoff events under the state's dam safety guidelines.[457] Those guidelines recommend and in some instances require a site-specific hydro-meteorological analysis to determine the probable maximum precipitation.[458] Yet the meteorological data for the mine site were apparently collected in 2004 and updated in 2011,[459] and they may no longer be current. In any event, the FEIS should assess the possible effects of climate change on the magnitude of inflow the dams and other facilities will likely need to withstand.

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[450] CEQ Guidance at 21.
[451] *See id.* at 23-24.
[452] *See id.* at 22.
[453] *See* K. E. Bennett, Changes in Extreme Hydroclimate Events in Interior Alaskan Boreal Forested Watersheds at 197 (Dec. 8, 2014) (unpublished Ph.D. dissertation, University of Alaska Fairbanks).
[454] *Id.* at 198.
[455] *See* W. McCullough, W. Jepson & B. Maehl, Zortman: Dealing with Extreme Weather Events at 5, 9-11, 15-16, 19, 26-28 (2011); T. D. Pearce *et al.*, *Climate Change and Mining in Canada*, 16 Mitigation & Adaptation Strategies for Global Change 347, 357-58, 360 (2011).
[456] R. D. Williams, BLM, Climate Change – Extreme Conditions: Do Plans of Operations Need to Include an Ark? at 29-44 (2012).
[457] *See* DEIS at 3.26-33. The same criteria apply to the design of the dam holding the operating pond under Alternative 5A. *See id.* at 3.26-57.
[458] *See* ADNR, Guidelines for Cooperation with the Alaska Dam Safety Program at 6-4 (2005).
[459] *See* BGC Eng'g Inc., Donlin Creek Gold Project Feasibility Study Update II: Tailings Storage Facility Design at 6 (2011).

Regarding the transportation facilities, the DEIS observes that higher precipitation in the fall and winter could lead to greater snowmelt during breakup, potentially blowing out culverts and bridges along the mine access road.[460] It rates the effect of climate change on these structures as low, however, because they are typically designed to withstand rare-weather events.[461] Similarly, it notes that greater discharge at breakup could increase the risk of bank erosion and scour where the pipeline crosses rivers[462] but characterizes these potential effects as "mostly low, in that the depth of cover designed for the 100-year event would be within the limits of historical variation"—while acknowledging that greater precipitation due to climate change could exceed historical maximums.[463] The FEIS should assess the likelihood that bridges and culverts will collapse and that the pipeline will be exposed at stream crossings under reasonable climate scenarios, and it should describe the extent of the resultant environmental impacts if structures fail during a major precipitation event.

Water management at the mine site also becomes an issue with increasing precipitation. The DEIS downplays such concerns by noting that Donlin Gold's water balance modeling included the 90th percentile of precipitation conditions from the past 30 years.[464] The model for pit-lake filling similarly assessed conditions in which groundwater recharge and stream flows were doubled.[465] Assessing the effects of wetter-than-average years on the mine's water balance or a long-term increase in filling rates on the pit lake, however, does not capture the possibility of dramatically higher short-term precipitation or worst-weather events that could result from climate change. As one expert explains, the pit lake's "pump and treat system would be required forever so all possible combinations of weather will eventually occur."[466] Likewise, "[t]reatment
CLIM 1 facilities must be designed to accommodate larger inflows that occur both as storm events and as long-term climate cycles."[467] The FEIS should address the capacity of the pit lake and the water treatment facility to sustain such inflows.

Not only could precipitation inundate facilities as temperatures increase, but permafrost thaw could destabilize structures and potentially even weaken the walls of the open pit.[468] At one mine in Canada's Yukon Territory, for instance, unexpected permafrost thaw caused tailings dumps to collapse and intrude into creeks, destroying fish habitat.[469] Structures built on slopes are especially susceptible to slumping and sliding as frozen soils melt and lose cohesion.[470]

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[460] *See* DEIS at 3.26-38.
[461] *Id.*
[462] *Id.* at 3.26-39.
[463] *Id.*
[464] *See id.* at 3.26-33 to 3.26-34.
[465] *Id.* at 3.26-34.
[466] Myers Memo at 4; *see also id.* at 18 ("It is critical to consider the potential inflow to the pit lake with not just an increased average flow but with a much increased variance to account for large inflow events occurring during a wet period.").
[467] *Id.* at 23.
[468] *See* Pearce *et al.*, *supra* note 455, at 349, 360.
[469] *Id.* at 358.
[470] *Id.* at 360.

The DEIS observes that areas upslope of the waste rock facility situated on ice-rich soils could become unstable, especially if hydraulic erosion occurs.[471] Seismic events could also cause deformation or slope failure if ice-rich soils remain under the waste rock facility post-construction.[472] Donlin Gold's engineering consultant concludes that excess ice in soils is not pervasive at the mine site even though about a third of the samples tested contained excess ice.[473] It recognizes that, where excess ice is present, thaw-induced settlement could compromise the integrity of the waste rock facility.[474] Yet neither the feasibility study nor the DEIS considers climate change when discussing the waste rock facility's stability,[475] and the DEIS's assertion that areas of permafrost underneath structures would largely be shielded from warming is unsupported.[476] The FEIS should analyze whether warming over the life of the mine and post-closure could cause the waste rock facility to collapse.

In addition, the DEIS briefly notes that thaw-settlement of ice-rich soils could lower the western rim of the open pit and increase the likelihood that Crooked Creek would overtop the wall during a flood.[477] Again, it does not discuss the effects of climate change on this risk or consider the possibility that thaw-induced settlement could compromise the integrity of the pit walls.[478] The FEIS should explain how the full range of potential settlement might increase the risk of overtopping and affect the pit itself.

Ground settlement underneath the pipeline could also cause serious impacts. The DEIS predicts that the ground underneath the pipeline could settle by as much as 23.5 feet during operations and 43 feet post-closure from permafrost thawing, with climate change accounting for 13 feet of the total settlement.[479] Air temperature is a useful proxy for ground temperature, and permafrost begins to disappear when mean annual air temperature rises to about 28 °F.[480] The modeling the DEIS relies on assumes that temperatures in the area of concern will continue to

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[471] DEIS at 3.2-81.
[472] *Id.* at 3.2-79; *id.* at 3.3-41 to 3.3-42.
[473] BGC Engineering, Inc., Donlin Creek Gold Project Feasibility Study Update II: Waste Rock Facility Design at 14-15 (2011).
[474] *See id.* at 46.
[475] *See id.*; DEIS at 3.2-79, 3.2-81.
[476] *See* DEIS at 3.26-41.
[477] *Id.* at 3.2-81; *id.* at 3.3-56 to 3.3-57.
[478] *See id.* at 3.2-81; *id.* at 3.3-56 to 3.3-57.
[479] *Id.* at 3.26-43. The DEIS identifies the north side of the Alaska Range as an area of particular concern. *Id.* A recent study confirms that this area will face an increasing risk of permafrost settlement due to warming at least through 2050. *See* E. Hong, R. Perkins & S. Trainor, *Thaw Settlement Hazard of Permafrost Related to Climate Warming in Alaska*, 67 Arctic 93, 100, Fig. 4 (2014).
[480] *See* Hong, Perkins & Trainor, *supra* note 479, at 95.

increase stepwise, by .04 °F per year, or a total of 3 °F, over the next 75 years.[481] Data from the University of Alaska Fairbanks's Scenarios Network for Alaska and Arctic Planning, however, indicate that warming may occur more rapidly.[482] The FEIS should analyze possible ground settlement under the pipeline based on realistic climate projections, instead of assuming that warming will continue to occur at its historical rate. It should also consider the potential for wildfires to exacerbate permafrost thaw and resultant ground subsidence.[483]

Along these lines, the Corps should characterize the risk of a pipeline rupture from thaw-induced ground settlement. The DEIS notes that Donlin Gold may apply for a special permit to use strain-based design in areas of discontinuous permafrost,[484] and that its application would involve tests replicating anticipated operating and environmental conditions.[485] Yet the DEIS does not specify the degree to which ground settlement could strain the pipeline, whether under the base case[486] or in a climate change scenario.[487] The Corps should address these potential impacts in the FEIS.

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[481] Memorandum from J. Fueg, Donlin Gold LLC, to N. Darigo, URS at 2 (May 14, 2014); *see also* J. P. Zarling, Geotechnical Thermal Analysis of Donlin Creek Mine Pipeline at 8 (2011) ("[A]n annual rate of increase in the mean annual temperature of 0.04 F°/year was chosen for this analysis. This results in an increase of 1.2 F° in the mean annual temperature over a 30-year period."); CH2M HILL, Donlin Creek Pipeline Project Geotechnical Report at 6-4 (2011) ("Potential effects of global warming were simulated with an annual increase in mean annual air temperature of 0.04°F over a 30-year period.").

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[482] *See* Community Charts, SNAP, https://www.snap.uaf.edu/sites/all/modules/snap_community_charts/charts.php (last visited May 5, 2016) (enter "McGrath, Alaska," select "High" representative concentration pathway, and hover over bars representing average monthly temperature from 2010-2019 and 2090-2099).

[483] *See* D. R. N. Brown *et al.*, *Interactive Effects of Wildfire and Climate on Permafrost Degradation in Alaskan Lowland Forests*, 120 J. Geophysical Res.: Biogeosciences 1619, 1636 (2015).

[484] DEIS at 3.25-15.

[485] *Id.* at 3.25-16.

[486] *Id.* at 3.2-84 ("Differential thaw settlement can have long-term effects on pipeline integrity."); *id.* at 3.2-85 ("[T]ransitions [between thaw-unstable and thaw-stable soils] are more likely to result in adverse thaw settlement or differential ground movement that could subject the pipeline to additional strain."); *id.* at 3.2-89 ("The effects of differential settlement below the pipe on pipeline integrity would be addressed through . . . Special Permit conditions."); *see also id.* App. E at E-7 ("Differing amounts of settlement along the alignment may . . . cause longitudinal bending in the pipe resulting in strains in excess of 0.5%."); *id.* App. E at E-8 ("Donlin Gold . . . recognize[s] the presence of discontinuous permafrost between [milepost] XX and [milepost] YY [*sic*] could potentially result in thaw settlement causing longitudinal pipe strains in excess of 0.5%.").

[487] *See id.* at 3.26-44 ("[T]he effects of differential settlement on pipeline integrity would be addressed through . . . Special Permit conditions."); *see also id.* at 3.26-6 ("Alternative pipeline designs to accommodate permafrost thaw effects would be evaluated . . . prior to issuance of a special permit.").

B. The DEIS does not adequately discuss how climate change could render the environment more susceptible to the project's impacts.

As an initial matter, the DEIS does not explain why it limits its analysis of climate change to the atmosphere, water, permafrost, biological resources, and subsistence.[488] Climate change will alter all aspects of the affected environment, and any discussion of the project's impacts that does not recognize this altered baseline is incomplete.[489]

In addition, the DEIS assumes that climate change would affect biological resources incrementally and that biomes would shift over an extended timeframe.[490] Even if warming occurs gradually and a total transformation of the living environment does not happen during the life of the mine, however, biological communities could begin to experience climate-related stresses within a timeframe relevant to project planning, and they may already be facing suboptimal conditions.[491] In northern regions in particular, amplified warming can have dramatic effects on species adapted to cooler habitats.[492] Partly due to this phenomenon and the resultant increase in wildfires, boreal forests in interior Alaska have been shifting from coniferous to deciduous composition since 1990, and the trend is expected to continue over the next several decades.[493] The FEIS should account for the near-term vulnerability of ecosystems potentially affected by the project when assessing its impacts on biological resources.

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[488] *See id.* at 3.26-6; *see also* Agency & Applicant Comments at 15-16 (comments by BLM identifying this issue).
[489] *See* CEQ Guidance at 21-22.
[490] *See id.* at 3.26-47; *see also id.* at 3.26-3 ("Because the effects would be incremental, the intensity of impacts for biological resources and subsistence would be low.").
[491] *See, e.g.*, C. Wobus *et al.*, *Hydrologic Alterations from Climate Change Inform Assessment of Ecological Risk to Pacific Salmon in Bristol Bay, Alaska*, 10 PLoS ONE 1, 2, 19 (2015) (noting that "salmon habitat quality could . . . be significantly modified by climate change over timescales that are relevant to planning for any large-scale mining activities"); A. S. Weed, M. P. Ayres & J. A. Hicke, *Consequences of Climate Change for Biotic Disturbances in North American Forests*, 83 Ecological Monographs 441, 454 (2013) (describing spruce beetle outbreaks associated with warming in Alaska); D. J. Isaak *et al.*, *Climate Change Effects on Stream and River Temperatures Across the Northwest U.S. from 1980–2009 and Implications for Salmonid Fishes*, 113 Climatic Change 499, 511-12, 513-14 (2012) (documenting recent warming of streams in the Pacific Northwest and concomitant effects on salmon).
[492] *See, e.g.*, Wobus *et al.*, *supra* note 491, at 2; *see also* A. W. R. Seddon *et al.*, *Sensitivity of Global Terrestrial Ecosystems to Climate Variability*, 531 Nature 229, 229-30 & Fig. 1 (2016) (finding that parts of the boreal forest belt, including southwest Alaska, have high ecological sensitivity to climate variability, which may indicate "pending ecological change").
[493] *See* D. H. Mann *et al.*, *Is Alaska's Boreal Forest Now Crossing a Major Ecological Threshold?*, 44 Arctic, Antarctic, and Alpine Res. 319, 323, 329 (2012); J. M. Wolken *et al.*, *Evidence and Implications of Recent and Projected Climate Change in Alaska's Forest Ecosystems*, 2 Ecosphere 1, 4, 10-11 (2011).

The DEIS also disregards the interactive or indirect effects of climate change on ecosystems. Variations in air temperature and precipitation can increase the prevalence of insects, disease, and invasive species; decrease snow and ice cover and permafrost; and drive wildfires, all of which may alter forest ecosystems.[494] For example, wildfires caused by warmer and drier conditions can affect the organic layer of soils and degrade permafrost, throwing off the successional trajectories of boreal forests.[495] Fungal infection has caused dieback in alders weakened by drought,[496] and loss of snow cover exposes birds and wildlife such as ptarmigan and snowshoe hares to predation.[497] In aquatic ecosystems, higher temperatures and a longer ice-free season may increase the rate of methylation of mercury, while extended food chains could lead to greater bioaccumulation of mercury in fish.[498] Complexities such as these go largely unacknowledged in the DEIS,[499] and their combined effects could make plants and animals—including subsistence resources—more susceptible to the project's impacts.

The climate-related impacts on ecosystems that the DEIS does mention do not receive adequate attention. It notes that "[a]n increase in wildfire frequency and intensity may create more early successional vegetation communities favorable to moose,"[500] but it omits the fact that burns may also impair habitat that caribou passing though the project area depend on during other seasons.[501] Similarly, it equivocates that warming may have "positive or negative" effects on fish and aquatic resources as habitat and food webs change, but it does not discuss how altered stream flows and more-intense barge scour could harm fish.[502] Indeed, the DEIS does not attempt to estimate alterations in flow from changes in precipitation,[503] even though studies suggest that the Kuskokwim River is sensitive to these kinds of variations.[504] Finally, the DEIS

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[494] Wolken *et al.*, *supra* note 493, at 8, Fig. 3.
[495] *Id.* at 10-11; *see also* H. Genet *et al.*, *Modeling the Effects of Fire Severity and Climate Warming on Active Layer Thickness and Soil Carbon Storage of Black Spruce Forests Across the Landscape in Interior Alaska*, 8 Envtl. Res. Letters 1, 2, 8 (2013); E. E. Jafarov *et al.*, *The Effects of Fire on the Thermal Stability of Permafrost in Lowland and Upland Black Spruce Forests of Interior Alaska in a Changing Climate*, 8 Envtl. Res. Letters 1, 9 (2013).
[496] Wolken *et al.*, *supra* note 493, at 12.
[497] *Id.* at 11.
[498] *See* G. A. Stern *et al.*, *How Does Climate Change Influence Arctic Mercury?*, 414 Sci. Total Env't 22, 30, 32 (2012).
[499] *See* DEIS at 3.26-45 to 3.26-47.
[500] *Id.* at 3.26-46.
[501] *See id.* at 3.12-18 (observing that individuals from several caribou herds could be present in the project area); K. Joly, P. A. Duffy & T. S. Rupp, *Simulating the Effects of Climate Change on Fire Regimes in Arctic Biomes: Implications for Caribou and Moose Habitat*, 3 Ecosphere 1, 12 (2012) (concluding that wildfires may cause significant declines in parts of some caribou's winter habitat).
[502] *See* DEIS at 3.26-35 to 3.26-37, 3.26-46; *see also id.* at 3.13-164 to 3.13-165.
[503] *See id.* at 3.26-12, 3.26-13, 3.26-15.
[504] *See* K. E. Bennett, A. J. Cannon & L. Hinzman, *Historical Trends and Extremes in Boreal Alaska River Basins*, 527 J. Hydrology 590, 601, 602-03 (2015).

CLIM 1 ignores potential climate-related cumulative effects that could worsen the project's impacts.[505] Without a more complete picture of the effects of climate change on the affected environment, it is impossible for the Corps and the public to evaluate the consequences of the proposed action.[506]

## CONCLUSION

For the reasons discussed above, the DEIS does not adequately analyze the potential consequences of the proposed action, nor those of the full range of reasonable alternatives. NEPA demands that it do so. Given the project's magnitude, the complexity of the risks posed, and the sensitivity and cultural importance of the resources affected, it is essential that both the public and the Corps be fully informed before the Corps renders a permitting decision. We therefore urge the Corps to prepare an SEIS that completely addresses the issues identified in these comments, as well as those raised by other interested groups and individuals.

Sincerely,

Thomas S. Waldo Peter Heisler

*Attorneys for Northern Alaska Environmental Center, Alaska Community Action on Toxics, Earthworks, Center for Biological Diversity, Cook Inletkeeper, Friends of Alaska National Wildlife Refuges, Kachemak Bay Conservation Society, and Sierra Club*

[505] *See* DEIS at 4-56 (discussing only other actions' contributions to climate change); *see also id.* at 3.26-63 ("While climate change effects on permafrost would be extended in extent, project-related impacts on climate-altered permafrost would be limited to intermittent areas of permafrost and localized beneath facility footprints and cleared areas.").

[506] *See* 40 C.F.R. § 1502.15 (requiring agencies to include in an EIS a description of the affected environment sufficient to understand the effects of the alternatives).

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# TECHNICAL MEMORANDUM
# REVIEW OF THE DRAFT SUPPLEMENT ENVIRONMENTAL IMPACT STATEMENT FOR THE DONLIN GOLD PROJECT

May 11, 2016
Minor Revisions, May 26, 2016

Prepared for: Northern Alaska Environmental Center

Prepared by: Tom Myers, PhD, Hydrologic Consultant, Reno NV

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# 1.0 INTRODUCTION

Donlin Gold, LLC (Donlin) has proposed to construct the Dolin Gold Project in the Kuskokwim watershed in southwest Alaska. The U.S. Army Corps of Engineers (Corps) is the lead agency for the preparation of the draft environmental impact statement (DEIS). The proposed project includes a large open pit mine with transportation facilities to a port at Bethel Alaska, and a natural gas pipeline from Cook Inlet.

This technical memorandum reviews the DEIS and supporting documents with an emphasis on hydrogeology at the mine sites. The emphasis is on the effects of mine dewatering, pit lake development, treatment of contact water (rainfall or snowmelt that has contacted lands disturbed by mining), and seepage from tailings and waste rock facilities reaching the streams. Dewatering effects include the effects on stream baseflow. This review does not include transportation facilities, port development, or the natural gas pipeline.

My background includes a PhD and MS in hydrology/hydrogeology from the University of Nevada, Reno and a BS in civil engineering from the University of Colorado. I have 35 years of employment experience in consulting, academics and government, with about 20 years specific to mining and energy development hydrogeology. My specialties include numerical modeling and contaminant transport. I have published 17 peer-reviewed journal articles with five articles since 2009 concerning groundwater modeling, contaminant transport, and aquifer water balance. My CV is attached to this review.

# 2.0 SUMMARY OF MAJOR IMPACTS OF THE PROPOSED PROJECT AND ERRORS WITH THE DEIS ANALYSIS

GRD 1

Development of the proposed mining project would affect the hydrogeology in the mine site area in the following ways.

Mine dewatering will substantially lower the groundwater table near the pit and in surrounding bedrock. Although errors in the conceptual flow model and numerical groundwater model cause the DEIS to under-predict the dewatering impacts, dewatering to keep the pit dry would intercept groundwater flowing toward a stream where it would be become baseflow. Dewatering will reduce streamflows by up to 10 and 30 % during summer and winter, respectively, according to the DEIS. Various uncertainties acknowledged in the DEIS could increase the flow loss from the creek.

HYD 7

Mine construction affects surface runoff in many ways, including the pit intercepting surface runoff in American Creek, thereby preventing it from reaching the stream and the tailings impoundment covering 70% of the Anaconda Creek drainage which prevents a large proportion

HYD 7

of that streams' flow from discharging to Crooked Creek. Ancillary mine facilities such as freshwater reservoirs divert or use surface water runoff which can affect both high and low streamflow rates. Together these effects could lower flows in the creek even more than just by dewatering, with some estimates being as high as 100 percent loss during winter baseflow periods.

WAQ 10

The mine would require approximately 17,438 gpm for processing which would be discharged to the tailings impoundment during operations. Water for the process plant comes from various places, including freshwater reservoirs, contact water reservoirs, and dewatering wells. Excess water would be discharged to Crooked Creek with treatment, so failures in the collection and treatment system would discharge contaminants to and degrade Crooked Creek. During operations, expected discharge from the water treatment plant is 1268 gpm with 786 gpm from mine dewatering and the remainder from underdrains and contact water reservoirs. All sources are subject to much uncertainty meaning that periodic high flows could overwhelm the treatment system. For example, if the bedrock has a significantly higher conductivity, the dewatering rates could be much higher because it would pull water from further away and allow recharge to enter the bedrock from the shallow aquifer faster. Heterogeneity in the bedrock including with the faults could cause periodic high dewatering amounts. The DEIS does not plan for the probability that the treatment facilities will be periodically exceeded by dewatering water or other contact water requiring treatment before discharge.

CLIM 8

The pit lake would recover during mine closure to a point where it would overflow its rim, if allowed, into Crooked Creek. The pit lake water quality would be very poor, according to pit lake modeling, due to waste rock seepage into the pit and acid generating rock around the pit and backfilled into the pit. Donlin would start pumping pit lake water when it reaches 33 feet below the rim to treat and discharge into Crooked Creek. At this point, most of the flow losses from Crooked Creek would cease. However, there are uncertainties not considered in the DEIS that could cause the pit lake to fill and overwhelm the pump and treat system. A spill could devastate Crooked Creek. Climate change could increase precipitation by up to 25% on average but there would also be more frequent very large events, which is not considered in the DEIS. This pump and treat system would be required forever so all possible combinations of weather will eventually occur.

GRD 1

The DEIS relies on the mine dewatering system and the pit lake to draw groundwater including seepage from the waste rock dump and prevent it contaminating downgradient groundwater or discharging to Crooked Creek. However, there is a significant probability that a perched aquifer will form in the shallow aquifer as dewatering lowers the groundwater table. This will short-circuit seepage from the waste rock dump to Crooked Creek. I describe the details in the next few paragraphs concerning the numerical groundwater model. Drawdown occurs under the

GRD 1

tailings impoundment but it will not draw groundwater to the pit because drawdown does not eliminate the ridge in the groundwater table between the tailings and the pit. Seepage escaping the underdrain will flow through the colluvium under Anaconda Creek and either discharge into Anaconda Creek or into the alluvium around and ultimately into Crooked Creek.

DAM 3

The DEIS does not consider the impacts of catastrophic failure, such as would occur with a tailings dam failure. The analysis should consider the probable maximum flood occurring in the watershed because the facility will be there forever. The DEIS should present hydraulic routing of a reasonable portion of the half million tons of tailings down Anaconda Creek and Crooked Creek to show the potential damages.

GRD 4

Most of the DEIS predictions are from a numerical groundwater model. Two aspects of the numerical groundwater model severely bias the predicted impacts of dewatering. The bias is that simulated dewatering does not spread far from the mine pit and affects stream flows much less than it probably will.

- The conceptualization of the bedrock away from the mine pit has very low conductivity, lower than measured in most pump tests and lower than would be expected by considering the scale effects of small-scale test and regional scale models. It is treated as undifferentiated bedrock, meaning treated as one single mass, with a conductivity an order of magnitude less than most of the bedrock simulated within the pit area. This low conductivity prevents the spread of drawdown from the pit into the bedrock, thereby limiting how far the effects can spread. The low conductivity is not justified by observed pump test values or by scale effects which would cause the conductivity to be higher than determined from small-scale pump tests. This prevents the simulated drawdown from affecting overlying streams and wetlands.
- The alluvium around Crooked Creek is simulated with a very high conductivity and very low storativity. Low conductivity bedrock and colluvium surrounds the alluvium. This effectively isolates the alluvium and Crooked Creek from impacts of dewatering. The low storage coefficient allows the alluvium to release very little water for a change in water levels in the alluvium while the very high conductivity limits the change in head. This explains why dewatering drawdown effectively hits a wall at the creek.

GRD 1

The numerical modeling also fails to consider that a perched aquifer could develop in the shallow aquifer. This is partly due to the large difference between bedrock and shallow aquifer conductivity. As simulated drawdown lowers the water table from the shallow groundwater into the bedrock, it is likely that an unsaturated zone would form between a saturated zone in the shallow aquifer and bedrock. Seepage from the waste rock facility would discharge to Crooked Creek rather than be drawn to the pit lake, as relied upon in the DEIS. Drawdown

GRD 1 would occur in the bedrock and pull contaminants toward the pit lake, but perched zones in the shallow aquifer would provide a saturated pathway for contaminants to reach Crooked Creek. The numerical model fails to simulate this because the model cannot simulate such as system. The only potential mitigation would be a liner beneath the waste rock with a leak capture system.

PAA 9 The option for the tailings facility that best prevents seepage from degrading Crooked Creek is dry stack tailing with both a liner and impervious cover to minimize potential seepage with time after closure. This is necessary because the tailings are outside of the pit capture zone and seepage would drain to the streams.

PAA 14 The TSF should have a 100-mil liner rather than a 60-mil liner to make leaks would be less likely. The TSF should have an impervious cover to prevent percolation through the tailings from mounding on the liner, which would increase head on the liner and the leak rates and potentially cause instability problems.

HYD 9 Donlin should consider removing the Snow Gulch Reservoir from the plan to avoid impacts to that tributary watershed.

PAA 27 They should also leave a buffer between the pit and the Crooked Creek alluvium to decrease the connection with the alluvium and decrease the amount of water potentially drawn from the creek.

## 3.0 DEIS ALTERNATIVES

The DEIS describes five alternatives, including no action (alternative 1), the proposed action (alternative 2,) (mine layout shown in Figure 1), two alternatives that alter the pipeline and transportation routes but leave the mine plan basically as proposed under alternative 2 (alternatives 3 and 4), and an alternative that would alter the mine plan to use dry stack tailings rather (alternative 5) than a slurry system. Dry stack tailings alternative 5 has two options. Option 1 would not be lined but there would be an underdrain to remove seepage. Option 2 would have a liner. There would be eight freshwater wells for domestic and sanitary uses, and up to 35 pit perimeter wells and 80 in-pit dewatering wells (DEIS, p 2-9).

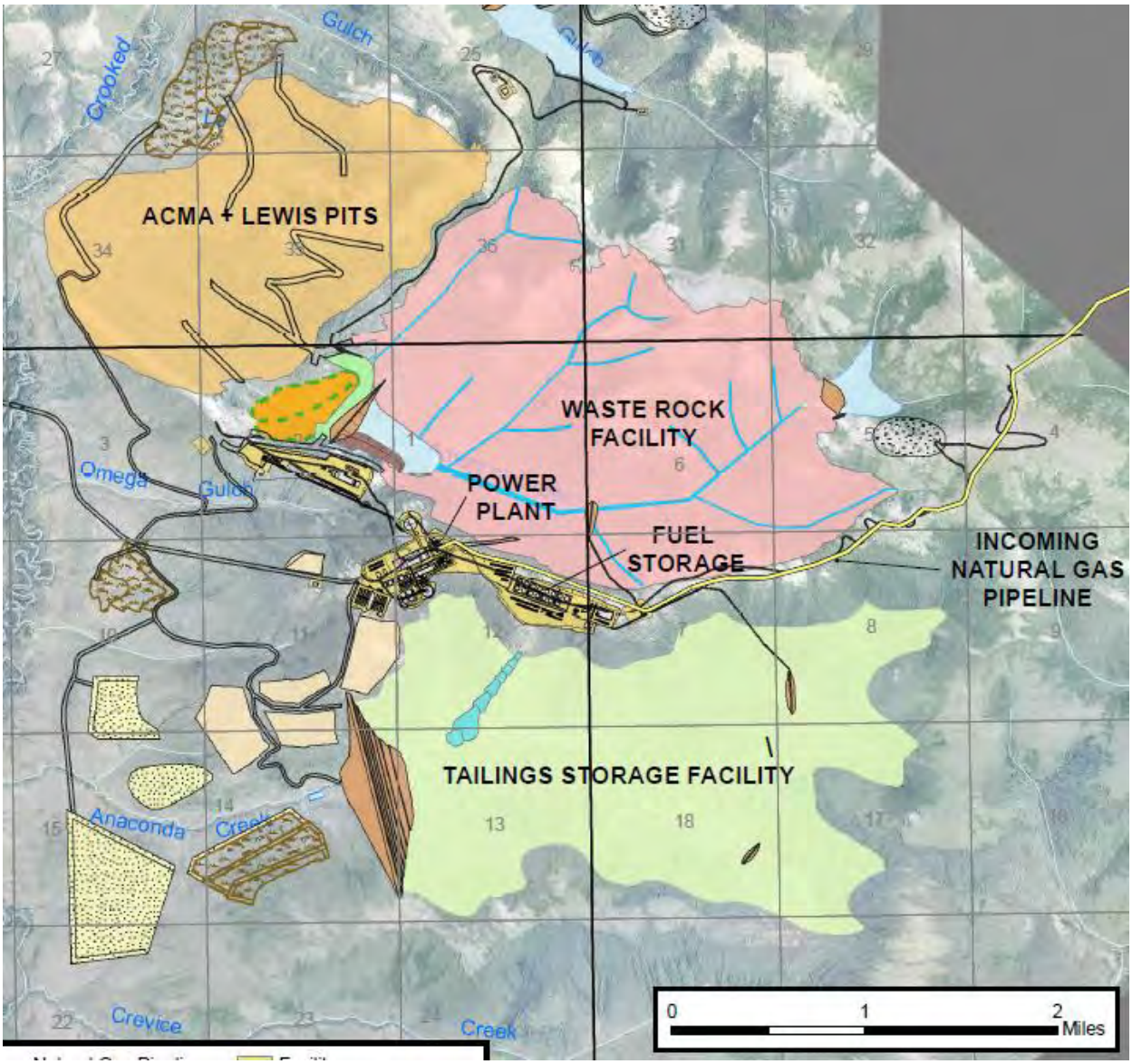


*Figure 1: Alternative 2 general mine layout - DEIS Figure 2.3-1*

## 3.1 Recommended Additional Alternative

PAA 27

A primary impact of this proposed mine is the impacts mine dewatering and pit lake formation could have on stream flows. As will be discussed in section 9.0, the properties of the bedrock separating the proposed pit from the alluvium under Crooked Creek have some control over the amount of surface water drawn from the stream into the groundwater. Several amendments should be made to Alternative 2 or should be added to an existing alternative and considered as a new alternative.

PAA 27
- The DEIS should include a setback alternative which requires the pit excavation not intersect the Crooked Creek alluvium. There should be a minimum setback from the creek of several hundred feet to protect stream flows. The exact distance could be determined based on additional understanding of the bedrock properties.

PAA 14
- The waste rock facility (WRF) that would be constructed over the American Creek should have a drain through it to allow streamflow to pass without being captured in an upper contact water pond. Below the WRF, there should be a channel created to allow it to pass the proposed pit

HYD 9
- Snow Gulch Reservoir should be removed if not really needed. See section 7.3 below.

## 3.2 Adaptive Management and Monitoring

The Corps calls for adaptive management activities pertaining to groundwater hydrology. Donlin should assess monitoring data especially with respect to drawdown to assess whether the groundwater monitoring regime is adequate. Donlin should assess whether drawdown has extended beyond the monitoring system.

- If drawdown at the most distant wells from the mine has become significant, new monitoring wells should be installed. This should be assessed at least every three years during operations.

GRD 12 The groundwater model would be reexamined after three years of pit dewatering to "minimize uncertainty about dewatering effects" (DEIS, p 3.6-44; DEIS, Table 5.7-1). This should include verification of the original model to assess the accuracy of the DEIS predictions.

- If they differ substantially, then new modeling and new NEPA analysis should be completed based on new predictions. A substantial difference is difficult to establish in advance, but would probably include the dewatering pumping rate being off by 100% (pumping twice the expected amount), having drawdown at a monitoring well twice that predicted, or having Crooked Creek lose flow along an unexpected rate or more than expected.
- New modeling should include new ideas of the conceptual flow model in the area. Two obvious considerations are the modeling of the bedrock as a porous media without considering fractures and the distribution of recharge throughout the area.

CLIM 10 The Corps indicates that climate change should be considered in future modeling (DEIS, p 3.6-45, DEIS Table 5.7-1 #3). Long-term climatic observations at the site should be compared with climate model predictions to assess the accuracy of the predictions with respect to Donlin.

CLIM 10

- Climate change effects on the project should be included with each model update and use the most current precipitation forecasts from global climate models. If the simulations predict substantially different potential future conditions, the Corps should complete supplementary NEPA analysis to disclose to the public the potential changes and to allow the public to provide additional comment.

## 4.0 MINE DEWATERING

Mine dewatering is the process of removing groundwater for the purpose of lowering the water table, or causing drawdown, to keep the mine pit dry. At Donlin, the company would use pit perimeter wells, in-pit wells, and horizontal drains in the pit wall. The water table would be drawn down near the Donlin pit as much as 1400 feet.

The lateral extent that drawdown expands to depends on recharge because recharge replaces groundwater as it is removed. Dewatering removes water out to the extent of an influence zone where the dewatering pumpage equals the sum of recharge that is captured and streamflow induced to recharge. Drawdown will expand until it has captured an amount of recharge and streamflow equal to the pumping rate needed to lower the water table at the mine. At the point where dewatering pumpage equals recharge, the groundwater pumping will approach steady state. Dewatering affects larger areas in dry regions because the recharge is low and smaller areas in wet regions because of the much higher recharge.

GRD 17

The bedrock hydrogeology controls the dewatering rate and affects how rapidly the drawdown expands. This effectively means conductivity (K), the ease with which groundwater flows through a porous media. All else being equal, more water will be pulled more quickly from further away with a high K value. This means the drawdown cone would approach its maximum extent more quickly with a high K.

### 4.1 Recharge

Groundwater recharge equals 5.5 in/y or 28 percent of average annual precipitation (DEIS, p 3.6-11). The DEIS does not provide a reference for this estimate, but the numerical model report (BGC 2014c) references BGC (2011b) as the source of the recharge estimate. That document mentions recharge only in an appendix which is a memorandum regarding "Potable Water Supply Assessment"; it states: "[a]verage annual recharge in the mine area was assumed to be 139 mm/y, based on the feasibility calibration of the numerical groundwater flow model (BGC 2007c)". The reference section does not have a BGC 2007c, but BGC 2007g is "Numerical Hydrogeologic Model Results ad Pit Dewatering Design, Final Report".

Recharge is usually estimated in a conceptual model report, but the most recent conceptual model report for Donlin, BGC (2014g), does not derive recharge. The amount used for this project, 5.5 in/y, is not unreasonable, based on my experience, although it is higher as a proportion of annual precipitation than most areas. Because snowmelt is a slow process the estimate is not unreasonable.

- It is important for the DEIS to have an accurate description of recharge, one of the most important hydrogeologic parameters, and how it was determined.

GRD 17 Recharge equals groundwater discharge from a basin which is at steady state (Myers 2016, Cherkauer 2004). Usually, groundwater discharge is stream baseflow. For the Crooked Creek watershed, recharge would equal baseflow at the mouth of the basin expressed as a depth, in inches, over the watershed. It could be estimated for smaller tributary basins if such detail is desirable but the accuracy may decrease if groundwater tributary areas do not exactly match topographic boundaries. In the Crooked Creek watershed, there could be two forms of baseflow because discharge from alluvial/colluvial aquifers should differ from discharge from bedrock aquifers. Shallow aquifers could effectively drain more quickly than the bedrock aquifers which should provide the late-winter baseflow. If the actual amount of recharge reaching bedrock is small, the drawdown in bedrock should expand more than it appears to and have a much larger effect on winter than on late summer flows (DEIS, Figure 3.6-8).

Recharge affects the DEIS predictions by its effects on groundwater model simulations, as reviewed below in section 9.3. In general, higher recharge means higher discharge and calibrating a model using higher groundwater flux rates would lead to higher estimated K values. Together, high recharge and high K could lead to higher dewatering estimates.

GRD 1 The modeled bedrock K is very low and that of the shallow aquifer, either colluvium or alluvium is much higher, as I describe below, so some of the recharge probably moves through the surficial aquifer to the nearest stream under natural conditions. Depending on the connection between the shallow and bedrock aquifer, dewatering of the bedrock might not pull all of the groundwater from the shallow aquifer into the bedrock which means that the shallow aquifer might remain saturated and continue discharging to the streams. While this might limit the effect of dewatering it also would affect the transport of contaminants from the TSF and WRF to the streams. Isotope data indicates that the age of groundwater varies from 21 to 56 years and that deeper water is older which generally follows the groundwater recharge path.

GRD 1 The DEIS notes that prediction of the impacts due to dewatering are very uncertain. "Sensitivity analysis simulations (see discussion below in this section) suggest that prediction of the amount of streamflow depletion is difficult." (DEIS, p 3.6-25) This refers to sensitivity of

GRD 1 the model predictions to both recharge and bedrock properties. I review model sensitivity in section 9.7.

## 4.2 Bedrock Hydrogeology

Most pit excavation will be in bedrock, so bedrock will control groundwater flow to the pit and, through connections with streams, control how dewatering affects groundwater baseflow. The DEIS (Table 3.6-2) reports bedrock K varies over about four orders of magnitude at each depth level for three different levels, upper (<330 ft), middle (330 – 660 feet depth), and lower (>660

GRD 2 ft depth). The K ranges are 0.006-14, 0.0009-0.9, and 0.0003-0.2 ft/d, respectively.

The gap analysis for hydrogeologic data acknowledges that scale could affect the hydrogeologic properties in the modeling (BGC 2013b). In general, the K of a formation increases with the scale of the volume being considered. This generally means that a single-well pump test or slug test yields a lower K estimate than a several day pump test with monitoring wells, with lab tests and groundwater modeling K estimates also considered on a similar scale relationship. The gap analysis suggests that BGC complete larger scale pump tests. As noted below in section 9.0, the numerical model did not account for scale effects.

The conceptual model report identifies up to 18 faults crossing the open pit zone (BGC 2014g). Little is known about the faults from a hydrogeologic perspective and they are not even mapped outside of the pit area. The bedrock hydrogeology treats the bedrock as a porous media meaning that the faults are not considered individually, either as flow barriers or conduits. Drawing 2 (BGC 2014g) shows mapped thrust faults mostly crossing the pit in a general east-west direction, but the mapping does not extend much beyond the pit. There is no indication of whether the fault layout in the pit is representative of faults beyond the pit. BGC (2014g, p 19) suggests that there is no indication of a trend of K with respect to the proximity to faults, but Drawing 26 does not show sufficient tests in the area with faults to

GRD 3 support this claim. Thrust faults can have high permeability damage zones. Therefore, if faults intersected by the pit have long-scale high permeability damage zones, dewatering effects could extend for a long distance beyond the pit and the predicted drawdown cone.

- The DEIS does not adequately disclose the properties of the faults that intersect the pit. The DEIS also does not propose monitoring or adaptive management for dealing with a fault system that extends drawdown far from the pit or causes much higher dewatering than expected. Model sensitivity analysis without actually simulating the faults is insufficient planning for the faults.

GRD 3

- If there is sufficient data, the DEIS should provide a plot of K versus distance from a faults to estimate whether there is a trend. There should also be more pump testing completed in the pit area among the faults to collect sufficient data for analysis.

## 5.0 PIT LAKE FORMATION

After mining ceases, mine dewatering would stop and groundwater would begin to flow into the mine. The open pit would fill in 50 to 55 years with groundwater inflow, surface runoff, and water from the TSF (DEIS, p 2-40), although other reports have estimated other times up to 60 years (Lorax 2012). TSF water would be pumped to the pit lake whenever it does not meet standards (DEIS, p 2-40); at the beginning of closure, about 30,000 acre-feet (af) of tailings water would be pumped into the pit so simulations of pit lake development start with an initial volume. The pit initially would be a hydrologic sink for regional groundwater but would eventually fill to a point where it would discharge into Crooked Creek, except that when the water level is 33 feet below the crest, the mine would begin pumping and discharging the water. This would be required in perpetuity to prevent the pit lake from overtopping its banks (Id.). Treatment sludge would be dumped into the pit lake (Id.).

GRD 6

Inflow to the pit lake is groundwater and runoff from various sources. The pit lake essentially would exist forever so the planning must account for all potential inflows and climate change. BGC (2015l) considers some of the extreme conditions the pit would experience in future, specifically "the ability of the pit lake to handle storm events during the post-closure period" (BGC 2015l, p 1). The average discharge to Crooked Creek, if not treated would average 2812 gallons per minute (gpm) and the treatment plant would be able to treat at rates up to 7486 gpm (Id.) with an operating period of six months per year. More inflow would require a longer annual operating period. To provide freeboard (not designed for any specific return interval), treatment of the pit lake would begin when the pit lake is 33 feet below its crest (Id.). There would be a spillway in the southwest corner of the pit near Crooked Creek designed to accommodate the probable maximum flood of 11,301 cfs (with flood routing through the pit lake, the actual discharge rate would be less). At water level elevation 328 (33 feet below the crest), the pit lake volume would be 376,170 af and at the crest of 359 feet above mean sea level (amsl) the volume would be 405,360 af (BGC 2015l, p 2). The watershed area above the outlet would be 5122 acres (Id.), although much of that would be the pit lake, and the estimated average annual runoff is 4700 af/y (Id.). At this rate it would require six years to fill the pit over the upper 33 feet, or 29,190 af (Id.). Presumably the difference would be made up by groundwater inflow.

## 5.1 Pit Lake Water Quality

The DEIS discloses that the pit lake "water quality … will not meet applicable water quality criteria without treatment" (DEIS, p 3.6-35). The DEIS and supporting documents complete substantial modeling of the pit lake water quality and show that it would be very poor. Details of that modeling are not reviewed here because there are huge uncertainties that lead to the precise predictions being inaccurate (Maest et al. 2005). The models are accurate enough to provide general trends of pit lake quality. DEIS Table 3.7-36 shows that the water quality of the surface layers of the pit lake would exceed standards for aluminum, antimony, arsenic, cadmium, copper, iron, lead, manganese, molybdenum, selenium, and mercury with pH being lower than standard (DEIS, p 3.7-129). Seepage inflows to the pit lake from PAG waste rock and from the tailings impoundment are extremely poor with sulfate inflow being as high as 180,000 mg/l (compare to a standard of 250 mg/l) (DEIS, Table 3.7-37). The modeling does depend on the pit lake remaining stratified because the pit lake quality at depth is extremely poor.

GRD 6

The predictions are accurate enough to plan around two aspects of the pit lake. Groundwater outflow from the pit lake would contaminate surrounding groundwater and discharges from the pit lake to surface water would contaminate Crooked Creek, in violation of standards and discharge permits.

## 5.2 Pit Lake Discharge Control

The plan is to use lake level management, basically pumping, to maintain the lake level at 10 to 30 feet below the level of Crooked Creek (Id.). The pumped water would be treated and discharged to Crooked Creek (Id.). The long-term treatment of water pumped from the pit lake, to prevent it overflowing, would be at 2911 gpm (BGC 2014b, Figure 5-4). This is pumping and treating in perpetuity. After closure and complete pit lake development[1], the groundwater inflow rate will probably not vary as much as it could during dewatering. However, the higher bedrock K scenario leads to substantially more groundwater inflow into the long term. The long-term pump and treat requirement could be much higher than specified here as a long-term average due to higher groundwater inflows. Runoff and precipitation entering the pit lake would cause short term variability.

WAQ 10

BGC estimates the volume of the probable maximum precipitation over the watershed is 5030 af in 24 hours, which is about one sixth of the freeboard (Id.). Treatment capacity in six months

[1] Many pit lakes only approach full development if evaporation exceeds inflow, mostly of groundwater. These terminal pit lakes usually have only evaporation as an outflow. The Donlin pit lake will reach full conditions because it will fill to its rim if pumping did not establish an outflow. The pit lake as a whole would therefore not be subject to significant evapoconcentration as a pit lake with evaporation as its exclusive outflow.

is 5920 af (Id.). BGC's conclusion is that the pit lake would have no difficulty holding large volumes of runoff for treatment in the future.

WAQ 10

This is essentially a treatment in perpetuity plan. The calibrated groundwater model predicted the pit lake would fill in 52 years while two sensitivity analyses predicted 26 and 39 years for a wet climate and more conductive bedrock scenario, respectively. The wet climate scenario had increased recharge and streamflow rates by a factor of two and the more conductive bedrock scenario has increased bedrock K by a factor of five. Both scenarios filled the lake faster because they provided more water more quickly than the calibrated model scenario. After the pit is full, groundwater presumably continues to flow toward it from all directions (Id.).

### 5.3 Groundwater Flows

GRD 6

The DEIS discloses that pit lake water would discharge to surrounding groundwater both initially and in the long term (DEIS, p 3.6-35), as described in Figure 2. This is partly due to the placement of unsaturated backfill in the pit and to the fact that as the pit lake fills water from the pit lake will resaturate the surrounding bedrock. This differs from many pit lake systems which fill primarily by groundwater inflow, but at Donlin the bedrock K is low and does not recover immediately. Figure 3 shows simulated groundwater inflow and outflow at Donlin.

GRD 6

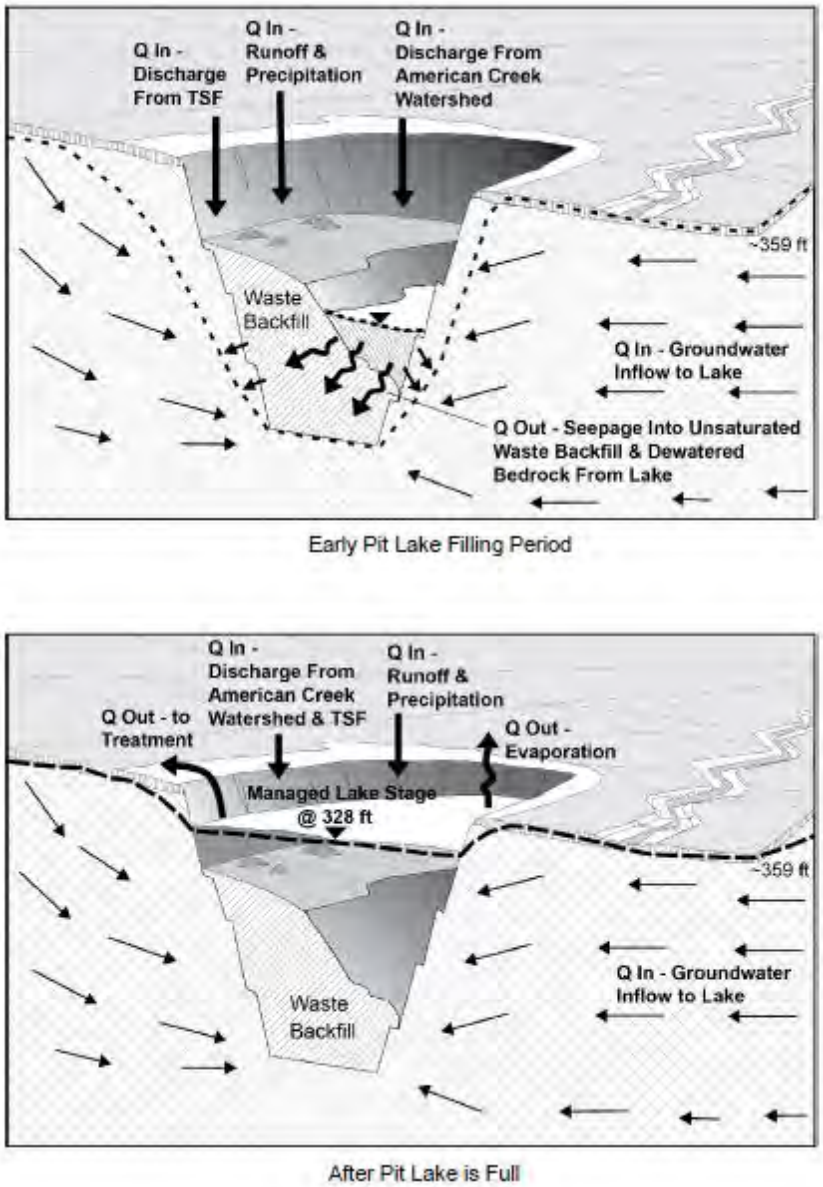


*Figure 2: Snapshot of a portion of DEIS Figure 3.6-9 showing the model of pit lake inflow and outflow.*

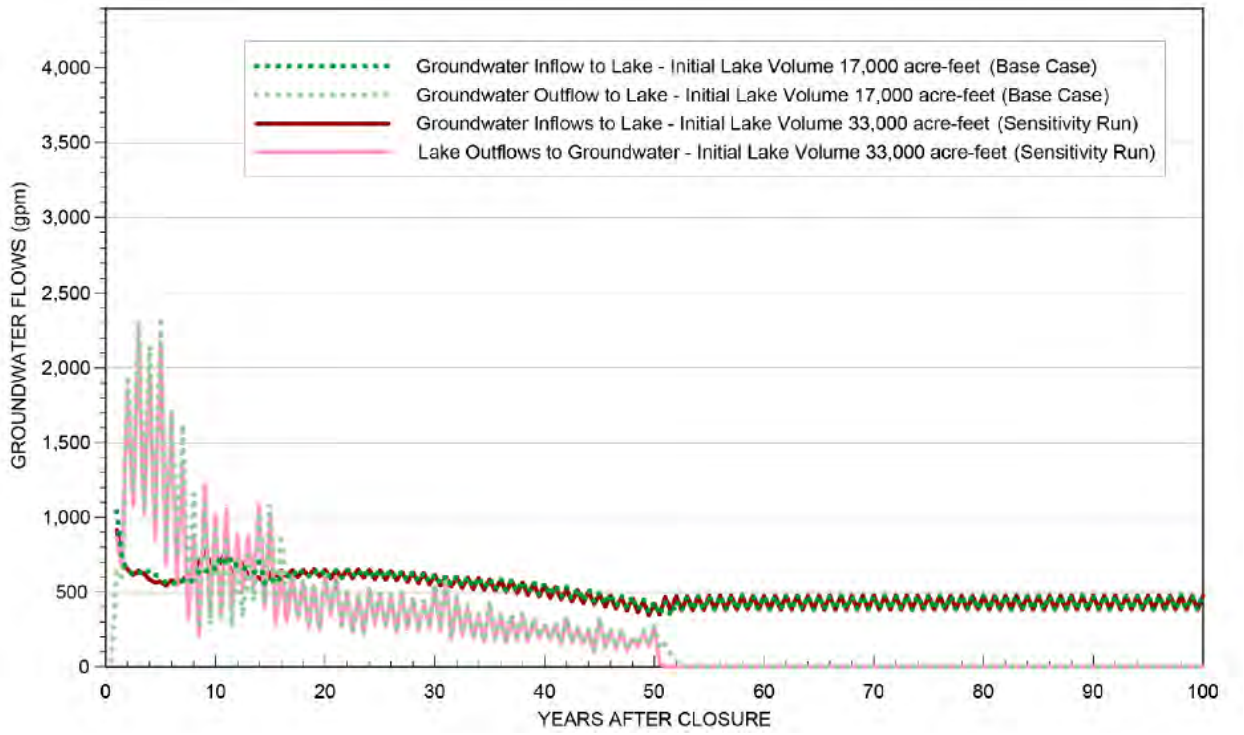


*Figure 3: Snapshot of a portion of DEIS Figure 3.6-10 showing simulated groundwater inflow to and outflow from the pit lake as the pit fills with water.*

GRD 6

Partially backfilling the pit causes an interesting system of groundwater inflow/outflow at the pit lake. The backfill would be unsaturated at the beginning of pit lake formation and therefore has to be wetted as part of the pit lake formation by groundwater outflow from the pit lake to the backfill (DEIS, p 3.6-35) (Figure 2). BGC (2014c) describes the groundwater/pit lake relationship:

> Results of the post-closure simulation show that the pit lake is predicted to fill to its managed maximum stage (i.e., 331 ft amsl or 101 m amsl) approximately 60 years after closure (Drawing 48). During the first 8 years after closure, pit lake water is predicted to seep out of the lake into the dewatered bedrock and into the pore space of the waste rock placed as backfill within the pit (see Figure 4-4). Predicted lake outflow during this period declines from approximately 2,860 gpm to 1,100 gpm (15,600 m3/d to 6,000 m3/d; Drawing 49). From Year 8 to 60 after closure, lake seepage or outflow is simulated to decline from 1,100 gpm to 0 gpm (6,000 m3/d to 0 m3/d) as groundwater elevations rise toward stable levels. Once the pit lake fills and groundwater elevations stabilize around the pit lake, seepage from the lake is predicted to cease. Thereafter, groundwater fluctuations are in response to seasonal changes and seasonal management of the lake stage. The managed lake stage results in a slight hydraulic gradient oriented toward the open pit, making the pit a groundwater sink. (BGC 2014c, p 45)

It is difficult to visualize how so much water leaves the pit lake and enters the surrounding groundwater (Figure 3), considering how the water table is hundreds of feet higher than the pit lake level (Figure 4). However, the modeling shows a significant outflow that is controlled partly by seasonal pit lake level changes. The net groundwater flow to the pit lake is very small (Figure 3) and the fact that discharge from the pit lake continues until the pit lake is almost full suggests pathways exist for flow to leave the pit lake and not return. This could occur at various depths depending on the details of the potentiometric surface.

GRD 6

The groundwater contours at the end of mining suggest one possible pathway for contaminants to leave the pit and possibly enter surface water (Figure 4). Southwest of the pit the groundwater contours are much lower than northeast of the pit due to the general slope of groundwater in the area. If the pit lake fills faster than the surrounding groundwater table, as indicated by Figures 2 and 3, it is possible that the pit lake creates pressure in deeper bedrock that causes an upward gradient to the creek away from the pit. Pit lake water could flow through deeper bedrock layers then upward toward the surface due to higher pressure conditions in deep bedrock.

- The DEIS or BGC (2014c) should present a detailed analysis of the potentiometric surface at depth near the pit lake to estimate where groundwater discharging from the pit lake would go. (The particle tracking diagrams in BGC (2014c) are not useful because they are apparently for single model layers whereas actual contaminants would change layers.)
- The DEIS or BCG (2014c) should present potentiometric surface maps for each model layer to assess whether outflow is possible from some depths in the pit lake.

GRD 6

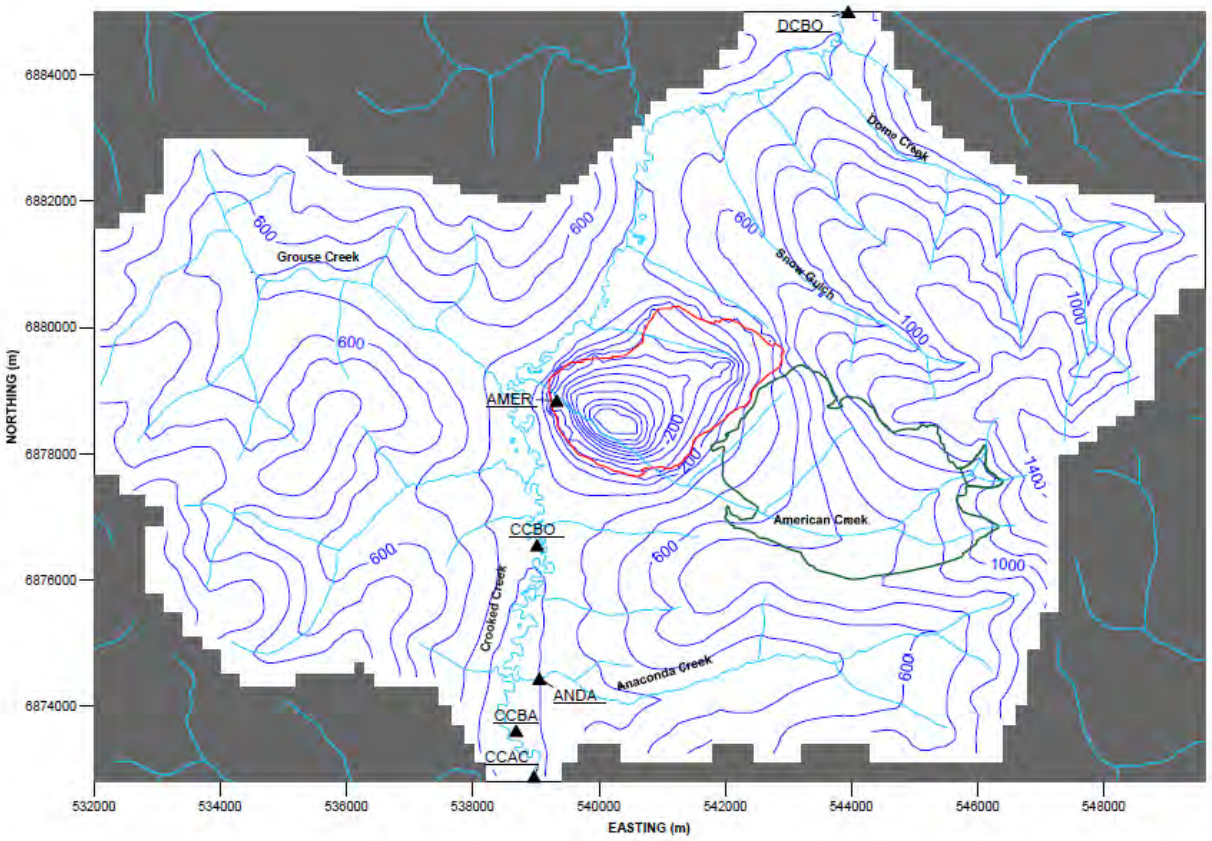


*Figure 4: Snapshot of Drawing 39 (BGC 2014c) showing simulated groundwater contours at the end of mining.*

## 5.4 Climate Change Impact on Pit Lake Planning

CLIM 8

The DEIS must plan for significant climate change into the future, as it appears to acknowledge (DEIS, p 3.26-2), due to the necessity of pumping and treating the pit lake water in perpetuity. Increased precipitation in this part of the Alaska must be considered because it could vastly increase the inflows to the pit. If they occur over a short-term period, it would seem likely that the potential for spills from the pit would increase.

However, the modeling does not include climate change. The design water balance is based on a deterministic data set of precipitation running from 1940 to 2010. Climate change will increase precipitation up to 25% over the next 80 years (DEIS, section 3.23), but as discussed above, the increase would be highly variable. It is critical to consider the potential inflow to the pit lake with not just an increased average flow but with a much increased variance to account for large inflow events occurring during a wet period.

CLIM 8

- Pit lake water balance simulations should include stochastically simulated precipitation events to account for the increased frequency of what are currently low frequency events.
- Pit lake simulations with climate change should also include simulations with higher groundwater inflow that could result from higher bedrock K or high-K faults and fractures.

Combined with the fact that groundwater inflow could be much higher (see section 9.0), the freeboard analyzed in BGC (2015l) is not as sufficient as suggested.

- The DEIS should disclose whether the closure treatment plant would be able to operate up to 12 months a year in all kinds of weather.
- The DEIS should plan for treatment on future conditions with climate change rather than being just based on the current climate statistics.

# 6.0 IMPACTS ON STREAM FLOWS

## 6.1 Pit Construction

Pit construction affects streamflow in two ways. First, dewatering to keep the pit dry would intercept groundwater flowing toward a stream where it would be become baseflow. Dewatering will reduce streamflows by up to 10 and 30 % during summer and winter, respectively (BGC 2014c, Drawing 44). Figure 5 shows reductions in groundwater discharges to various Crooked Creek tributaries caused by dewatering (BGC 2014c, p 40). The impact of dewatering decreases with distance from the stream.

HYD 7

Second, mine construction affects surface runoff in many ways, many having to do with mine water management described in Section 7.0. The pit would intercept surface runoff in American Creek, thereby preventing it from reaching the stream (BGC 2015h). The tailings impoundment would cover about 70% of the Anaconda Creek drainage (DEIS, p 3.5-77) which removes a large proportion of that streams' flow from discharging to Crooked Creek; much of that flow is diverted to mine water management as tailings water or as captured by the tailings underdrain. Ancillary mine facilities also divert or use surface water runoff which can affect both high and low streamflow rates.

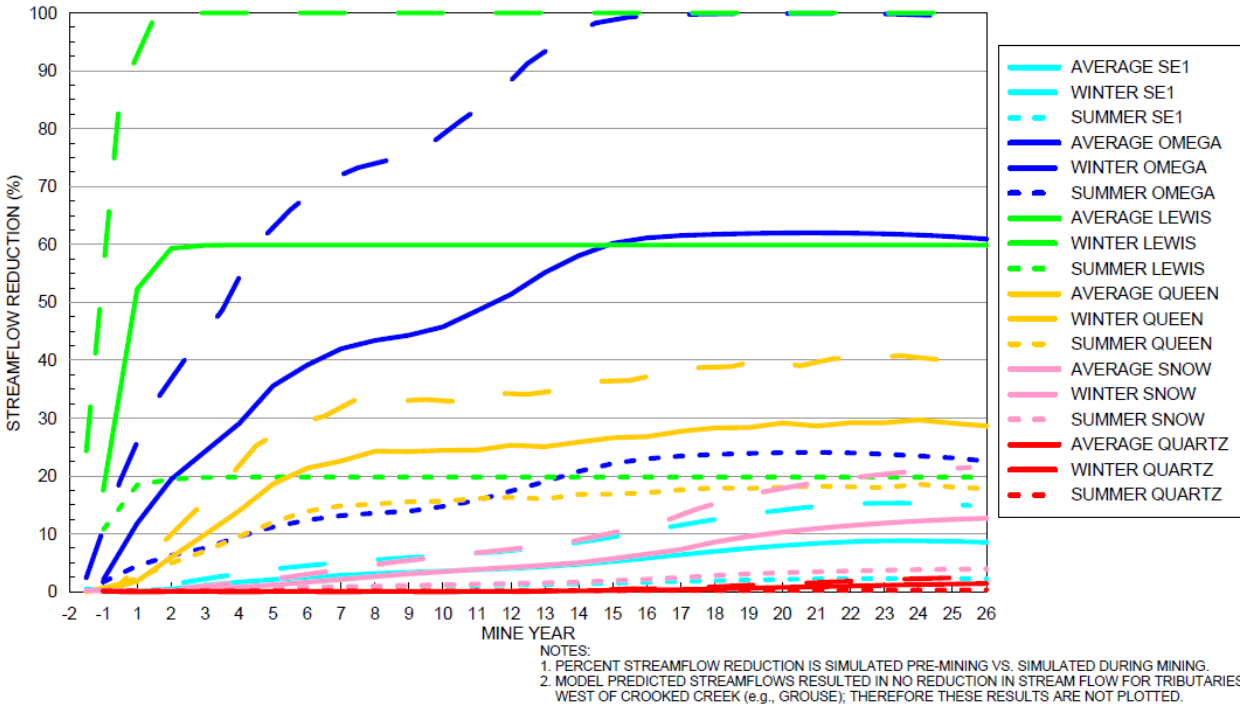


*Figure 5: Snapshot of Drawing 45 (BGC 2014c) showing reductions in flow from various Crooked Creek tributaries due to mine dewatering.*

HYD 7

Together, dewatering and mine water management cause very substantial changes in streamflows in Crooked Creek and its tributaries. The DEIS separates the discussion of impacts which can be very confusing. For example, the description of flow losses to Anaconda Creek (DEIS, p 3.5-76 - -77) does not address a loss to mine dewatering, but the summary of loss in DEIS Table 3.5-26 does include dewatering (as shown by the variation in losses for the high-K scenario which is a mine dewatering scenario in the groundwater model (BGC 2014c)). The DEIS apparently considers all impacts to Crooked Creek including cumulative impacts from the tributaries, which includes dewatering impacts (Figure 5). The failure to assign flow losses to specific activities increases the difficulty of considering mitigation.

- The DEIS should tabulate all of the predicted streamflow losses in the same table so that their magnitude can be compared

There is a lot of uncertainty around the predicted losses to Crooked Creek and other features.

MIT 31

Effects on Crooked Creek flow could vary widely depending on season, precipitation conditions, bedrock hydraulic K, phase of mine operations, and distance from the mine. For example, Crooked Creek flow below the mine site near Crevice Creek would be

MIT 31

reduced by 20 percent in winter under average precipitation and K conditions, and by 26 percent in dry conditions, during late operations (year 20 onward). The greatest flow reduction experienced near the mouth of Crooked Creek (at Bell Creek about 8 miles downstream of the mine) is projected to be 4 to 10 percent under the above conditions. In the event that K is higher than expected, 45 to 100 percent of Crooked Creek flow could be reduced in winter near the mine site under average to dry precipitation conditions, with much of the flow restored below Crevice Creek (16 to 40 percent reductions) due to tributary inflows. (DEIS, p 3.5-2)

Year 20 may be the year of maximum impact on Crooked Creek stream flows because the pit footprint would be at its maximum extent which would make for the greatest capture of runoff by the pit and because pit dewatering captures its maximum rate in year 20 (DEIS, p 3.5-82). Flow losses from Crooked Creek are as high as 100% (during year 20 at the confluence with American Creek for the high bedrock K, low precipitation scenario, DEIS Table 3.5-26), but are substantial all along the reach to Bell Creek.

- The DEIS should implement as mitigation for these flow losses a plan to discharge treated waste water in locations that would mitigate these losses.

## 6.2 Pit Lake Formation

Pit lake formation creates a permanent loss of water from Crooked Creek in two ways. First, the groundwater flow that pre-mine had been toward the creek will be reversed with the permanent drawdown to the pit reversing the gradient at the creek so that water flows into the groundwater. The Corps relies on this reversal of gradient to prevent highly contaminated pit lake water from reaching groundwater or downstream surface water. The streamflow loss to the pit lake would apply along the creek in the pit lake capture zone (the continuing drawdown cone near the pit lake). The second is that the pit would capture surface flows from American Creek, thereby preventing both high and low flows from reaching Crooked Creek.

- The overall effect of the pit depends on the timing of groundwater diversion from the creek, the hydrograph of captured water from American Creek, and the discharge of pit lake water into Crooked Creek.

Effects on surface drainages (Figure 3-5.1) appear mostly constrained to three drainages. If there are facilities that slope over drainage divides, the Corps should make efforts to avoid doing so.

# 7.0 MINE WATER MANAGEMENT

Mine water management is the plan for how the mine would handle water requirements throughout its operation. It is both a plan for obtaining necessary production water and for discarding water that hinders production. For example, approximately 17,438 gpm would be used for processing and discharged to the tailings impoundment during operations (DEIS, 3.5-21). Water for the process plant comes from various places, including freshwater reservoirs, contact water reservoirs, and dewatering wells. Stormwater management and mine dewatering are the two activities for which the mine attempts to discard excess water. Efficient management of the two can decrease the impacts the mine has on the environment, but the Donlin water management could be improved as described here.

## 7.1 Discharge to Crooked Creek

Excess water would be discharged to Crooked Creek with treatment, so failures in the collection and treatment system would degrade Crooked Creek. During operations, expected discharge is
WAQ 10 1268 gpm with 786 gpm from mine dewatering (DEIS, Figure 3.5-21). The remainder is from underdrains and contact water reservoirs, with all estimates being highly uncertain. There is a lot of uncertainty in the dewatering estimates, but during operations, most of the dewatering water (547 + 694 = 1241 gpm), whether through perimeter or in-pit dewatering wells, would be treated and discharged (783 gpm) to Crooked Creek (BGC 2014b, Figure 4-2). However, as discussed below, the high K modeling scenario would result in dewatering as much as 3.3 times higher than the predicted scenario. With time, the mine would have to increase its treatment capacity to accommodate this much extra flow. However, the actual geology is highly heterogeneous so it is probable that actual dewatering rates would be variable and could periodically far exceed the 3.3 times, especially if there are high K faults combined with the high K bedrock. The high precipitation scenario which estimates treatment at 859 gpm (BGC 2014b, Figure 4-3) does not encompass the potential for higher treatment rates due to heterogeneous bedrock.

- The DEIS should better plan for treating higher flow rates of dewatering water (and contaminated water from other sources.
- HYD 9 The DEIS should better plan to use dewatering water in operations rather than capturing freshwater flows. For example see section 7.3 regarding the need for Snow Gulch Reservoir.

## 7.2 Climate Change

CLIM 8

The Corps considered a climate change scenario for the mine site by using an estimate from a group at the University of Alaska Fairbanks, Scenarios Network for Alaska + Arctic Planning (SNAP). It was based on global climate models (GCMs). The SNAP data shows that precipitation during winter months "is projected to increase from current conditions over these decades" (DEIS, p 3.26-10), referring to the time from now to the end of the 21st century. By the 2060-2099 time frame, the SNAP data suggests that precipitation at the mine could increase by from 17 to 25 percent. DEIS Table 3.26-3 shows the increase by month for several future time periods. The table implies a systematic increase by month, but this does not disclose how those changes may occur. It is not likely that each storm system simply has increased precipitation. It is far more likely that a few large events will cause much of the increased precipitation. This could have significant impacts on aspects of the project affected by runoff, which would be much higher during these events. This perhaps could be most important with respect to treatment of runoff from various facilities.

- Treatment facilities must be designed to accommodate larger inflows that occur both as storm events and as long-term climate cycles.

## 7.3 Snow Gulch Reservoir

HYD 9

A reservoir would be constructed on Snow Gulch, north of the minesite, to provide a contingency source of water for the project (DEIS, p 2-27). "In years with average or below-average precipitation, the CWDs and pit dewatering system would not be able to meet process plant water requirements, in which case additional water would be obtained from the Snow Gulch reservoir" (Id.). However, the water balance modeling shows it provides only a small amount of water to the mine plan and that much more water would be discharged to Crooked Creek than obtained from Snow Gulch (BGC 2014b). During average conditions Snow Gulch would provide 136 gpm of water to the process plant (BGC 2014b, Figure 4-2) and BGC (2014b) Figure 4-1 shows the reservoir would hold about 3000 af most of the time. The process plant uses a large amount of water, with 17,484 gpm being discharged to the tailings; sources include contact water from the Lower and Upper Contact Water Dams (waste rock runoff and seepage), recycled water from the tailings, and dewatering water. Considering the treatment plant discharges 783 gpm to Crooked Creek, and that it is mostly dewatering water during operations, there does not seem to be a need for Snow Gulch water.

- The DEIS should provide better justification for constructing a reservoir in Snow Gulch. It should consider whether the water otherwise obtained from Snow Gulch could be obtained by dewatering at higher rates temporarily.

## 8.0 WATER QUALITY

WAQ 20

Donlin Mine could affect water quality in many ways although they can be summarized into three possibilities. First, meteoric waters could seep through waste facilities (waste rock or tailings) to reach groundwater or streams. Second, there would be discharge of waters collected from various sources to surface water after treatment. The sources include collected seepage from waste facilities, excess tailings water, contact water from contact water reservoirs, and excess dewatering water (DEIS, Figure 3.5-21). If the collection and treatment facilities work as planned, treated water should not degrade water quality. A third source is the long-term discharge of pit lake water to groundwater or surface water, as discussed above in section 7.1.

### 8.1 Seepage from Waste Facilities

WAQ 20

A significant issue is the potential for seepage from the WRF or TSF to reach streams thereby causing degradation. There will be over 3,000,000 kilotons of waste rock, which the DEIS claims would be about 91% NAG and the rest being PAG over varying time periods (DEIS, p ES-12). Most PAG-6 rock would be mined early and placed in isolated cells in the waste rock facility (WRF) (Id.). PAG-7 and some PAG-6 rock would be backfilled into the ACMA pit (Id.). In section 2.3, the DEIS identifies 2.99 billion tons waste rock, with 2.46 bil tons going into the WRF and the remainder backfilled into the ACMA pit (DEIS, p 2-7). Conventional tailings at 568 million tons will be held in a slurry tailings impoundment (DEIS, p 2-8).

GRD 1

DEIS Table 3.7-47 notes seepage from the WRF and TSF will exceed standards for various constituents. The Corps assumes that the seepage would either be captured by underdrains and treated or discharged to the pit lake (DEIS, Table 3.7-47, p 3.7-207). The modeling predicts that seepage from the waste rock dump would be diverted to the pit, both while dewatering and as a long-term pit lake. The DEIS relies on this mechanism to prevent stream degradation. The pit will likely be a sink for the bedrock aquifer, but there is much uncertainty regarding the shallow aquifer and whether it would drain towards the pit. The DEIS and supporting studies treat the shallow and bedrock groundwater system as being connected through the mining period, but there is no evidence supporting the assumption.

GRD 1

During pre-mining conditions, overall the aquifer would be unconfined with the pressure head in bedrock being similar to the water table in the shallow aquifer. As the groundwater simulation lowers the pressure below the top of the bedrock, it simulates the shallow aquifer becoming desaturated so that the bedrock aquifer becomes an unconfined aquifer. The reality may be that as pressure in the bedrock drops below the top of the bedrock, an unsaturated zone develops in the bedrock while the shallow aquifer remains saturated and functions as a

GRD 1

perched aquifer. The groundwater modeling code used to simulate dewatering, MODFLOW, is not capable of simulating the development of such an unsaturated zone, so the model results are not evidence against this idea.

GRD 1

Seepage from waste facilities would be into a rather thin surficial layer of alluvium, near the streams, or colluvium, over the mountains. The conceptual model report shows overburden thickness maps that indicate the colluvial thickness is rarely more than 30 feet in the American Creek drainage and mostly less than five feet in the Anaconda Creek drainage, except directly under the creek where it is more than six feet thick (BGC 2014g, Drawings 3 and 4). The groundwater model simulated the shallow aquifer as being 16 feet thick.

The shallow aquifer could have K substantially higher than the bedrock, at least in areas. As noted, the model cannot simulate the hydraulic disconnect that could occur during dewatering. Rather, the groundwater model simply draws groundwater from the surficial layer into the bedrock; the MODFLOW code can do nothing else because it simulates all layers as a saturated porous media with connections among all layers. It cannot simulate an unsaturated zone developing between the surficial layer and the bedrock in the upper part of the bedrock. Simulated drawdown in bedrock would lower the potentiometric surface below the bottom of the surficial aquifer after which MODFLOW simulations would simply desaturate the surficial aquifer.

GRD 1

Because the bedrock K is low, the surficial aquifer could remain saturated, and due to dewatering become perched at least in areas away from fractures. If hydraulic separation occurs and a perched aquifer develops, seepage from the waste facilities may not enter the bedrock and flow to the pit. Rather, the seepage could flow laterally through the surficial aquifer to the streams, thereby bypassing the pit. Seepage from the waste rock and tailings facilities could degrade surface water, primarily in Crooked Creek but also in its tributaries. All assumptions in the DEIS regarding contaminants reaching the pit and not the streams would be incorrect.

GRD 8

Mitigation would be very difficult. Pumpback wells, or converting monitoring wells to pumping wells, would not be effective unless they are very closely spaced[2]. This is because the surficial aquifer is thin and there is a limit to any capture zone that can be created. A capture zone is the portion of the aquifer that would be drawn to the pumping well. If the saturated zone within the aquifer is just a few feet or tens of feet thick, drawdown at the well would be limited

[2] Four monitoring wells would be installed downgradient of the TSF, two on each side of Anaconda Creek. On each side, one would be deep and one would be shallow. Each would be capable of pumping up to 90 gpm if necessary to capture TSF seepage downgradient of the tailings impoundment (DEIS, p 3.6-32). This would be grossly insufficient to capture seepage from the TSF.

GRD 8 to the interface with the bedrock; attempting to draw it lower could just create another bedrock/surficial aquifer disconnect. While theoretically, it is possible to intercept the flow through the surficial aquifer, the required well spacing could be as low as a hundred feet or even less.

PAA 14
- The only effective mitigation would be to avoid the seepage by having a liner under the waste rock. A liner would cause most seepage to collect in the underdrains.

GRD 1
- There is too little information concerning the connection between the surficial aquifer and the bedrock. Pump tests that show pumping in bedrock drawing from the stream are not actually testing what occurs if the potentiometric surface draws below the top of the bedrock; pump tests do not stress the system sufficiently to estimate the potential for a hydraulic disconnect.

## 8.2 Tailings Facility

The tailings impoundment would be lined with 60-mil liner. This is the same thickness as was used at the TSF at the Stillwater Mine in Montana. At Stillwater, the TSF has been shown to be leaky and the company will shift during future stages to 100-mil liner due to the failure of the 60-mil liner.

PAA 14

- The Donlin Mine should have a 100-mil liner rather than a 60-mil liner to make leaks would be less likely It would also reduce the amount of seepage captured in the underdrain and recirculated which could allow the TSF to be decommissioned more quickly.

The tailings facility is not within the pit capture zone, as shown in Figure 6. The tailings facility would lie over the Anaconda Creek drainage at the bottom of the figure. Although most of the watershed has drawdown due to the tailings impoundment capturing recharge (BGC 2014c, Drawing 40), the groundwater contours show that most of the Anaconda Creek watershed would drain to the low point beneath Anaconda Creek. The creek would lose substantial water due to a loss of recharge due to the tailings. Seepage however would report to the colluvium beneath Anaconda Creek and then to Crooked Creek.

PAA 9

- The best alternative from the perspective of avoiding contamination from the tailings facility is to use dry stack tailings with both a liner beneath them and then an impervious cover as part of reclamation. The DEIS predicts that seepage would be very low after 200 years. If leaks were limited, this option would minimize degradation to Crooked Creek. The impervious cover would help to prevent percolating water from mounding on the liner as well.

PAA 9

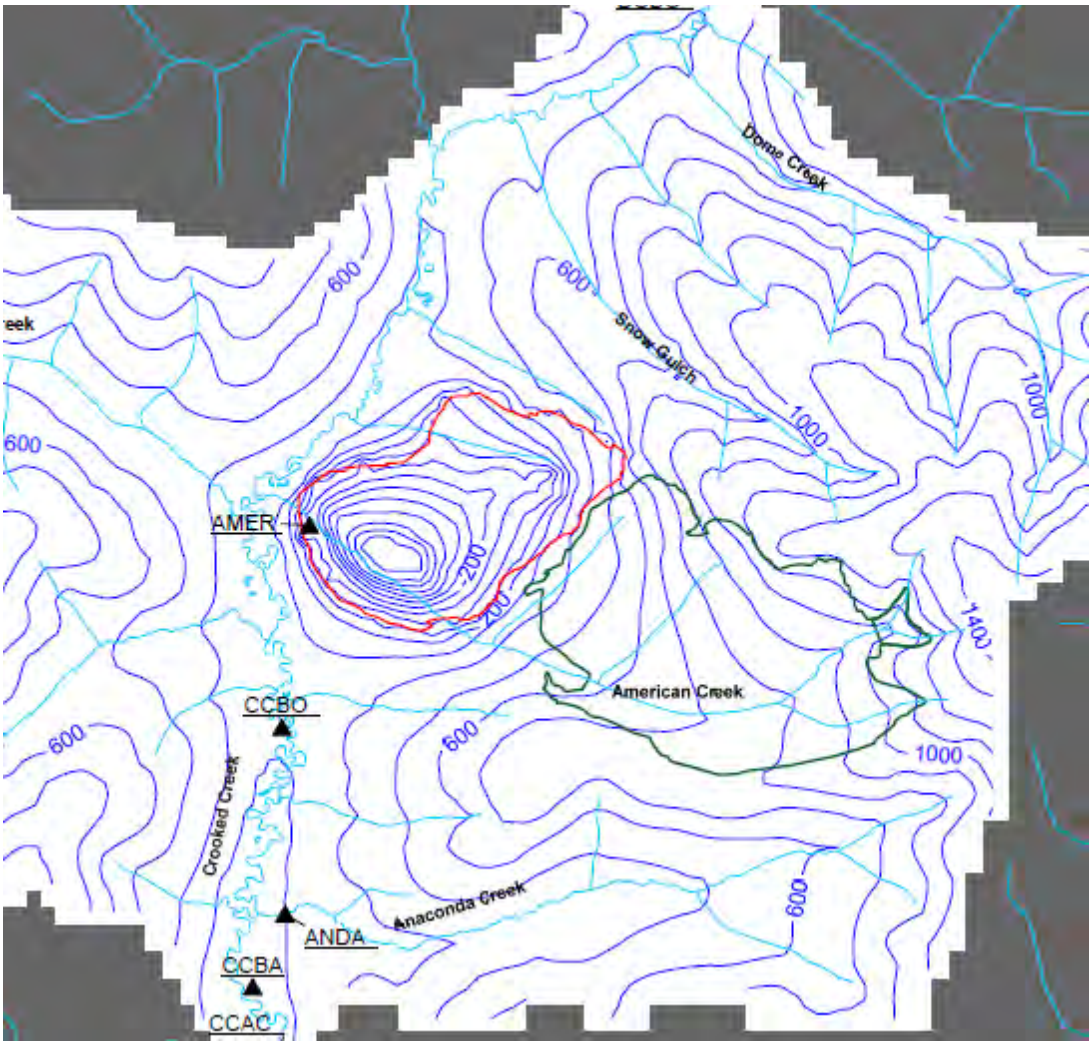


*Figure 6: Snapshot of a portion of Drawing 39 (BGC 2014c) showing the bedrock potentiometric surface at the end of mine operations.*

NEP 6

Some facilities are not within the predicted pit drawdown cone and the DEIS acknowledges a potential for contaminants to leach to Crooked Creek (DEIS, p 3.6-34). Mitigating measures include liners or other hydraulic containment and doing "further studies such as fate and transport groundwater modeling during final design" (Id.). These suggestions indicate the DEIS was issued prematurely since planning for the mine has not progressed far enough to even have completed all necessary studies or planned adequate mitigation.

- A supplemental DEIS is necessary to disclose important plans such as mitigation for seepage and to complete fate and transport modeling of contaminants leaching from mine facilities.

NEP 6 In closure, the pit lake would remain a hydraulic sink, but it would pull groundwater from much less of a distance during operations or early closure.

### 8.3 Failure Analysis

The Exec Summary notes that tailings are a "hazardous substance of concern" and that "focus is on high consequence, low probability occurrences [including] … partial tailings dam failure" (DEIS, p ES-44). DEIS section 3.24.3.5 notes such a failure as being a 1 in a thousand year event (DEIS, p 3.24-30), but a tailings impoundment must last forever so even events considered very rare or unlikely have a good chance of eventually occurring. The DEIS should complete a detailed flow routing of slurried tailings.

DAM 5

- The DEIS should analyze the risks associated with tailings dam failure. The analysis should consider the PMF occurring in the watershed because the facility will be there forever. The DEIS should present hydraulic routing of a reasonable portion of the half million tons of tailings down Anaconda Creek and Crooked Creek to show the potential damages.

The DEIS notes that "complete failure of the TSF SRS could lead to release of untreated water in a matter of weeks" (DEIS, p ES – 34). This is another example of a potential systems failure that could lead to substantial degradation in a short time period.

## 9.0 REVIEW OF GROUNDWATER MODEL DETAILS

Most of the numerical predictions of mine dewatering and impacts on stream flow rely on groundwater modeling. The details of groundwater modeling were presented in BGC (2014c) which is reviewed in this section. BGC (2014c) used the MODFLOW SURFACT code which is based on the MODFLOW code but has a proprietary numerical solver and a routine for simulating unsaturated seepage of recharge to the water table.

GRD 4

### 9.1 Model Structure

Layer 1 represents alluvium or colluvium up to 200 m amsl and is 5 to 10 m thick (BGC 2014c, p 22). Above 200 m amsl, layer 1 is bedrock, presumably representing an outcrop. Layers 2 through 9 are bedrock with layer 4 being about 70 m thick and layers 5 through 9 increasing from 100 m to 240 m thick (Id.). Layers are thickest in the uplands.

## 9.2 Parameter Zones

The geologic formations in an aquifer are delineated into zones for simulation. Each model cell is assigned a zone according to its geology. The properties include horizontal and vertical K, storage coefficients, and porosity. The values are initially set based on tests or literature values, and then adjusted during model calibration.

### 9.21 Conductivity

Within the pit area, the bedrock was delineated into 8 different sedimentary rock formations along with intrusives (BGC 2014c, p 24). Outside of the pit area, the bedrock was considered undifferentiated bedrock of the Kuskokwim group (Id.). Presumably this was done because the bedrock near the pit is better known than away from the pit. The figures showing parameter zones by layer show a complex square section near the pit that abuts against single parameters extending to the boundary; the single parameters are Kuskokwim – Valley and Kuskokwim – Ridge. There could be abrupt transitions among various parameter zones within a layer. This could have large effects on the flow patterns if the changes are substantial.

GRD 4

Basal Greywacke and Upper Greywacke have the same calibrated K values for the same layers (BGC 2014c, Table 7). For layers 1-4, 5, and 6-9 the K values are 0.1, 0.06, and 0.01 ft/d. These formations abut the Kuskokwim formation, which for layers 5, 6-7, and 8-9 have K equal to 0.03, 0,006, and 0.001 ft/d; above layer 5 the Kuskokwim (Ridge) K is 0.03 ft/d and the Kuskokwim (Valley) K varies from 0.1 to 0.3 ft/d (Id.). For layers 5 and lower the surrounding bedrock, undifferentiated Kuskokwim, has K about an order of magnitude lower than near the pit. The low calibrated K values away from the pit are not supported by the observed K values for bedrock near the pit area. The intrusive and shale formations within the pit area are also low K, but above layer 5 these will be removed within the pit. The detailed modeling occurs within the pit area and primarily is important during calibration because it would not be part of the simulation of either dewatering or pit lake development.

- The low K values away from the pit may prevent the expansion of drawdown away from the pit.

GRD 3 Zonation includes a trend of decreasing K with depth. Although they are extensive across the pit area (section 4.2), faults were not modeled except in the sensitivity analysis (Id.).

GRD 1 Calibrated horizontal and vertical K in the alluvium under Crooked Creek is 300 and 70 ft/d. These values are substantially higher than the colluvium which are respectively 0.2 and 0.06 ft/d. These K estimates for alluvium are about three times higher than the observed values.

The colluvium estimates are close to the observed values but the tests in colluvium are small scale. Colluvium K may be substantially underestimated because the thinness of the aquifer would bias the estimate of K through pump test or slug tests to be low.

BGC (2014c, p 8) describes the colluvium as "well-graded materials ranging from cobbles and gravel to sand, silt and clay". Unless the fine materials, silt and clay, fill most of the pores in the cobbles and gravel, K should be much higher. Low simulated K values in the colluvium could limit the amount of water that enters the bedrock due during recharge and could limit the amount drawn into the bedrock during dewatering as long as the colluvium remains hydraulically connected to the bedrock. The contrast between higher K in the colluvium and low K in the bedrock could cause the seepage from waste facilities to move laterally through the shallow groundwater rather than enter deeper bedrock. As discussed in section 7.0, the dewatering simulation could cause a hydraulic disconnect between the bedrock and shallow groundwater allowing a perched zone to form in the shallow groundwater.

Model layer 1 has a sharp transition from alluvium along Crooked Creek to colluvium surrounding the alluvium (Figure 7). Conductivity changes from 300 to 0.6 ft/d along a long reach of the stream. Such large changes in K between adjacent cells often leads to water balance errors in the model solutions. BGC should address the potential for local errors which
GRD 1 can lead to large inappropriate head changes. Conductivity of the valley Kuskokwim formation, which underlies the alluvium (Figure 8), ranges from 0.1 to 0.3 ft/d (BGC 2014c, Table 7). Effectively, the model simulates the high K alluvium as being surrounded by very low K bedrock or colluvium which essentially disconnects the alluvium from the rest of model domain; the model conceptualization as simulated here effectively isolates the alluvium. Using more appropriate K values to simulate the alluvium and surrounding formation would provide a more accurate simulation of flow across the formation boundaries and of the surface/groundwater interchange at Crooked Creek.

- The model simulates the alluvium with a very high K surrounded by low K bedrock and colluvium. This effectively isolates the alluvium and minimizes the effects of dewatering on the stream.

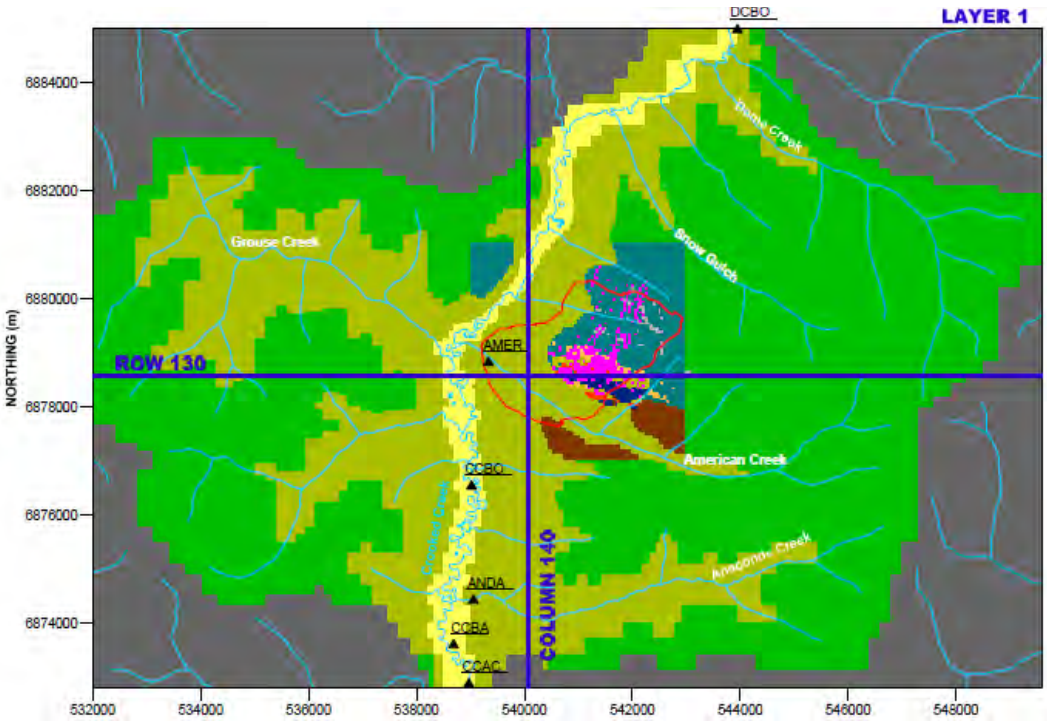


*Figure 7: Snapshot of a portion of BGC (2014c) Drawing 17 showing parameter zones in model layer 1. See Figure 9 for a legend.*

GRD 1

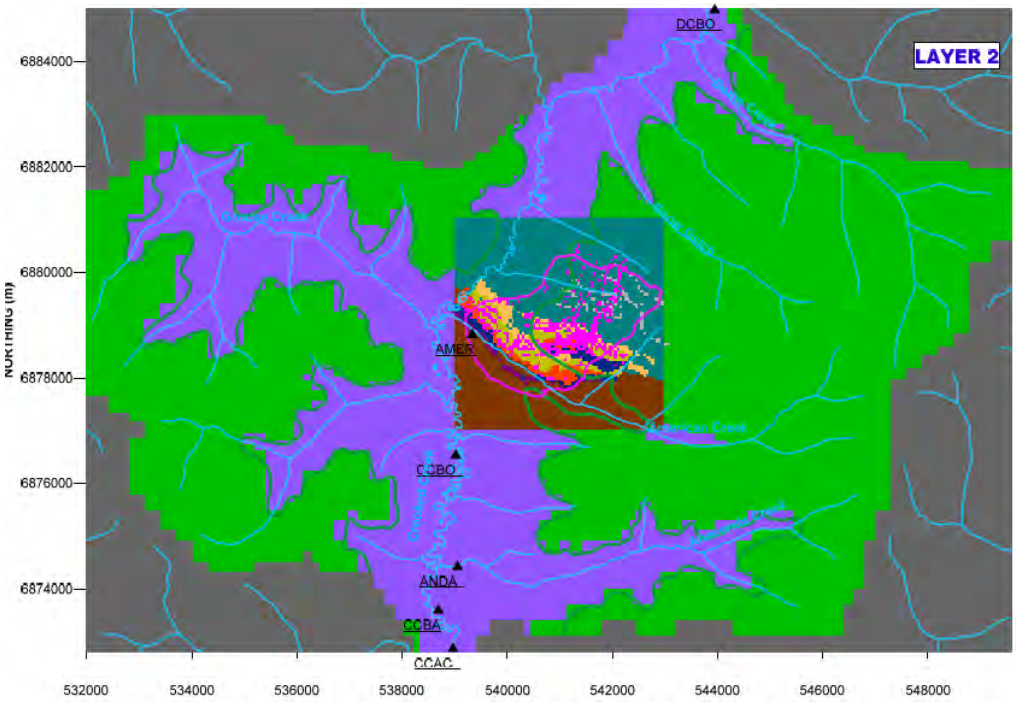


*Figure 8: Snapshot of a portion of BGC (2014c) Drawing 18 showing parameter zones in model layer 2. See Figure 9 for a legend.*

GRD 1

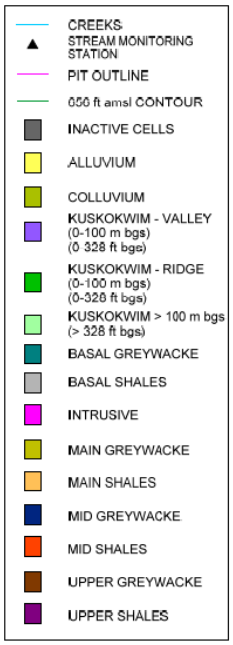


*Figure 9: Snapshot of the legend from BGC (2014c) Drawing 18 describing parameter zones used for all of the model drawings. This applies to Figure 7 and 8.*

GRD 2

The K estimates represent very small sections of their respective aquifers, but in setting the formation properties, the authors ignore important scale factors. In general, the representative volume of a pump test is the amount of water pumped, divided by the effective porosity (Schulz-Makuch et al. 1999); this effectively means a sample volume, including all pore spaces affected by the pumping. Short-term tests represent properties only over a very small volume. Figure 10 shows an example from the literature of variability for a fracture-flow media, the type of media that controls the flow near the pit. Hydraulic conductivity varies over seven orders of magnitude in the example (Figure 10), depending upon the volume of the aquifer represented in a given test. Setting K for the undifferentiated bedrock as a single value less than most of the tests violates these concepts of scale.

From the perspective of flow and transport prediction (as needed near the pit and waste rock dumps), small-scale properties control local flow while the larger-scale measurements control regional flow, which can be estimated without understanding localized details. A mine that intersects and excavates significant portions of a formation affects flow at a regional level, and therefore needs property measurements at that scale. The short-term tests in the crystalline bedrock presented by INTERA are not relevant at a regional scale.

- Most of the hydrogeologic properties estimated for the DEIS are for a small-scale and yield conductivity values that are much too low for regional flow analysis. This causes the DEIS to predict impacts limited to the areas closer to the Mine.

GRD 2

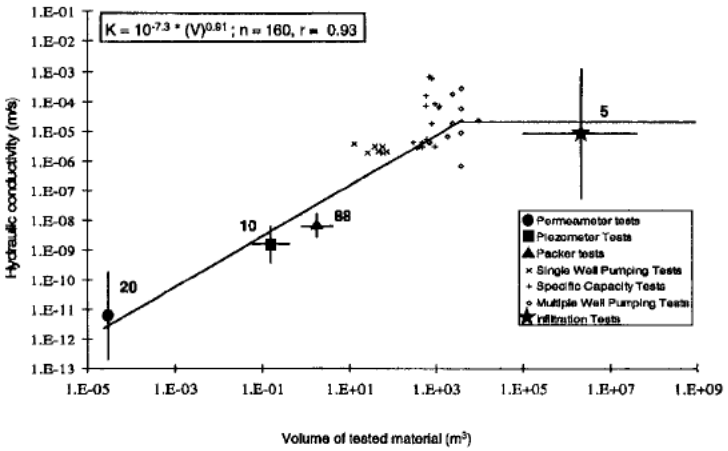


**Figure 6. Relationship of hydraulic conductivity to scale of measurement in the Racine Formation of the carbonate aquifer of southeastern Wisconsin. Permeameter, piezometer, packer, and passive infiltration tests were plotted as geometric means with 95% confidence intervals; pumping tests and specific capacity data as single values. Number of observations are given adjacent to means. Passive infiltration tests are derived from the infiltration of Lake Michigan water into the Racine Formation due to the construction of a sewage tunnel. The regression line is derived from all individual values (n = 160) below the infiltration scale. The 95% confidence interval about the slope is 0.91 ± 0.06, and r is the correlation coefficient.**

*Figure 10: Figure 6 from Schulz-Makuch et al. (1999) showing the variation of hydraulic conductivity with volume of material used for testing. The Racine Formation is a fracture-flow formation and is used here only as an example of the variability.*

## 9.22 Storage Coefficients

GRD 1

Specific yield (Sy) for the alluvium is extremely low, being set at 0.01 (BGC 2014c, Table 7). Sy is the amount of water that is released from storage for a unit drop in the water table; for Sy=0.01, a head drop of one foot would release just 0.01 foot of water from storage. Usually, Sy is much higher. Table 3.5 in Anderson and Woessner (1992) shows a range of 0.01 to 0.46 for categories from fine sand through coarse gravel, the particle sizes found in the alluvium along Crooked Creek. The published range of Sy technically includes the value used in this model for alluvium, but Sy = 0.01 is for fine sand (Id.). Crooked Creek alluvium includes a mixture of particle sizes and the estimates for fine sand have a mean of 0.33 (Id.). Without a substantial detailed pump test estimate of Sy for the alluvium, the value used for the Donlin groundwater model is suspect. Also, the very high K and low Sy in the alluvium are incongruous because Sy is often a surrogate for porosity, and having porosity equal 0.01 is inconsistent with K being 300 ft/d.

- A low Sy for the alluvium will cause the model to underestimate the amount of water drawn into the bedrock during dewatering.

GRD 1 Together the high K and low Sy in the alluvium would serve to minimize the simulated flux from the alluvium into the bedrock. The Sy value affects the simulated interchange of water between the stream and the alluvium and then between the alluvium and the bedrock beneath it. The amount of water drawn into the bedrock from the alluvium due to dewatering could be grossly underestimated. The very high K would allow the alluvium to provide water to the bedrock very easily, meaning without substantial change in head. The gradient at the stream boundary would change very little due to the high K. The streambed K was set equal to the alluvium K so the stream allowed water to pass easily, meaning it provided the necessary water with very little change in gradient. The simulated drawdown would be very low.

### 9.3 Recharge

The model assumes that recharge enters the model domain at a 28% of annual precipitation per year rate, with all 5.5 in/y applied all in the summer period. If the water surface is above the ground surface, the model does not accept the recharge and it becomes surface runoff to the stream network (BGC 2014c, p 25).

Three conceptual problems with this recharge simulation are obvious. The method does not account for recharge variability due to precipitation amount, slope, or geology. Studies from around the western US have shown variable rates of recharge as a proportion of precipitation, although none of the studies were based in Alaska.

GRD 17 Because recharge must first percolate through a soil zone it is likely that a higher proportion will do so for a higher precipitation because the amount of evapotranspiration is unlikely to increase linearly along with precipitation and because higher precipitation would more often have moister antecedent conditions leading to less precipitation being taken up to make up a soil water deficit.

Slope and geology controls the rate at which precipitation can enter the aquifers and unsaturated zone between the soils and aquifer. Fractured bedrock accepts more percolation than intact bedrock and the ground slope controls the rate at which the meteoric water may runoff or flow downslope as interflow, if a soil layer is available. Differences in conductivity and slope would lead to differences in the rate of recharge at a given point.

Combined, precipitation amount, slope and geology controls the amount of recharge at a location, with the remainder becoming runoff. Drainages would likely be sources of large amounts of water and recharge beneath the streams.

GRD 17

Very little recharge as simulated reaches deeply into the bedrock because the low simulated permeability of the deep bedrock significantly limits the deeper circulation of recharge. BGC (2014c) does not present the simulated amount of groundwater that percolates into the bedrock, the deep groundwater system, but it should. This would reflect the contrast in conductivity between shallow and deep aquifer systems, with lower conductivity at depth preventing deep percolation. The water that remains in the shallow system discharges to surface water quickly. This critical point controls the most important results of the model simulation as well. If the deep bedrock is a little more permeable and allows more recharge to circulate deeply, the required mine dewatering could be doubled without changing the discharge to the stream very significantly.

The comparison of premining baseflows shown in DSEIS Table 4-7 is not meaningful since presumably each model used similar recharge and if the inflow to each model domain is the same, so must be the outflow.

### 9.4 Calibration

There were about 182 observed groundwater elevations used for calibration. For a model of this size, this is a reasonable number, however, there was a definite bias in their distribution. As shown on BGC (2014c) Drawing 7, the majority of sites were in drainages and only a few were on the ridges. Groundwater converges into the drainages so there is likely an upward gradient in most of the areas that are most represented in the calibration.

GRD 5

Initial calibration for most models is by a steady state simulation wherein average fluxes are simulated and average head values are matched. BGC apparently skipped this step, opting instead for calibrating based on a seasonal transient model (BGC 2014c, p 27). This is reasonable if the model best fit was compared to an observed time series of groundwater observations (and stream flows). However, the "primary calibration target at each location" was the average value of multiple observations, if there were multiple observations (BGC 2014c, p 28). Average groundwater levels may not represent any given seasonal time period, so at best this calibration technique is difficult to evaluate.

BGC (2014c) does not provide necessary details for understanding the calibration simulation:

- BGC should describe the initial conditions used for the calibration scenario.
- BGC should specify how long the calibration scenario was run.
- BGC should specify the head value used for comparison to the average observed head. Is it the value for a given time period or an average for a multitude of simulated observations?

Given that the calibration scenario description is not very useful, the graph of simulated and observed head values (BGC 2014c, Drawing 24) shows some significant bias in the calibration. About 20 of the observations plot below the -25 m envelope line on the graph and just two plot above the +25 m line. At least eight of the observations below the -25m line are wells in the Upper Greywacke formation, layers 1 through 3. The Upper Greywacke may be seen south of and on the south side of the pit underlying much of the American Creek drainage. Simulated heads are about 50 m lower than observed in this area. The gradient driving flow to the American Creek is likely simulated lower than observed. This could lead to a higher K estimate which would lead to drawdown affecting the creek less than it actually would do.

A second calibration scenario was the simulation of the MW07-11 pump test (BGC 2014c, p 29). Other than stating that the grid size was changed for the simulation (Id.), BGC provides almost no details of the test, as follows: "Model stress period lengths or time steps were not specified. It is common to define a stress period based on pumping at specific rates, but the report does not specify how or whether this was done." (Id.)

The report does not explain how calibration was competed. In short term pump test simulations, it is common to adjust storage coefficients because short-term head changes are more sensitive to storage coefficients. The report does not specify whether test statistics were
GRD 5 determined for the pump test simulations, so it is difficult to objectively evaluate these transient calibrations.

The graphs that compare simulated water levels with observed show a very poor match (BGC 2014c, Drawings 26-29). There is no apparent consistency or bias, with some simulated levels exceeding observed and vice versa (Id.). BGC (2014c, p 29) suggests that "bedrock hydraulic conductivity is heterogeneous at the scale of the pumping test". This means that the model may not be accurate with respect to the details of the simulation. However, BGC also suggests that having simulated values "within a factor of two to three of measured drawdowns at the observations wells" (Id.) suggest the K values are reasonable for the scale of the modeling. There is no logic behind this statement because missing the target by a factor of three implies the K should have been set substantially different. It indicates there is substantial room for improvement.

The second transient calibration was of the pump test run to test properties between Crooked Creek and the proposed pit. The drawdown graphs for both alluvial and bedrock wells (BGC 2014c, Drawings 30-32), including both pumped and monitoring wells, show very little agreement between simulated an observed hydrographs. However, these tests were used to set the high alluvial K and low Sy values described above. The lousy match between the

observed and simulate groundwater levels does not provide justification for the alluvial parameters, the effects of which were described above.

Based on the overall calibration summary (BGC 2014c, p 32), the following bullet points suggest problems with the calibration.

GRD 5

- Modeled K of the alluvium is generally higher than observed and that of the colluvium is low for the model scale used here (Id.).
- Modeled bedrock K tended to be lower than the observed range, especially at distance from the pit.
- There is no evidence that storage parameters were even calibrated since they do not vary among formations and because the model fit during pump tests was so poor.
- Any agreement between simulated and observed flows (Drawing 25) is spurious due to the large difference in flow rates.
- It is not appropriate to claim there was a good seasonal match. Graphs for wells MW03-02, -03, -04, -05, -06, -07, -09, -12, -13, and -15, (BGC 2014c, Appendix A) show almost no simulated seasonal effect while the observed seasonal variation exceeds a meter. Some wells, such as MW07-05, and -06, show an observed trend with time that substantially masks the seasonal trend.

## 9.5 Simulating Mine Dewatering and Pit Development

BGC (2014c) chapter 7 describes the methods used to simulate mine dewatering and pit development. The modeling has three objectives that are of interest here:

GRD 1

- Estimate the dewatering extraction rate
- Evaluate the impacts on mine dewatering and pit development on local surface water
- Estimate the rate of pit lake formation and the recovery in groundwater levels and flow conditions after dewatering

Also of interest is how development of the tailings impoundment affects flows. Other objectives specified by BGC (2014c) are for design purposes.

GRD 17

BGC simulated dewatering using MODFLOW drain boundaries, and possibly also used the well package in advance of reaching a given pit level to remove some initial water. ET was appropriately set to zero within the enlarging pit. However, recharge should have continued to have been simulated because precipitation falls within the pit and if it does not runoff, it will percolate and become recharge. Runoff from within the pit may be captured and managed, but by definition recharge is precipitation that does not runoff. If not pumped it will flow into the

GRD 17 pit at lower levels; there is really no way to “manage” precipitation to prevent recharge (BCG 2014c, p 34).

Captured streams were appropriately turned off during the simulation. During operations, there would be some backfill in the pit. The simulation included simply turning off the drain boundary to the level of the backfill and allowing the groundwater level to recover.

The bedrock properties were not altered during the operations portion of the simulation (BGC 2014c, p 35). This was justified due to the relatively short time period simulated. However, not changing the bedrock properties was an error due to the large difference in storage properties between backfill (Sy = 0.33 for closure simulations) and in-situ bedrock (Sy = 0.003, BGC (2014c), Table 7). The amount of water necessary to fill the unsaturated bedrock with Sy=0.003 is miniscule, by two orders of magnitude, compared to that necessary to fill the backfill with Sy=0.33. During the five years of operations, groundwater levels would fill in the backfill while
GRD 1 removing very little water from the model. Presumably this would be the initial conditions for simulations of the operations period. Recovery would have occurred with too little water being removed. This would decrease the simulated losses to the streams and basically cause the model to underestimate flow losses to the streams. If it allows the backfill to become saturated prematurely, the initial conditions for the closure simulation will be too high and cause the model to simulate too little water removed from the model to be stored in the backfill; this would also reduce the simulated impacts to the streams.

The modeling predicted that total groundwater extraction rate from all wells and drains would initially equal 1700 gpm, increase to 2600 gpm by year 12 and average 1600 gpm over the mine life. The simulated rate decreases to about 1500 gpm after year 20 and some groundwater recovery into the backfill begins to occur (BGC 2014c, Drawing 36). Various factors, some already discussed, could make the dewatering rate higher than simulated:

- Bedrock K away from the pit has been underestimated. This slows the flow of groundwater to the pit and minimizes the simulated dewatering.

GRD 17
- Failure to simulate recharge within the pit boundary simply ignores a source of water that will be removed as dewatering water.

Dewatering dries much of layer 1 as can be seen by the 30 foot drawdown contour encircling much of the area (Figure 11). The model cells within that area would be dry. As noted in the
GRD 1 text (BGC 2014c, p 39), drawdown in the alluvium along Crooked Creek is less than two feet. The lack of drawdown corresponds to the high K and encirclement by low K bedrock and colluvium as described above. The alluvium is effectively isolated from the effects of dewatering (Figure 11) by the model design.

The model also simulates substantial reductions to streamflow in Crooked Creek and tributaries, which would have a large effect on the flows in those streams. However, the reductions have been underestimated for reasons as described herein. Primarily, all dewatering water is prevented from discharging to a groundwater sink which in this model would be a stream. For all of the reasons that dewatering rates have been underestimated, the reductions in streamflow has also been underestimated. Additionally, dewatering effects on Crooked Creek have been underestimated due to the simulation of K and storage properties, therefore Crooked Creek flows would be decreased much more than disclosed in the DEIS.

GRD 1

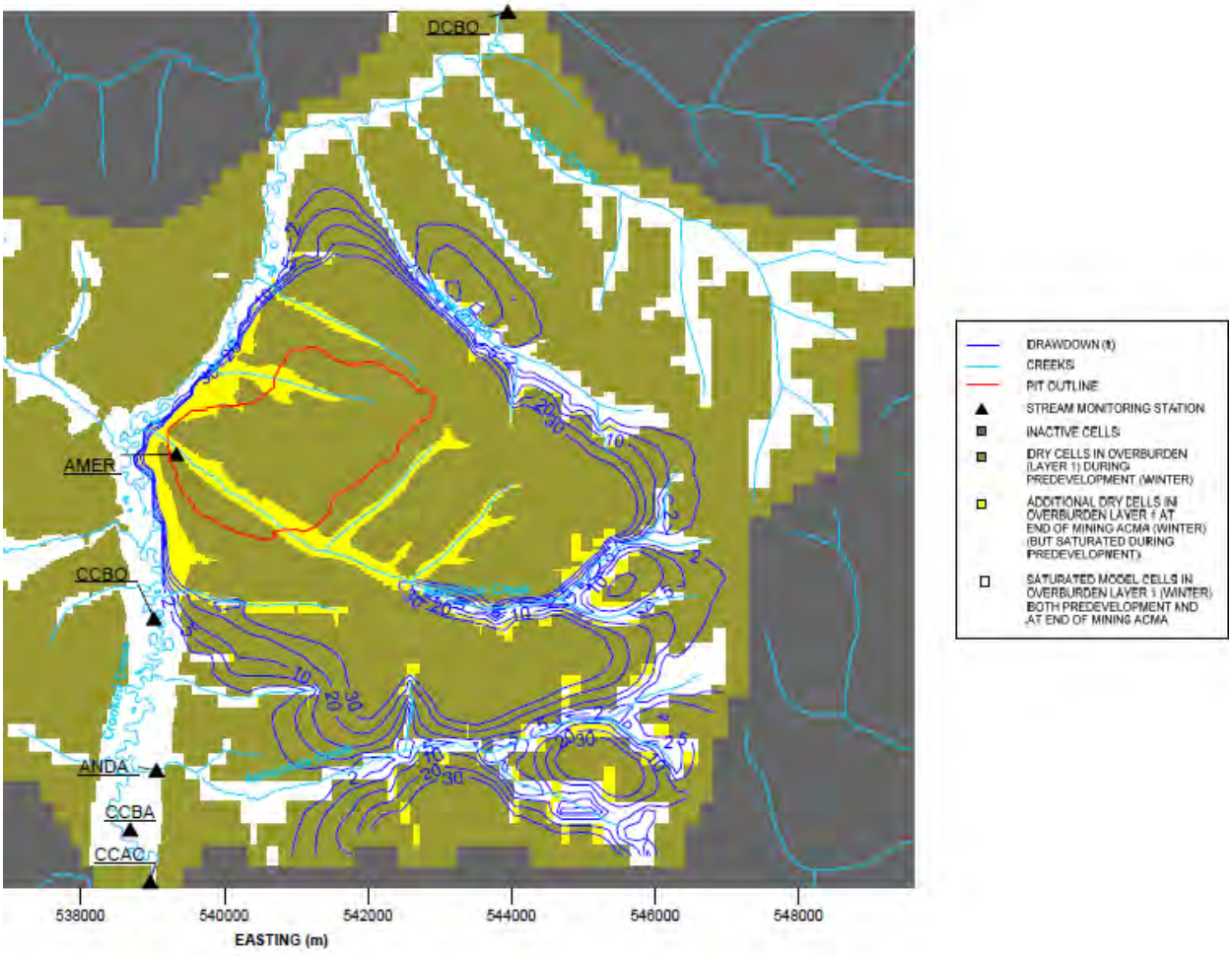


*Figure 11: Snapshot of a portion of BGC (2014c) Drawing 37 showing drawdown in model layer 1, the surficial aquifer.*

## 9.6 Simulating Pit Lake Formation

WAQ 11

BGC (2014c) used a special pit lake package to simulate the forming lake. In addition to groundwater flowing into the pit lake, there is inflow from precipitation, runoff, American

Creek flows, waste rock underdrain, contact pond water, and tailings impoundment discharge. The pit lake fills until it is just below its crest after which water would be pumped, treated, and discharged. It initially receives almost 33,000 af of excess tailings water (Lorax 2012, p 3-7), which is generally of poor quality (Lorax 2012, Table 3-3). Water from the tails and waste rock would be discharged to the bottom of the pit void "to encourage the more contaminated (i.e. denser) water to remain at depth within the pit lake and to foster chemically stratified or meromictic conditions within the pit lake" (Lorax 2012, p 3-7)). If this works as planned and the lake does not turn over, water at the bottom of the pit lake would be highly contaminated.

WAQ 11

Groundwater inflow to the pit lake will generally be of good quality compared to the inflows of waste or tailings seepage (Lorax 2012, Table 3-3). However, Lorax (2012) has not simulated different groundwater quality for groundwater entering from different levels or formations. Background groundwater quality is not homogeneous through the entire mass of rock surrounding the pit (BGC, 2011l) and inflows should not be simulated as if it is. This could affect the predicted pit lake water chemistry.

The pit lake would be almost full after 60 years. Although the pit is a sink, meaning the regional groundwater flows toward it from all directions, there is a significant groundwater outflow (BGC 2014c, Drawing 49). This outflow is to fill the backfilled waste rock and dewatered bedrock near the pit, presumably as the lake fills faster than the groundwater levels recover. The particle tracking (BGC 2014c, Drawings 50-53) does not suggest that any water would escape the pit and flow away into the groundwater, but BGC should verify this because escaping pit lake water would degrade surrounding groundwater.

GRD 6

The managed lake elevations is intended to provide adequate freeboard and maintain water levels that the groundwater would continue to discharge to the pit lake rather than creating a flow-through pit lake (BGC 2015g). The gradient is "slight" (BGC 2015g, p 2), however, which suggests that it could reverse so that pit lake water would discharge from the lake occasionally.

- The groundwater model should consider groundwater/pit lake relations when the pit fills to its crest as it could do during extreme wet conditions, as reviewed herein at section 5.2.

## 9.7 Sensitivity Analysis

A numerical model sensitivity analysis is designed to test the effects of changing various model parameters on the results of simulation. BGC (2014c) chapter 9 describes the sensitivity analysis completed for the Donlin numerical model. BGC's method is to simply make large adjustments to various factors and compare the change in the calibration and to show how it

GRD 1

changes the simulation of future conditions. I review only the sensitivity results that reveal important aspects of the model with respect to the environmental impacts of the proposed mine.

GRD 1

The model was not sensitive to raising and lowering the hydraulic K of the alluvium because the alluvium was essentially isolated from the rest of the system so that stream levels controlled the heads, as discussed above. Calibration statistics improved for three changes, decreasing bedrock K, increasing recharge and streamflow, and simulating faults as low hydraulic K faults (BGC 2014c, p 51). That these wholescale changes improved the calibrations shows the model is not unique but also suggests that the calibration as presented in BGC (2014c) is not as accurate as it could be. I argued above that bedrock K was underestimated so the improvement in calibration statistics for using even lower K suggests that some other aspect of the model is more important for matching head values. Recharge and streamflow were estimated external to the model so changing them would be inappropriate.

GRD 4

Including low K faults improved the calibration (BGC 2014c, p 51). This conceptualization suggests the groundwater system could be segmented. Details of the analysis are sparse, but the faults were only mapped in the pit area so it is likely that faults were only added in that area. This sensitivity analysis illustrates the importance of better understanding the faults and how they affect the groundwater flow.

GRD 3

- Faults could segment bedrock into higher or lower K zones better than formation maps.
- Faults could segment bedrock in ways that would allow dewatering to affect areas farther from the pit, especially if the segmentation includes areas with higher K.
- If the higher K segments extent under creeks, they could create zones in the streams that are much more affected by dewatering.

The model, and DEIS, requires much more information about the faults to be accurate.

Mine dewatering rates were sensitive to bedrock properties (BGC 2014c, p 52). Increasing bedrock K by a factor of 5 increased mine dewatering rates by 3.3 times; increasing bedrock storage coefficients by ten times increased mine dewatering rates by 1.5 (Id.).

GRD 4

High K faults could increase the mine dewatering rates up to 3.3 times depending on their location and the extent of connection with Crooked Creek (BGC 2014c, p 53). This could probably also result from the low-K faults segmenting high-K bedrock under the streams.

GRD 3

Changing bedrock K substantially affected stream flows. Reducing bedrock K reduced streamflows relative to the base case. If the model has bedrock K that is too low, as I argued above, impacts on the streams would be underestimated. Increasing bedrock K by a factor of 5

GRD 4

GRD 4

reduced winter streamflow by 86% and simulating high K faults decreased streamflows by 83% (BGC 2014c, p 54). Increasing bedrock K by a factor of 20 caused Crooked Creek to go dry by the pit (Id.). Increasing storage coefficient also reduced streamflows. The sensitivity of the model predictions to bedrock properties further indicates that the model could have grossly underestimated impacts to streamflow.

The sensitivity results regarding bedrock K verifies the points above about how low K estimates could have caused the model to underestimate dewatering, the extent of the drawdown, and impacts on streamflow.

GRD 3

Low K faults decreased the impacts that dewatering had on streamflow (BGC 2014c, p 54). This is probably due to the segmentation caused by the faults.

GRD 1

Changing alluvial K had little effect on the impacts dewatering had on streamflow (BGC 2014, p 54). This further reflects the comments above about how the alluvium under Crooked Creek is isolated from the bedrock. The isolated alluvium acts as a tub in which water is easily exchanged with the stream.

GRD 4

Pit lake refill time was also sensitive to bedrock K (BGC 2014c, p 55). The increased bedrock K causes the pit lake to fill from 14 to 30 years faster, reflecting the higher flow to the pit (Id.). Decreased K increased the fill time by about 12 years (Id.).

### 9.8 TSF underdrain predictions

The groundwater model (BGC 2014c) estimated discharge to the tailings impoundment underdrain (Figure 12). The only description of how the TSF was simulated was to note that ET and recharge was set equal to zero (BGC 2014c, p 16, 34).

GRD 8

> The TSF will be a fully-lined impoundment. Therefore, groundwater recharge to the underlying aquifer will cease within the footprint of the facility. In addition, the TSF underdrain will be installed beneath the **liner to capture groundwater discharge from the catchment and deliver it to the SRS downstream of the TSF dam**. Any seepage through the liner would also report to the SRS. SRS water will be used either as make-up water in the process or potentially treated and discharged to Crooked Creek. (BGC 2014c, p 16, emphasis added)

The DEIS describes it as follows: "The TSF would be designed with a rock underdrain that would serve two purposes: 1) capture and direct any TSF leakage to a Seepage Recovery System (SRS) located immediately downgradient of the TSF dam; and 2) collect groundwater from areas upgradient of the TSF and direct it to the SRS as TSF underflow" (DEIS, p3.6-31). The mine would obtain a water right for the diversion of groundwater by the TSF drain (DEIS, p 3.6-32).

The report does not describe the boundary used to simulate the drains, although if the underdrain is beneath the liner to capture groundwater discharge, the underdrain must be simulated as a drain in layer 1. An underdrain would allow groundwater discharging upward due to artesian pressure from undermining the TSF.

Decreased bedrock K in the sensitivity analysis increased flows to the tailings underdrain system (BGC 2014c, p 54, 55). This is because low bedrock K causes more groundwater to remain in the shallow groundwater.

> The reduction in recharge is predicted to lead to a progressive decrease in groundwater flow reporting to the foundation underdrain, from approximately 730 gpm (4,000m3/d) in Year -2 to approximately 440 gpm (2,400m3/d) at the end of mining" (BGS 2014c, p xiv). "Predicted groundwater discharge to the TSF underdrain for the post closure analysis fluctuates on a seasonal basis, and averages 370 gpm (2,000 m3/d) during the winter season, and 440 gpm (2,400 m3/d) during the summer season (BGC 2014c, p xv).

GRD 8

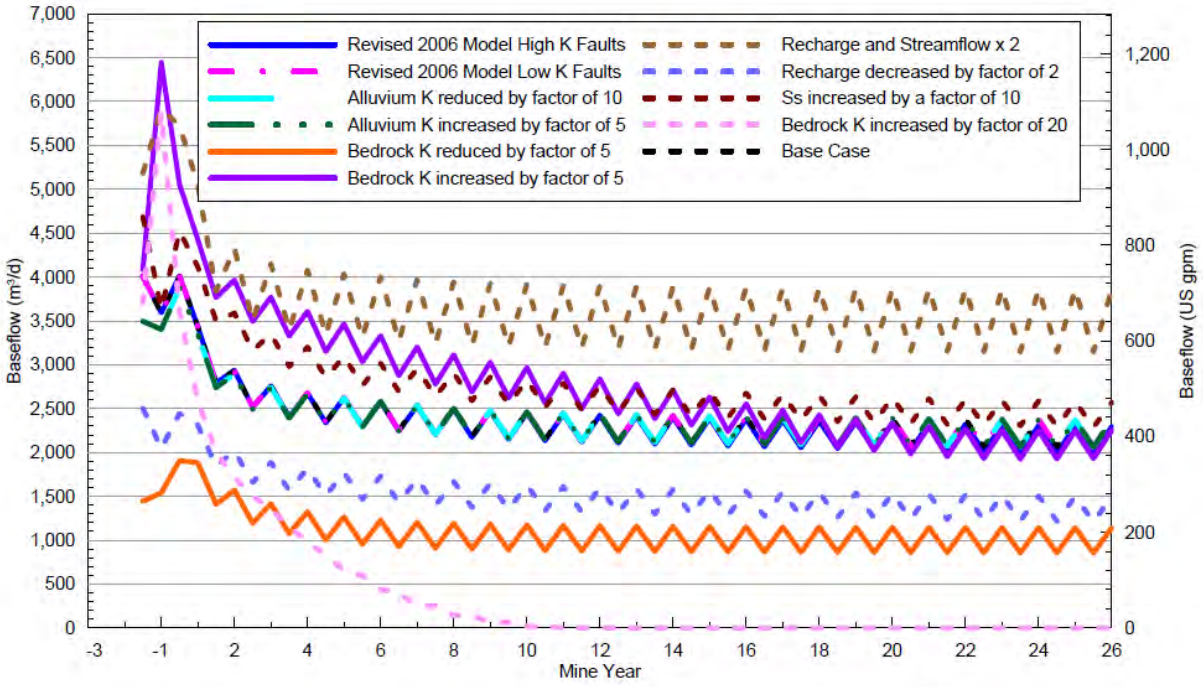


*Figure 12: Snapshot of BGC (2014c) Drawing G22 showing the discharge to the tailings impoundment underdrain for the base case and various sensitivity analysis simulations.*

## 10.0 MISCELLANEOUS

GRD 1

The potentiometric surface map (DEIS Figure 3.6-2) does not distinguish among aquifers which means there is an assumption that the groundwater pressure in the bedrock equals the water table in the overlying colluvial aquifer. It argues that "vertical gradients within the groundwater system are not large compared to the scale of the map and the overall relief of the potentiometric surface" (DEIS, p 3.6-8). A reference is to BGC 2011d. This can be an important assumption, driving recharge and discharge locations. What is meant by gradients "not large compared to the scale of the map"?

Groundwater discharge occurs only in creeks and gulches, not to wetlands away from the creeks and gulches (BGC 2014g, p 6). Permafrost is intermittent and generally limited to soils but does extend into bedrock up to 33 feet with an average of 14 feet (BGC 2014g, p 6-8). The only trends apparent in the permafrost mapping show that permafrost is more common in the drainages of American and Anaconda Creek.

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# Attachment 1

# Tom Myers CV

**Tom Myers, Ph.D.**
Consultant, Hydrology and Water Resources
6320 Walnut Creek Road
Reno, NV 89523
(775) 530-1483
Tommyers1872@gmail.com

# Curriculum Vitae

**Objective**: To provide diverse research and consulting services to nonprofit, government, legal and industry clients focusing on hydrogeology specializing in mine dewatering, contaminant transport, natural gas development, groundwater modeling, NEPA analysis, federal and state regulatory review, and fluvial morphology.

## Education

| Years | Degree | University |
|---|---|---|
| 1992-96 | Ph.D.<br>Hydrology/Hydrogeology | University of Nevada, Reno<br>Dissertation: Stochastic Structure of Rangeland Streams |
| 1990-92 | | University of Arizona, Tucson AZ<br>Classes in pursuit of Ph.D. in Hydrology. |
| 1988-90 | M.S.<br>Hydrology/Hydrogeology | University of Nevada, Reno<br>Thesis: Stream Morphology, Stability and Habitat in Northern Nevada |
| 1981-83 | | University of Colorado, Denver, CO<br>Graduate level water resources engineering classes. |
| 1977-81 | B.S., Civil Engineering | University of Colorado, Boulder, CO |

## Professional Experience

| Years | Position | Duties |
|---|---|---|
| 1993-Pr. | Hydrologic Consultant | Completion of hydrogeology studies and testimony focusing on mine dewatering, groundwater modeling, natural gas development, contaminant transport, NEPA review, and water rights for nonprofit groups and government agencies. |
| 1999-2004 | Great Basin Mine Watch, Exec Director | Responsible for reviewing and commenting on mining projects with a focus on groundwater and surface water resources, preparing appeals and litigation, organizational development and personnel management. |
| 1992-1997 | Univ of NV, Reno, Res. Assoc. | Research on riparian area and watershed management including stream morphology, aquatic habitat, cattle grazing and low-flow and flood hydrology. |
| 1990-1992 | U of AZ, Res. and Teach. Assistant | Research on rainfall/runoff processes and climate models. Taught lab sections for sophomore level "Principles of Hydrology". Received 1992 Outstanding Graduate Teaching Assistant Award in the College of Engineering |
| 1988-1990 | U of NV, Reno Res. Asst | Research on aquatic habitat, stream morphology and livestock management. |
| 1983-1988 | US Bureau of Reclamation Hydraulic Eng. | Performed hydrology planning studies on topics including floodplains, water supply, flood control, salt balance, irrigation efficiencies, sediment transport, rainfall-runoff modeling and groundwater balances. |

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## Special Coursework

| Years | Course | Sponsor |
|---|---|---|
| 2011 | Hydraulic Fracturing of the Marcellus Shale | National Groundwater Association |
| 2008 | Fractured Rock Analysis | MidWest Geoscience |
| 2005 | Groundwater Sampling Field Course | Nielson Environmental Field School |
| 2004 | Environmental Forensics | National Groundwater Association |
| 2004 and -5 | Groundwater and Environmental Law | National Groundwater Association |

| | |
|---|---|
| **From:** | Peter Heisler |
| **To:** | donlingoldeis, POA; Newman, Sheila M POA |
| **Cc:** | Tom Waldo; Sarah Saunders |
| **Subject:** | [EXTERNAL] Myers Comments on Donlin Gold Project Draft EIS |
| **Date:** | Tuesday, May 31, 2016 6:18:58 PM |
| **Attachments:** | Myers, Final Technical Memorandum Review of the DEIS (5-11-16).pdf |

Dear Ms. Newman,

Please find attached comments on the Donlin Gold Project Draft Environmental Impact Statement, prepared by Tom Myers for Northern Alaska Environmental Center (Northern Center). We ask that you consider these comments independently of comments submitted by Earthjustice on behalf of the Northern Center and other groups.

Please let me know if you have any difficulty accessing the attached.

Thank you,

Peter Heisler
Associate Attorney
Earthjustice Alaska Office
441 West 5th Avenue, Suite 301
Anchorage, Alaska 99501
T: 907-792-7104
F: 907-277-1390
earthjustice.org

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# TECHNICAL MEMORANDUM
# REVIEW OF THE DRAFT SUPPLEMENT ENVIRONMENTAL IMPACT STATEMENT FOR THE DONLIN GOLD PROJECT

May 11, 2016
Minor Revisions, May 26, 2016

Prepared for: Northern Alaska Environmental Center

Prepared by: Tom Myers, PhD, Hydrologic Consultant, Reno NV

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# 1.0 INTRODUCTION

Donlin Gold, LLC (Donlin) has proposed to construct the Dolin Gold Project in the Kuskokwim watershed in southwest Alaska. The U.S. Army Corps of Engineers (Corps) is the lead agency for the preparation of the draft environmental impact statement (DEIS). The proposed project includes a large open pit mine with transportation facilities to a port at Bethel Alaska, and a natural gas pipeline from Cook Inlet.

This technical memorandum reviews the DEIS and supporting documents with an emphasis on hydrogeology at the mine sites. The emphasis is on the effects of mine dewatering, pit lake development, treatment of contact water (rainfall or snowmelt that has contacted lands disturbed by mining), and seepage from tailings and waste rock facilities reaching the streams. Dewatering effects include the effects on stream baseflow. This review does not include transportation facilities, port development, or the natural gas pipeline.

My background includes a PhD and MS in hydrology/hydrogeology from the University of Nevada, Reno and a BS in civil engineering from the University of Colorado. I have 35 years of employment experience in consulting, academics and government, with about 20 years specific to mining and energy development hydrogeology. My specialties include numerical modeling and contaminant transport. I have published 17 peer-reviewed journal articles with five articles since 2009 concerning groundwater modeling, contaminant transport, and aquifer water balance. My CV is attached to this review.

# 2.0 SUMMARY OF MAJOR IMPACTS OF THE PROPOSED PROJECT AND ERRORS WITH THE DEIS ANALYSIS

GRD 1

Development of the proposed mining project would affect the hydrogeology in the mine site area in the following ways.

Mine dewatering will substantially lower the groundwater table near the pit and in surrounding bedrock. Although errors in the conceptual flow model and numerical groundwater model cause the DEIS to under-predict the dewatering impacts, dewatering to keep the pit dry would intercept groundwater flowing toward a stream where it would be become baseflow. Dewatering will reduce streamflows by up to 10 and 30 % during summer and winter, respectively, according to the DEIS. Various uncertainties acknowledged in the DEIS could increase the flow loss from the creek.

HYD 7

Mine construction affects surface runoff in many ways, including the pit intercepting surface runoff in American Creek, thereby preventing it from reaching the stream and the tailings impoundment covering 70% of the Anaconda Creek drainage which prevents a large proportion

HYD 7

of that streams' flow from discharging to Crooked Creek. Ancillary mine facilities such as freshwater reservoirs divert or use surface water runoff which can affect both high and low streamflow rates. Together these effects could lower flows in the creek even more than just by dewatering, with some estimates being as high as 100 percent loss during winter baseflow periods.

WAQ 10

The mine would require approximately 17,438 gpm for processing which would be discharged to the tailings impoundment during operations. Water for the process plant comes from various places, including freshwater reservoirs, contact water reservoirs, and dewatering wells. Excess water would be discharged to Crooked Creek with treatment, so failures in the collection and treatment system would discharge contaminants to and degrade Crooked Creek. During operations, expected discharge from the water treatment plant is 1268 gpm with 786 gpm from mine dewatering and the remainder from underdrains and contact water reservoirs. All sources are subject to much uncertainty meaning that periodic high flows could overwhelm the treatment system. For example, if the bedrock has a significantly higher conductivity, the dewatering rates could be much higher because it would pull water from further away and allow recharge to enter the bedrock from the shallow aquifer faster. Heterogeneity in the bedrock including with the faults could cause periodic high dewatering amounts. The DEIS does not plan for the probability that the treatment facilities will be periodically exceeded by dewatering water or other contact water requiring treatment before discharge.

CLIM 8

The pit lake would recover during mine closure to a point where it would overflow its rim, if allowed, into Crooked Creek. The pit lake water quality would be very poor, according to pit lake modeling, due to waste rock seepage into the pit and acid generating rock around the pit and backfilled into the pit. Donlin would start pumping pit lake water when it reaches 33 feet below the rim to treat and discharge into Crooked Creek. At this point, most of the flow losses from Crooked Creek would cease. However, there are uncertainties not considered in the DEIS that could cause the pit lake to fill and overwhelm the pump and treat system. A spill could devastate Crooked Creek. Climate change could increase precipitation by up to 25% on average but there would also be more frequent very large events, which is not considered in the DEIS. This pump and treat system would be required forever so all possible combinations of weather will eventually occur.

GRD 1

The DEIS relies on the mine dewatering system and the pit lake to draw groundwater including seepage from the waste rock dump and prevent it contaminating downgradient groundwater or discharging to Crooked Creek. However, there is a significant probability that a perched aquifer will form in the shallow aquifer as dewatering lowers the groundwater table. This will short-circuit seepage from the waste rock dump to Crooked Creek. I describe the details in the next few paragraphs concerning the numerical groundwater model. Drawdown occurs under the

GRD 1

tailings impoundment but it will not draw groundwater to the pit because drawdown does not eliminate the ridge in the groundwater table between the tailings and the pit. Seepage escaping the underdrain will flow through the colluvium under Anaconda Creek and either discharge into Anaconda Creek or into the alluvium around and ultimately into Crooked Creek.

DAM 3

The DEIS does not consider the impacts of catastrophic failure, such as would occur with a tailings dam failure. The analysis should consider the probable maximum flood occurring in the watershed because the facility will be there forever. The DEIS should present hydraulic routing of a reasonable portion of the half million tons of tailings down Anaconda Creek and Crooked Creek to show the potential damages.

GRD 4

Most of the DEIS predictions are from a numerical groundwater model. Two aspects of the numerical groundwater model severely bias the predicted impacts of dewatering. The bias is that simulated dewatering does not spread far from the mine pit and affects stream flows much less than it probably will.

- The conceptualization of the bedrock away from the mine pit has very low conductivity, lower than measured in most pump tests and lower than would be expected by considering the scale effects of small-scale test and regional scale models. It is treated as undifferentiated bedrock, meaning treated as one single mass, with a conductivity an order of magnitude less than most of the bedrock simulated within the pit area. This low conductivity prevents the spread of drawdown from the pit into the bedrock, thereby limiting how far the effects can spread. The low conductivity is not justified by observed pump test values or by scale effects which would cause the conductivity to be higher than determined from small-scale pump tests. This prevents the simulated drawdown from affecting overlying streams and wetlands.
- The alluvium around Crooked Creek is simulated with a very high conductivity and very low storativity. Low conductivity bedrock and colluvium surrounds the alluvium. This effectively isolates the alluvium and Crooked Creek from impacts of dewatering. The low storage coefficient allows the alluvium to release very little water for a change in water levels in the alluvium while the very high conductivity limits the change in head. This explains why dewatering drawdown effectively hits a wall at the creek.

GRD 1

The numerical modeling also fails to consider that a perched aquifer could develop in the shallow aquifer. This is partly due to the large difference between bedrock and shallow aquifer conductivity. As simulated drawdown lowers the water table from the shallow groundwater into the bedrock, it is likely that an unsaturated zone would form between a saturated zone in the shallow aquifer and bedrock. Seepage from the waste rock facility would discharge to Crooked Creek rather than be drawn to the pit lake, as relied upon in the DEIS. Drawdown

GRD 1 would occur in the bedrock and pull contaminants toward the pit lake, but perched zones in the shallow aquifer would provide a saturated pathway for contaminants to reach Crooked Creek. The numerical model fails to simulate this because the model cannot simulate such as system. The only potential mitigation would be a liner beneath the waste rock with a leak capture system.

PAA 9 The option for the tailings facility that best prevents seepage from degrading Crooked Creek is dry stack tailing with both a liner and impervious cover to minimize potential seepage with time after closure. This is necessary because the tailings are outside of the pit capture zone and seepage would drain to the streams.

PAA 14 The TSF should have a 100-mil liner rather than a 60-mil liner to make leaks would be less likely. The TSF should have an impervious cover to prevent percolation through the tailings from mounding on the liner, which would increase head on the liner and the leak rates and potentially cause instability problems.

HYD 9 Donlin should consider removing the Snow Gulch Reservoir from the plan to avoid impacts to that tributary watershed.

PAA 27 They should also leave a buffer between the pit and the Crooked Creek alluvium to decrease the connection with the alluvium and decrease the amount of water potentially drawn from the creek.

## 3.0 DEIS ALTERNATIVES

The DEIS describes five alternatives, including no action (alternative 1), the proposed action (alternative 2,) (mine layout shown in Figure 1), two alternatives that alter the pipeline and transportation routes but leave the mine plan basically as proposed under alternative 2 (alternatives 3 and 4), and an alternative that would alter the mine plan to use dry stack tailings rather (alternative 5) than a slurry system. Dry stack tailings alternative 5 has two options. Option 1 would not be lined but there would be an underdrain to remove seepage. Option 2 would have a liner. There would be eight freshwater wells for domestic and sanitary uses, and up to 35 pit perimeter wells and 80 in-pit dewatering wells (DEIS, p 2-9).

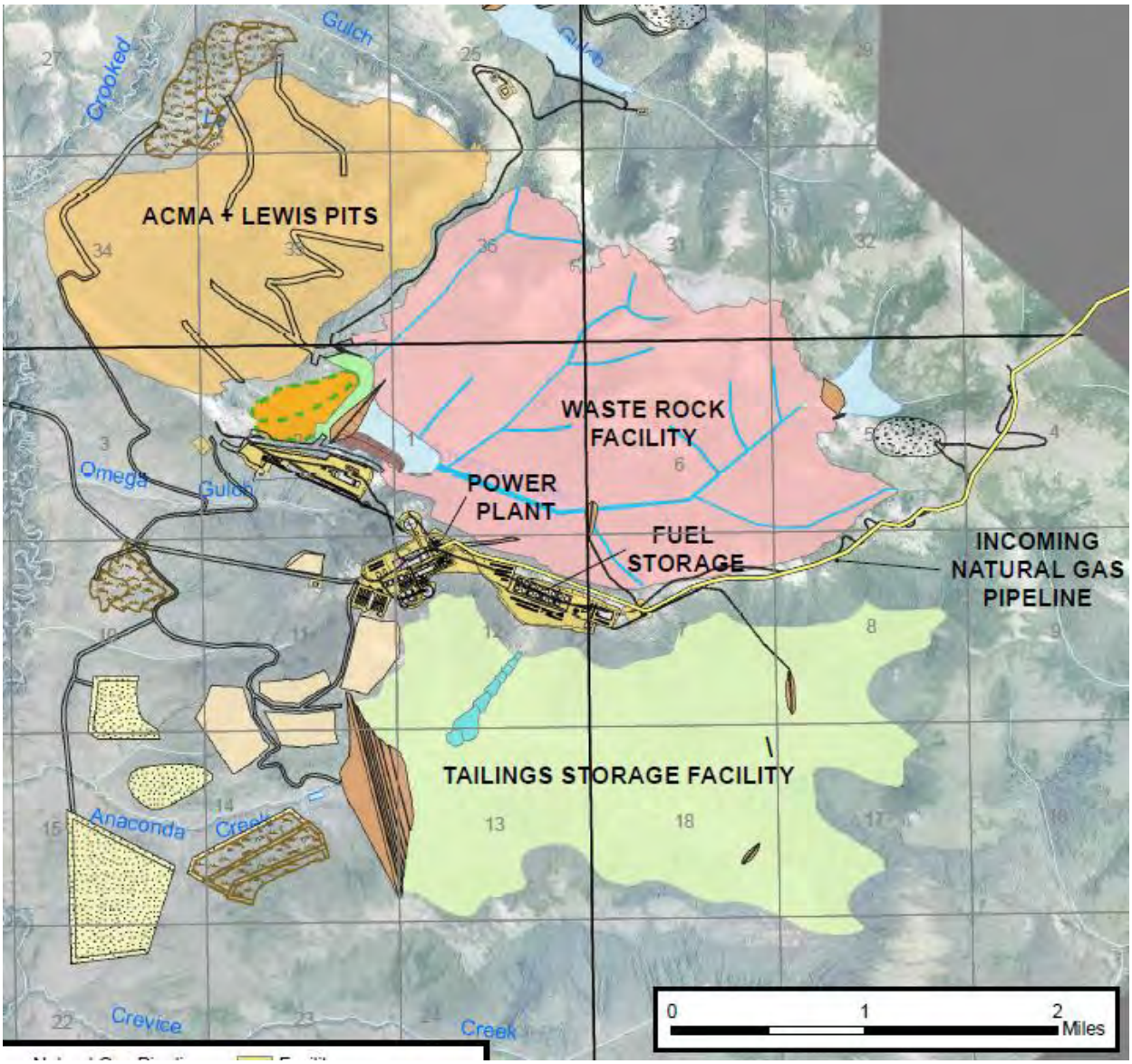


*Figure 1: Alternative 2 general mine layout - DEIS Figure 2.3-1*

## 3.1 Recommended Additional Alternative

PAA 27

A primary impact of this proposed mine is the impacts mine dewatering and pit lake formation could have on stream flows. As will be discussed in section 9.0, the properties of the bedrock separating the proposed pit from the alluvium under Crooked Creek have some control over the amount of surface water drawn from the stream into the groundwater. Several amendments should be made to Alternative 2 or should be added to an existing alternative and considered as a new alternative.

PAA 27
- The DEIS should include a setback alternative which requires the pit excavation not intersect the Crooked Creek alluvium. There should be a minimum setback from the creek of several hundred feet to protect stream flows. The exact distance could be determined based on additional understanding of the bedrock properties.

PAA 14
- The waste rock facility (WRF) that would be constructed over the American Creek should have a drain through it to allow streamflow to pass without being captured in an upper contact water pond. Below the WRF, there should be a channel created to allow it to pass the proposed pit

HYD 9
- Snow Gulch Reservoir should be removed if not really needed. See section 7.3 below.

## 3.2 Adaptive Management and Monitoring

The Corps calls for adaptive management activities pertaining to groundwater hydrology. Donlin should assess monitoring data especially with respect to drawdown to assess whether the groundwater monitoring regime is adequate. Donlin should assess whether drawdown has extended beyond the monitoring system.

- If drawdown at the most distant wells from the mine has become significant, new monitoring wells should be installed. This should be assessed at least every three years during operations.

GRD 12 The groundwater model would be reexamined after three years of pit dewatering to "minimize uncertainty about dewatering effects" (DEIS, p 3.6-44; DEIS, Table 5.7-1). This should include verification of the original model to assess the accuracy of the DEIS predictions.

- If they differ substantially, then new modeling and new NEPA analysis should be completed based on new predictions. A substantial difference is difficult to establish in advance, but would probably include the dewatering pumping rate being off by 100% (pumping twice the expected amount), having drawdown at a monitoring well twice that predicted, or having Crooked Creek lose flow along an unexpected rate or more than expected.
- New modeling should include new ideas of the conceptual flow model in the area. Two obvious considerations are the modeling of the bedrock as a porous media without considering fractures and the distribution of recharge throughout the area.

CLIM 10 The Corps indicates that climate change should be considered in future modeling (DEIS, p 3.6-45, DEIS Table 5.7-1 #3). Long-term climatic observations at the site should be compared with climate model predictions to assess the accuracy of the predictions with respect to Donlin.

CLIM 10

- Climate change effects on the project should be included with each model update and use the most current precipitation forecasts from global climate models. If the simulations predict substantially different potential future conditions, the Corps should complete supplementary NEPA analysis to disclose to the public the potential changes and to allow the public to provide additional comment.

## 4.0 MINE DEWATERING

Mine dewatering is the process of removing groundwater for the purpose of lowering the water table, or causing drawdown, to keep the mine pit dry. At Donlin, the company would use pit perimeter wells, in-pit wells, and horizontal drains in the pit wall. The water table would be drawn down near the Donlin pit as much as 1400 feet.

The lateral extent that drawdown expands to depends on recharge because recharge replaces groundwater as it is removed. Dewatering removes water out to the extent of an influence zone where the dewatering pumpage equals the sum of recharge that is captured and streamflow induced to recharge. Drawdown will expand until it has captured an amount of recharge and streamflow equal to the pumping rate needed to lower the water table at the mine. At the point where dewatering pumpage equals recharge, the groundwater pumping will approach steady state. Dewatering affects larger areas in dry regions because the recharge is low and smaller areas in wet regions because of the much higher recharge.

GRD 17

The bedrock hydrogeology controls the dewatering rate and affects how rapidly the drawdown expands. This effectively means conductivity (K), the ease with which groundwater flows through a porous media. All else being equal, more water will be pulled more quickly from further away with a high K value. This means the drawdown cone would approach its maximum extent more quickly with a high K.

### 4.1 Recharge

Groundwater recharge equals 5.5 in/y or 28 percent of average annual precipitation (DEIS, p 3.6-11). The DEIS does not provide a reference for this estimate, but the numerical model report (BGC 2014c) references BGC (2011b) as the source of the recharge estimate. That document mentions recharge only in an appendix which is a memorandum regarding "Potable Water Supply Assessment"; it states: "[a]verage annual recharge in the mine area was assumed to be 139 mm/y, based on the feasibility calibration of the numerical groundwater flow model (BGC 2007c)". The reference section does not have a BGC 2007c, but BGC 2007g is "Numerical Hydrogeologic Model Results ad Pit Dewatering Design, Final Report".

Recharge is usually estimated in a conceptual model report, but the most recent conceptual model report for Donlin, BGC (2014g), does not derive recharge. The amount used for this project, 5.5 in/y, is not unreasonable, based on my experience, although it is higher as a proportion of annual precipitation than most areas. Because snowmelt is a slow process the estimate is not unreasonable.

- It is important for the DEIS to have an accurate description of recharge, one of the most important hydrogeologic parameters, and how it was determined.

GRD 17 Recharge equals groundwater discharge from a basin which is at steady state (Myers 2016, Cherkauer 2004). Usually, groundwater discharge is stream baseflow. For the Crooked Creek watershed, recharge would equal baseflow at the mouth of the basin expressed as a depth, in inches, over the watershed. It could be estimated for smaller tributary basins if such detail is desirable but the accuracy may decrease if groundwater tributary areas do not exactly match topographic boundaries. In the Crooked Creek watershed, there could be two forms of baseflow because discharge from alluvial/colluvial aquifers should differ from discharge from bedrock aquifers. Shallow aquifers could effectively drain more quickly than the bedrock aquifers which should provide the late-winter baseflow. If the actual amount of recharge reaching bedrock is small, the drawdown in bedrock should expand more than it appears to and have a much larger effect on winter than on late summer flows (DEIS, Figure 3.6-8).

Recharge affects the DEIS predictions by its effects on groundwater model simulations, as reviewed below in section 9.3. In general, higher recharge means higher discharge and calibrating a model using higher groundwater flux rates would lead to higher estimated K values. Together, high recharge and high K could lead to higher dewatering estimates.

GRD 1 The modeled bedrock K is very low and that of the shallow aquifer, either colluvium or alluvium is much higher, as I describe below, so some of the recharge probably moves through the surficial aquifer to the nearest stream under natural conditions. Depending on the connection between the shallow and bedrock aquifer, dewatering of the bedrock might not pull all of the groundwater from the shallow aquifer into the bedrock which means that the shallow aquifer might remain saturated and continue discharging to the streams. While this might limit the effect of dewatering it also would affect the transport of contaminants from the TSF and WRF to the streams. Isotope data indicates that the age of groundwater varies from 21 to 56 years and that deeper water is older which generally follows the groundwater recharge path.

GRD 1 The DEIS notes that prediction of the impacts due to dewatering are very uncertain. "Sensitivity analysis simulations (see discussion below in this section) suggest that prediction of the amount of streamflow depletion is difficult." (DEIS, p 3.6-25) This refers to sensitivity of

GRD 1 the model predictions to both recharge and bedrock properties. I review model sensitivity in section 9.7.

## 4.2 Bedrock Hydrogeology

Most pit excavation will be in bedrock, so bedrock will control groundwater flow to the pit and, through connections with streams, control how dewatering affects groundwater baseflow. The DEIS (Table 3.6-2) reports bedrock K varies over about four orders of magnitude at each depth level for three different levels, upper (<330 ft), middle (330 – 660 feet depth), and lower (>660

GRD 2 ft depth). The K ranges are 0.006-14, 0.0009-0.9, and 0.0003-0.2 ft/d, respectively.

The gap analysis for hydrogeologic data acknowledges that scale could affect the hydrogeologic properties in the modeling (BGC 2013b). In general, the K of a formation increases with the scale of the volume being considered. This generally means that a single-well pump test or slug test yields a lower K estimate than a several day pump test with monitoring wells, with lab tests and groundwater modeling K estimates also considered on a similar scale relationship. The gap analysis suggests that BGC complete larger scale pump tests. As noted below in section 9.0, the numerical model did not account for scale effects.

The conceptual model report identifies up to 18 faults crossing the open pit zone (BGC 2014g). Little is known about the faults from a hydrogeologic perspective and they are not even mapped outside of the pit area. The bedrock hydrogeology treats the bedrock as a porous media meaning that the faults are not considered individually, either as flow barriers or conduits. Drawing 2 (BGC 2014g) shows mapped thrust faults mostly crossing the pit in a general east-west direction, but the mapping does not extend much beyond the pit. There is no indication of whether the fault layout in the pit is representative of faults beyond the pit. BGC (2014g, p 19) suggests that there is no indication of a trend of K with respect to the proximity to faults, but Drawing 26 does not show sufficient tests in the area with faults to

GRD 3 support this claim. Thrust faults can have high permeability damage zones. Therefore, if faults intersected by the pit have long-scale high permeability damage zones, dewatering effects could extend for a long distance beyond the pit and the predicted drawdown cone.

- The DEIS does not adequately disclose the properties of the faults that intersect the pit. The DEIS also does not propose monitoring or adaptive management for dealing with a fault system that extends drawdown far from the pit or causes much higher dewatering than expected. Model sensitivity analysis without actually simulating the faults is insufficient planning for the faults.

GRD 3

- If there is sufficient data, the DEIS should provide a plot of K versus distance from a faults to estimate whether there is a trend. There should also be more pump testing completed in the pit area among the faults to collect sufficient data for analysis.

## 5.0 PIT LAKE FORMATION

After mining ceases, mine dewatering would stop and groundwater would begin to flow into the mine. The open pit would fill in 50 to 55 years with groundwater inflow, surface runoff, and water from the TSF (DEIS, p 2-40), although other reports have estimated other times up to 60 years (Lorax 2012). TSF water would be pumped to the pit lake whenever it does not meet standards (DEIS, p 2-40); at the beginning of closure, about 30,000 acre-feet (af) of tailings water would be pumped into the pit so simulations of pit lake development start with an initial volume. The pit initially would be a hydrologic sink for regional groundwater but would eventually fill to a point where it would discharge into Crooked Creek, except that when the water level is 33 feet below the crest, the mine would begin pumping and discharging the water. This would be required in perpetuity to prevent the pit lake from overtopping its banks (Id.). Treatment sludge would be dumped into the pit lake (Id.).

GRD 6

Inflow to the pit lake is groundwater and runoff from various sources. The pit lake essentially would exist forever so the planning must account for all potential inflows and climate change. BGC (2015l) considers some of the extreme conditions the pit would experience in future, specifically "the ability of the pit lake to handle storm events during the post-closure period" (BGC 2015l, p 1). The average discharge to Crooked Creek, if not treated would average 2812 gallons per minute (gpm) and the treatment plant would be able to treat at rates up to 7486 gpm (Id.) with an operating period of six months per year. More inflow would require a longer annual operating period. To provide freeboard (not designed for any specific return interval), treatment of the pit lake would begin when the pit lake is 33 feet below its crest (Id.). There would be a spillway in the southwest corner of the pit near Crooked Creek designed to accommodate the probable maximum flood of 11,301 cfs (with flood routing through the pit lake, the actual discharge rate would be less). At water level elevation 328 (33 feet below the crest), the pit lake volume would be 376,170 af and at the crest of 359 feet above mean sea level (amsl) the volume would be 405,360 af (BGC 2015l, p 2). The watershed area above the outlet would be 5122 acres (Id.), although much of that would be the pit lake, and the estimated average annual runoff is 4700 af/y (Id.). At this rate it would require six years to fill the pit over the upper 33 feet, or 29,190 af (Id.). Presumably the difference would be made up by groundwater inflow.

## 5.1 Pit Lake Water Quality

The DEIS discloses that the pit lake "water quality … will not meet applicable water quality criteria without treatment" (DEIS, p 3.6-35). The DEIS and supporting documents complete substantial modeling of the pit lake water quality and show that it would be very poor. Details of that modeling are not reviewed here because there are huge uncertainties that lead to the precise predictions being inaccurate (Maest et al. 2005). The models are accurate enough to provide general trends of pit lake quality. DEIS Table 3.7-36 shows that the water quality of the surface layers of the pit lake would exceed standards for aluminum, antimony, arsenic, cadmium, copper, iron, lead, manganese, molybdenum, selenium, and mercury with pH being lower than standard (DEIS, p 3.7-129). Seepage inflows to the pit lake from PAG waste rock and from the tailings impoundment are extremely poor with sulfate inflow being as high as 180,000 mg/l (compare to a standard of 250 mg/l) (DEIS, Table 3.7-37). The modeling does depend on the pit lake remaining stratified because the pit lake quality at depth is extremely poor.

GRD 6

The predictions are accurate enough to plan around two aspects of the pit lake. Groundwater outflow from the pit lake would contaminate surrounding groundwater and discharges from the pit lake to surface water would contaminate Crooked Creek, in violation of standards and discharge permits.

## 5.2 Pit Lake Discharge Control

The plan is to use lake level management, basically pumping, to maintain the lake level at 10 to 30 feet below the level of Crooked Creek (Id.). The pumped water would be treated and discharged to Crooked Creek (Id.). The long-term treatment of water pumped from the pit lake, to prevent it overflowing, would be at 2911 gpm (BGC 2014b, Figure 5-4). This is pumping and treating in perpetuity. After closure and complete pit lake development[1], the groundwater inflow rate will probably not vary as much as it could during dewatering. However, the higher bedrock K scenario leads to substantially more groundwater inflow into the long term. The long-term pump and treat requirement could be much higher than specified here as a long-term average due to higher groundwater inflows. Runoff and precipitation entering the pit lake would cause short term variability.

WAQ 10

BGC estimates the volume of the probable maximum precipitation over the watershed is 5030 af in 24 hours, which is about one sixth of the freeboard (Id.). Treatment capacity in six months

[1] Many pit lakes only approach full development if evaporation exceeds inflow, mostly of groundwater. These terminal pit lakes usually have only evaporation as an outflow. The Donlin pit lake will reach full conditions because it will fill to its rim if pumping did not establish an outflow. The pit lake as a whole would therefore not be subject to significant evapoconcentration as a pit lake with evaporation as its exclusive outflow.

is 5920 af (Id.). BGC's conclusion is that the pit lake would have no difficulty holding large volumes of runoff for treatment in the future.

WAQ 10

This is essentially a treatment in perpetuity plan. The calibrated groundwater model predicted the pit lake would fill in 52 years while two sensitivity analyses predicted 26 and 39 years for a wet climate and more conductive bedrock scenario, respectively. The wet climate scenario had increased recharge and streamflow rates by a factor of two and the more conductive bedrock scenario has increased bedrock K by a factor of five. Both scenarios filled the lake faster because they provided more water more quickly than the calibrated model scenario. After the pit is full, groundwater presumably continues to flow toward it from all directions (Id.).

### 5.3 Groundwater Flows

GRD 6

The DEIS discloses that pit lake water would discharge to surrounding groundwater both initially and in the long term (DEIS, p 3.6-35), as described in Figure 2. This is partly due to the placement of unsaturated backfill in the pit and to the fact that as the pit lake fills water from the pit lake will resaturate the surrounding bedrock. This differs from many pit lake systems which fill primarily by groundwater inflow, but at Donlin the bedrock K is low and does not recover immediately. Figure 3 shows simulated groundwater inflow and outflow at Donlin.

GRD 6

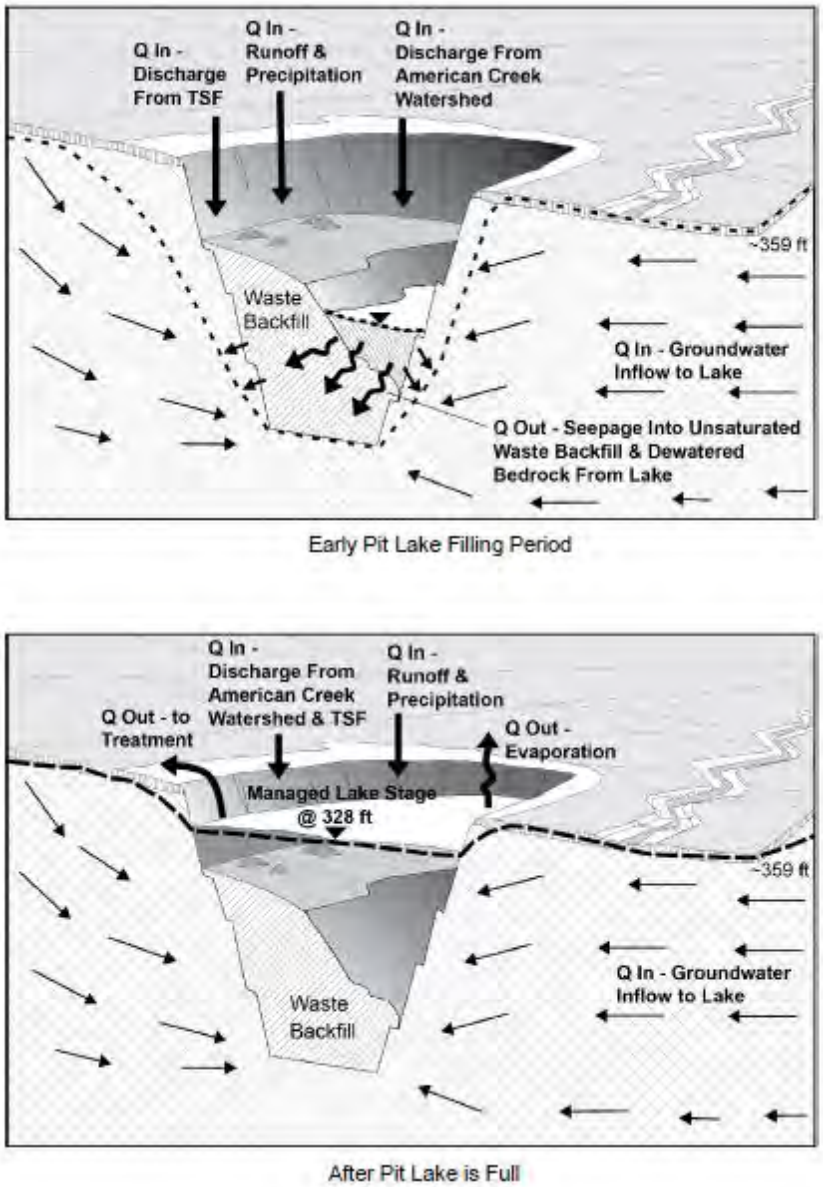


*Figure 2: Snapshot of a portion of DEIS Figure 3.6-9 showing the model of pit lake inflow and outflow.*

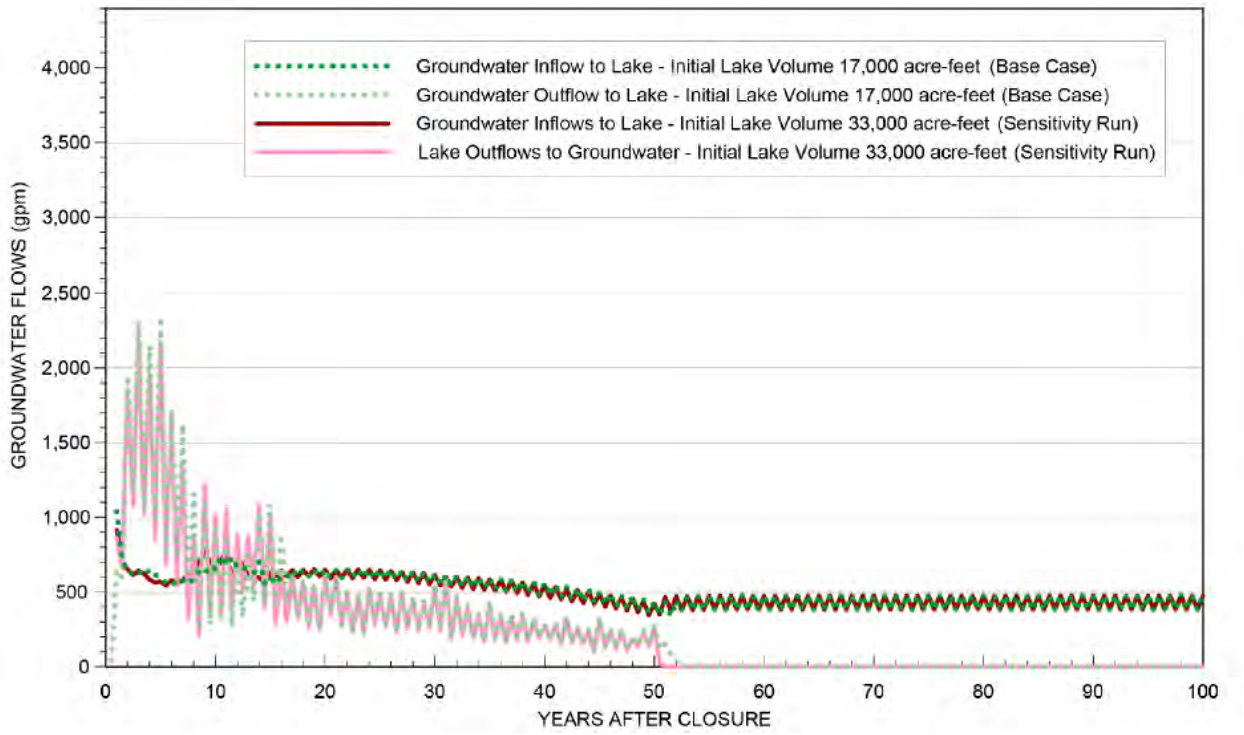


*Figure 3: Snapshot of a portion of DEIS Figure 3.6-10 showing simulated groundwater inflow to and outflow from the pit lake as the pit fills with water.*

GRD 6

Partially backfilling the pit causes an interesting system of groundwater inflow/outflow at the pit lake. The backfill would be unsaturated at the beginning of pit lake formation and therefore has to be wetted as part of the pit lake formation by groundwater outflow from the pit lake to the backfill (DEIS, p 3.6-35) (Figure 2). BGC (2014c) describes the groundwater/pit lake relationship:

> Results of the post-closure simulation show that the pit lake is predicted to fill to its managed maximum stage (i.e., 331 ft amsl or 101 m amsl) approximately 60 years after closure (Drawing 48). During the first 8 years after closure, pit lake water is predicted to seep out of the lake into the dewatered bedrock and into the pore space of the waste rock placed as backfill within the pit (see Figure 4-4). Predicted lake outflow during this period declines from approximately 2,860 gpm to 1,100 gpm (15,600 m3/d to 6,000 m3/d; Drawing 49). From Year 8 to 60 after closure, lake seepage or outflow is simulated to decline from 1,100 gpm to 0 gpm (6,000 m3/d to 0 m3/d) as groundwater elevations rise toward stable levels. Once the pit lake fills and groundwater elevations stabilize around the pit lake, seepage from the lake is predicted to cease. Thereafter, groundwater fluctuations are in response to seasonal changes and seasonal management of the lake stage. The managed lake stage results in a slight hydraulic gradient oriented toward the open pit, making the pit a groundwater sink. (BGC 2014c, p 45)

It is difficult to visualize how so much water leaves the pit lake and enters the surrounding groundwater (Figure 3), considering how the water table is hundreds of feet higher than the pit lake level (Figure 4). However, the modeling shows a significant outflow that is controlled partly by seasonal pit lake level changes. The net groundwater flow to the pit lake is very small (Figure 3) and the fact that discharge from the pit lake continues until the pit lake is almost full suggests pathways exist for flow to leave the pit lake and not return. This could occur at various depths depending on the details of the potentiometric surface.

GRD 6

The groundwater contours at the end of mining suggest one possible pathway for contaminants to leave the pit and possibly enter surface water (Figure 4). Southwest of the pit the groundwater contours are much lower than northeast of the pit due to the general slope of groundwater in the area. If the pit lake fills faster than the surrounding groundwater table, as indicated by Figures 2 and 3, it is possible that the pit lake creates pressure in deeper bedrock that causes an upward gradient to the creek away from the pit. Pit lake water could flow through deeper bedrock layers then upward toward the surface due to higher pressure conditions in deep bedrock.

- The DEIS or BGC (2014c) should present a detailed analysis of the potentiometric surface at depth near the pit lake to estimate where groundwater discharging from the pit lake would go. (The particle tracking diagrams in BGC (2014c) are not useful because they are apparently for single model layers whereas actual contaminants would change layers.)
- The DEIS or BCG (2014c) should present potentiometric surface maps for each model layer to assess whether outflow is possible from some depths in the pit lake.

GRD 6

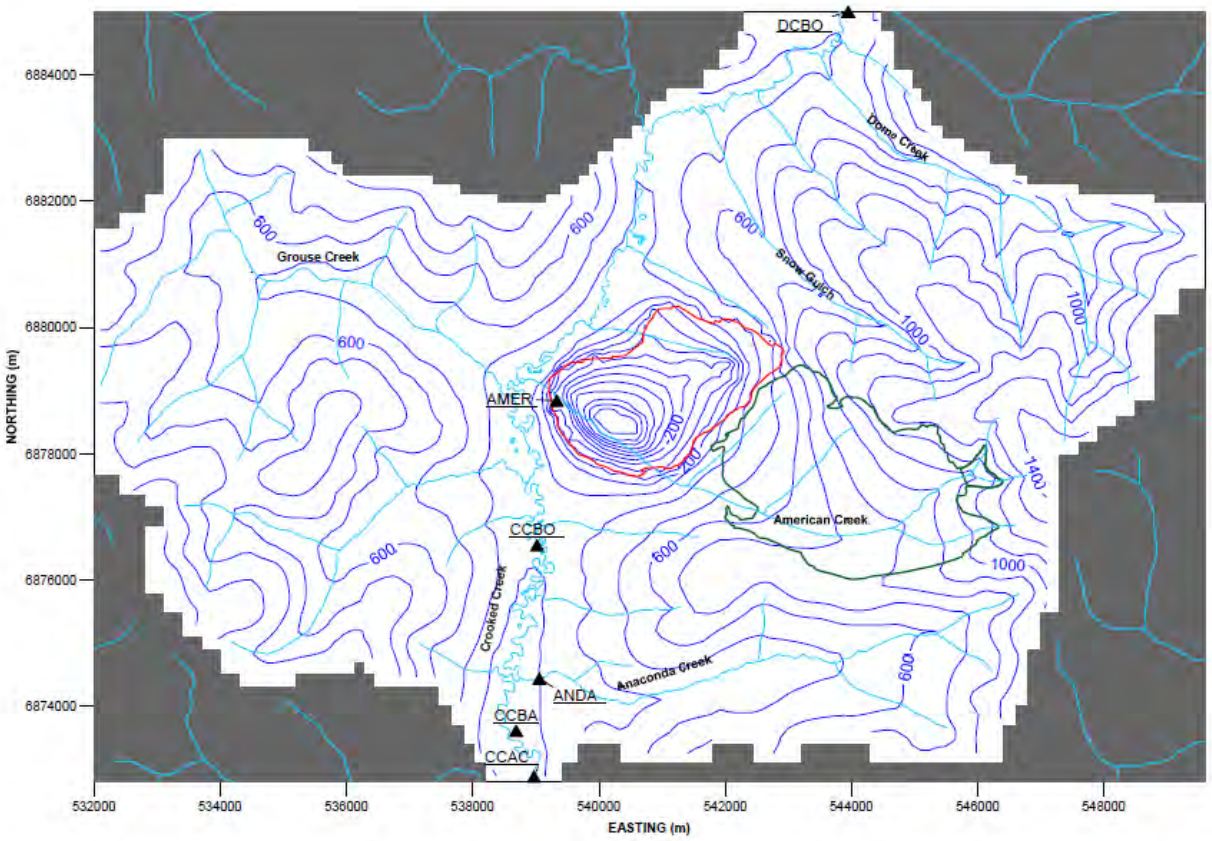


*Figure 4: Snapshot of Drawing 39 (BGC 2014c) showing simulated groundwater contours at the end of mining.*

## 5.4 Climate Change Impact on Pit Lake Planning

CLIM 8

The DEIS must plan for significant climate change into the future, as it appears to acknowledge (DEIS, p 3.26-2), due to the necessity of pumping and treating the pit lake water in perpetuity. Increased precipitation in this part of the Alaska must be considered because it could vastly increase the inflows to the pit. If they occur over a short-term period, it would seem likely that the potential for spills from the pit would increase.

However, the modeling does not include climate change. The design water balance is based on a deterministic data set of precipitation running from 1940 to 2010. Climate change will increase precipitation up to 25% over the next 80 years (DEIS, section 3.23), but as discussed above, the increase would be highly variable. It is critical to consider the potential inflow to the pit lake with not just an increased average flow but with a much increased variance to account for large inflow events occurring during a wet period.

CLIM 8

- Pit lake water balance simulations should include stochastically simulated precipitation events to account for the increased frequency of what are currently low frequency events.
- Pit lake simulations with climate change should also include simulations with higher groundwater inflow that could result from higher bedrock K or high-K faults and fractures.

Combined with the fact that groundwater inflow could be much higher (see section 9.0), the freeboard analyzed in BGC (2015l) is not as sufficient as suggested.

- The DEIS should disclose whether the closure treatment plant would be able to operate up to 12 months a year in all kinds of weather.
- The DEIS should plan for treatment on future conditions with climate change rather than being just based on the current climate statistics.

# 6.0 IMPACTS ON STREAM FLOWS

## 6.1 Pit Construction

Pit construction affects streamflow in two ways. First, dewatering to keep the pit dry would intercept groundwater flowing toward a stream where it would be become baseflow. Dewatering will reduce streamflows by up to 10 and 30 % during summer and winter, respectively (BGC 2014c, Drawing 44). Figure 5 shows reductions in groundwater discharges to various Crooked Creek tributaries caused by dewatering (BGC 2014c, p 40). The impact of dewatering decreases with distance from the stream.

HYD 7

Second, mine construction affects surface runoff in many ways, many having to do with mine water management described in Section 7.0. The pit would intercept surface runoff in American Creek, thereby preventing it from reaching the stream (BGC 2015h). The tailings impoundment would cover about 70% of the Anaconda Creek drainage (DEIS, p 3.5-77) which removes a large proportion of that streams' flow from discharging to Crooked Creek; much of that flow is diverted to mine water management as tailings water or as captured by the tailings underdrain. Ancillary mine facilities also divert or use surface water runoff which can affect both high and low streamflow rates.

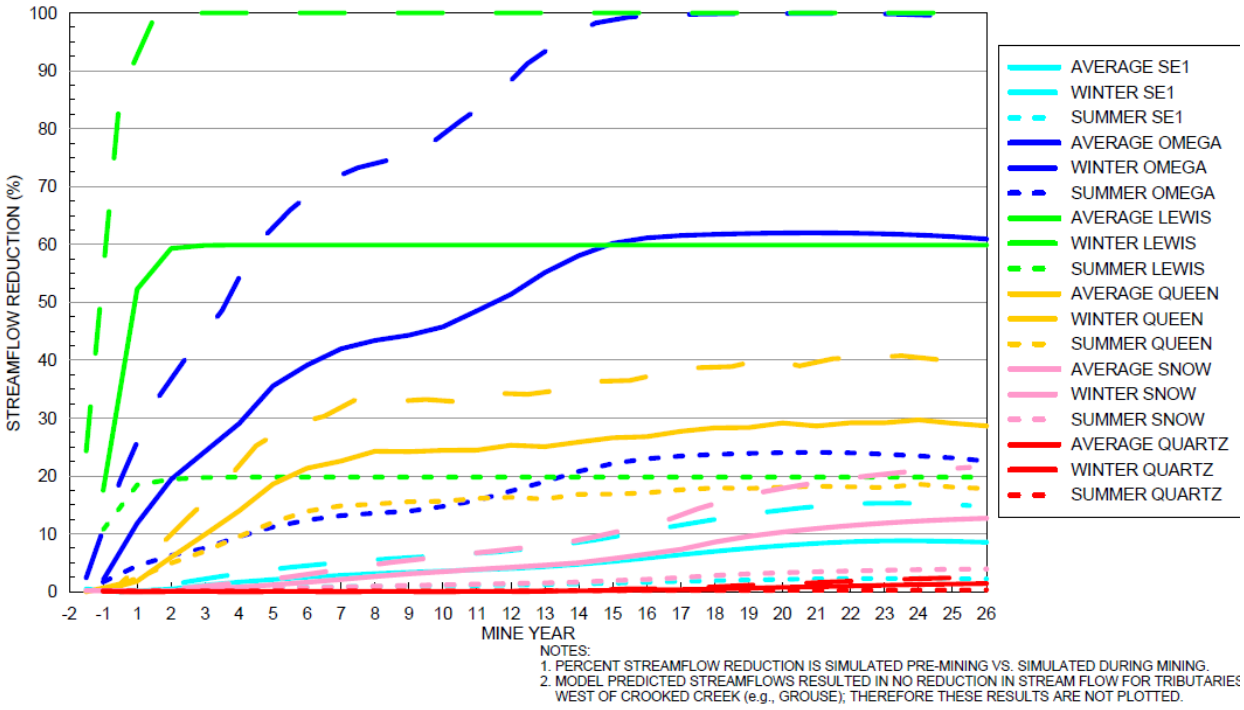


*Figure 5: Snapshot of Drawing 45 (BGC 2014c) showing reductions in flow from various Crooked Creek tributaries due to mine dewatering.*

HYD 7

Together, dewatering and mine water management cause very substantial changes in streamflows in Crooked Creek and its tributaries. The DEIS separates the discussion of impacts which can be very confusing. For example, the description of flow losses to Anaconda Creek (DEIS, p 3.5-76 - -77) does not address a loss to mine dewatering, but the summary of loss in DEIS Table 3.5-26 does include dewatering (as shown by the variation in losses for the high-K scenario which is a mine dewatering scenario in the groundwater model (BGC 2014c)). The DEIS apparently considers all impacts to Crooked Creek including cumulative impacts from the tributaries, which includes dewatering impacts (Figure 5). The failure to assign flow losses to specific activities increases the difficulty of considering mitigation.

- The DEIS should tabulate all of the predicted streamflow losses in the same table so that their magnitude can be compared

There is a lot of uncertainty around the predicted losses to Crooked Creek and other features.

MIT 31

Effects on Crooked Creek flow could vary widely depending on season, precipitation conditions, bedrock hydraulic K, phase of mine operations, and distance from the mine. For example, Crooked Creek flow below the mine site near Crevice Creek would be

MIT 31

reduced by 20 percent in winter under average precipitation and K conditions, and by 26 percent in dry conditions, during late operations (year 20 onward). The greatest flow reduction experienced near the mouth of Crooked Creek (at Bell Creek about 8 miles downstream of the mine) is projected to be 4 to 10 percent under the above conditions. In the event that K is higher than expected, 45 to 100 percent of Crooked Creek flow could be reduced in winter near the mine site under average to dry precipitation conditions, with much of the flow restored below Crevice Creek (16 to 40 percent reductions) due to tributary inflows. (DEIS, p 3.5-2)

Year 20 may be the year of maximum impact on Crooked Creek stream flows because the pit footprint would be at its maximum extent which would make for the greatest capture of runoff by the pit and because pit dewatering captures its maximum rate in year 20 (DEIS, p 3.5-82). Flow losses from Crooked Creek are as high as 100% (during year 20 at the confluence with American Creek for the high bedrock K, low precipitation scenario, DEIS Table 3.5-26), but are substantial all along the reach to Bell Creek.

- The DEIS should implement as mitigation for these flow losses a plan to discharge treated waste water in locations that would mitigate these losses.

## 6.2 Pit Lake Formation

Pit lake formation creates a permanent loss of water from Crooked Creek in two ways. First, the groundwater flow that pre-mine had been toward the creek will be reversed with the permanent drawdown to the pit reversing the gradient at the creek so that water flows into the groundwater. The Corps relies on this reversal of gradient to prevent highly contaminated pit lake water from reaching groundwater or downstream surface water. The streamflow loss to the pit lake would apply along the creek in the pit lake capture zone (the continuing drawdown cone near the pit lake). The second is that the pit would capture surface flows from American Creek, thereby preventing both high and low flows from reaching Crooked Creek.

- The overall effect of the pit depends on the timing of groundwater diversion from the creek, the hydrograph of captured water from American Creek, and the discharge of pit lake water into Crooked Creek.

Effects on surface drainages (Figure 3-5.1) appear mostly constrained to three drainages. If there are facilities that slope over drainage divides, the Corps should make efforts to avoid doing so.

# 7.0 MINE WATER MANAGEMENT

Mine water management is the plan for how the mine would handle water requirements throughout its operation. It is both a plan for obtaining necessary production water and for discarding water that hinders production. For example, approximately 17,438 gpm would be used for processing and discharged to the tailings impoundment during operations (DEIS, 3.5-21). Water for the process plant comes from various places, including freshwater reservoirs, contact water reservoirs, and dewatering wells. Stormwater management and mine dewatering are the two activities for which the mine attempts to discard excess water. Efficient management of the two can decrease the impacts the mine has on the environment, but the Donlin water management could be improved as described here.

## 7.1 Discharge to Crooked Creek

Excess water would be discharged to Crooked Creek with treatment, so failures in the collection and treatment system would degrade Crooked Creek. During operations, expected discharge is
WAQ 10 1268 gpm with 786 gpm from mine dewatering (DEIS, Figure 3.5-21). The remainder is from underdrains and contact water reservoirs, with all estimates being highly uncertain. There is a lot of uncertainty in the dewatering estimates, but during operations, most of the dewatering water (547 + 694 = 1241 gpm), whether through perimeter or in-pit dewatering wells, would be treated and discharged (783 gpm) to Crooked Creek (BGC 2014b, Figure 4-2). However, as discussed below, the high K modeling scenario would result in dewatering as much as 3.3 times higher than the predicted scenario. With time, the mine would have to increase its treatment capacity to accommodate this much extra flow. However, the actual geology is highly heterogeneous so it is probable that actual dewatering rates would be variable and could periodically far exceed the 3.3 times, especially if there are high K faults combined with the high K bedrock. The high precipitation scenario which estimates treatment at 859 gpm (BGC 2014b, Figure 4-3) does not encompass the potential for higher treatment rates due to heterogeneous bedrock.

- The DEIS should better plan for treating higher flow rates of dewatering water (and contaminated water from other sources.
- HYD 9 The DEIS should better plan to use dewatering water in operations rather than capturing freshwater flows. For example see section 7.3 regarding the need for Snow Gulch Reservoir.

## 7.2 Climate Change

CLIM 8

The Corps considered a climate change scenario for the mine site by using an estimate from a group at the University of Alaska Fairbanks, Scenarios Network for Alaska + Arctic Planning (SNAP). It was based on global climate models (GCMs). The SNAP data shows that precipitation during winter months "is projected to increase from current conditions over these decades" (DEIS, p 3.26-10), referring to the time from now to the end of the 21st century. By the 2060-2099 time frame, the SNAP data suggests that precipitation at the mine could increase by from 17 to 25 percent. DEIS Table 3.26-3 shows the increase by month for several future time periods. The table implies a systematic increase by month, but this does not disclose how those changes may occur. It is not likely that each storm system simply has increased precipitation. It is far more likely that a few large events will cause much of the increased precipitation. This could have significant impacts on aspects of the project affected by runoff, which would be much higher during these events. This perhaps could be most important with respect to treatment of runoff from various facilities.

- Treatment facilities must be designed to accommodate larger inflows that occur both as storm events and as long-term climate cycles.

## 7.3 Snow Gulch Reservoir

HYD 9

A reservoir would be constructed on Snow Gulch, north of the minesite, to provide a contingency source of water for the project (DEIS, p 2-27). "In years with average or below-average precipitation, the CWDs and pit dewatering system would not be able to meet process plant water requirements, in which case additional water would be obtained from the Snow Gulch reservoir" (Id.). However, the water balance modeling shows it provides only a small amount of water to the mine plan and that much more water would be discharged to Crooked Creek than obtained from Snow Gulch (BGC 2014b). During average conditions Snow Gulch would provide 136 gpm of water to the process plant (BGC 2014b, Figure 4-2) and BGC (2014b) Figure 4-1 shows the reservoir would hold about 3000 af most of the time. The process plant uses a large amount of water, with 17,484 gpm being discharged to the tailings; sources include contact water from the Lower and Upper Contact Water Dams (waste rock runoff and seepage), recycled water from the tailings, and dewatering water. Considering the treatment plant discharges 783 gpm to Crooked Creek, and that it is mostly dewatering water during operations, there does not seem to be a need for Snow Gulch water.

- The DEIS should provide better justification for constructing a reservoir in Snow Gulch. It should consider whether the water otherwise obtained from Snow Gulch could be obtained by dewatering at higher rates temporarily.

## 8.0 WATER QUALITY

WAQ 20

Donlin Mine could affect water quality in many ways although they can be summarized into three possibilities. First, meteoric waters could seep through waste facilities (waste rock or tailings) to reach groundwater or streams. Second, there would be discharge of waters collected from various sources to surface water after treatment. The sources include collected seepage from waste facilities, excess tailings water, contact water from contact water reservoirs, and excess dewatering water (DEIS, Figure 3.5-21). If the collection and treatment facilities work as planned, treated water should not degrade water quality. A third source is the long-term discharge of pit lake water to groundwater or surface water, as discussed above in section 7.1.

### 8.1 Seepage from Waste Facilities

WAQ 20

A significant issue is the potential for seepage from the WRF or TSF to reach streams thereby causing degradation. There will be over 3,000,000 kilotons of waste rock, which the DEIS claims would be about 91% NAG and the rest being PAG over varying time periods (DEIS, p ES-12). Most PAG-6 rock would be mined early and placed in isolated cells in the waste rock facility (WRF) (Id.). PAG-7 and some PAG-6 rock would be backfilled into the ACMA pit (Id.). In section 2.3, the DEIS identifies 2.99 billion tons waste rock, with 2.46 bil tons going into the WRF and the remainder backfilled into the ACMA pit (DEIS, p 2-7). Conventional tailings at 568 million tons will be held in a slurry tailings impoundment (DEIS, p 2-8).

GRD 1

DEIS Table 3.7-47 notes seepage from the WRF and TSF will exceed standards for various constituents. The Corps assumes that the seepage would either be captured by underdrains and treated or discharged to the pit lake (DEIS, Table 3.7-47, p 3.7-207). The modeling predicts that seepage from the waste rock dump would be diverted to the pit, both while dewatering and as a long-term pit lake. The DEIS relies on this mechanism to prevent stream degradation. The pit will likely be a sink for the bedrock aquifer, but there is much uncertainty regarding the shallow aquifer and whether it would drain towards the pit. The DEIS and supporting studies treat the shallow and bedrock groundwater system as being connected through the mining period, but there is no evidence supporting the assumption.

GRD 1

During pre-mining conditions, overall the aquifer would be unconfined with the pressure head in bedrock being similar to the water table in the shallow aquifer. As the groundwater simulation lowers the pressure below the top of the bedrock, it simulates the shallow aquifer becoming desaturated so that the bedrock aquifer becomes an unconfined aquifer. The reality may be that as pressure in the bedrock drops below the top of the bedrock, an unsaturated zone develops in the bedrock while the shallow aquifer remains saturated and functions as a

GRD 1

perched aquifer. The groundwater modeling code used to simulate dewatering, MODFLOW, is not capable of simulating the development of such an unsaturated zone, so the model results are not evidence against this idea.

GRD 1

Seepage from waste facilities would be into a rather thin surficial layer of alluvium, near the streams, or colluvium, over the mountains. The conceptual model report shows overburden thickness maps that indicate the colluvial thickness is rarely more than 30 feet in the American Creek drainage and mostly less than five feet in the Anaconda Creek drainage, except directly under the creek where it is more than six feet thick (BGC 2014g, Drawings 3 and 4). The groundwater model simulated the shallow aquifer as being 16 feet thick.

The shallow aquifer could have K substantially higher than the bedrock, at least in areas. As noted, the model cannot simulate the hydraulic disconnect that could occur during dewatering. Rather, the groundwater model simply draws groundwater from the surficial layer into the bedrock; the MODFLOW code can do nothing else because it simulates all layers as a saturated porous media with connections among all layers. It cannot simulate an unsaturated zone developing between the surficial layer and the bedrock in the upper part of the bedrock. Simulated drawdown in bedrock would lower the potentiometric surface below the bottom of the surficial aquifer after which MODFLOW simulations would simply desaturate the surficial aquifer.

GRD 1

Because the bedrock K is low, the surficial aquifer could remain saturated, and due to dewatering become perched at least in areas away from fractures. If hydraulic separation occurs and a perched aquifer develops, seepage from the waste facilities may not enter the bedrock and flow to the pit. Rather, the seepage could flow laterally through the surficial aquifer to the streams, thereby bypassing the pit. Seepage from the waste rock and tailings facilities could degrade surface water, primarily in Crooked Creek but also in its tributaries. All assumptions in the DEIS regarding contaminants reaching the pit and not the streams would be incorrect.

GRD 8

Mitigation would be very difficult. Pumpback wells, or converting monitoring wells to pumping wells, would not be effective unless they are very closely spaced[2]. This is because the surficial aquifer is thin and there is a limit to any capture zone that can be created. A capture zone is the portion of the aquifer that would be drawn to the pumping well. If the saturated zone within the aquifer is just a few feet or tens of feet thick, drawdown at the well would be limited

[2] Four monitoring wells would be installed downgradient of the TSF, two on each side of Anaconda Creek. On each side, one would be deep and one would be shallow. Each would be capable of pumping up to 90 gpm if necessary to capture TSF seepage downgradient of the tailings impoundment (DEIS, p 3.6-32). This would be grossly insufficient to capture seepage from the TSF.

GRD 8 to the interface with the bedrock; attempting to draw it lower could just create another bedrock/surficial aquifer disconnect. While theoretically, it is possible to intercept the flow through the surficial aquifer, the required well spacing could be as low as a hundred feet or even less.

PAA 14
- The only effective mitigation would be to avoid the seepage by having a liner under the waste rock. A liner would cause most seepage to collect in the underdrains.

GRD 1
- There is too little information concerning the connection between the surficial aquifer and the bedrock. Pump tests that show pumping in bedrock drawing from the stream are not actually testing what occurs if the potentiometric surface draws below the top of the bedrock; pump tests do not stress the system sufficiently to estimate the potential for a hydraulic disconnect.

## 8.2 Tailings Facility

The tailings impoundment would be lined with 60-mil liner. This is the same thickness as was used at the TSF at the Stillwater Mine in Montana. At Stillwater, the TSF has been shown to be leaky and the company will shift during future stages to 100-mil liner due to the failure of the 60-mil liner.

PAA 14

- The Donlin Mine should have a 100-mil liner rather than a 60-mil liner to make leaks would be less likely It would also reduce the amount of seepage captured in the underdrain and recirculated which could allow the TSF to be decommissioned more quickly.

The tailings facility is not within the pit capture zone, as shown in Figure 6. The tailings facility would lie over the Anaconda Creek drainage at the bottom of the figure. Although most of the watershed has drawdown due to the tailings impoundment capturing recharge (BGC 2014c, Drawing 40), the groundwater contours show that most of the Anaconda Creek watershed would drain to the low point beneath Anaconda Creek. The creek would lose substantial water due to a loss of recharge due to the tailings. Seepage however would report to the colluvium beneath Anaconda Creek and then to Crooked Creek.

PAA 9

- The best alternative from the perspective of avoiding contamination from the tailings facility is to use dry stack tailings with both a liner beneath them and then an impervious cover as part of reclamation. The DEIS predicts that seepage would be very low after 200 years. If leaks were limited, this option would minimize degradation to Crooked Creek. The impervious cover would help to prevent percolating water from mounding on the liner as well.

PAA 9

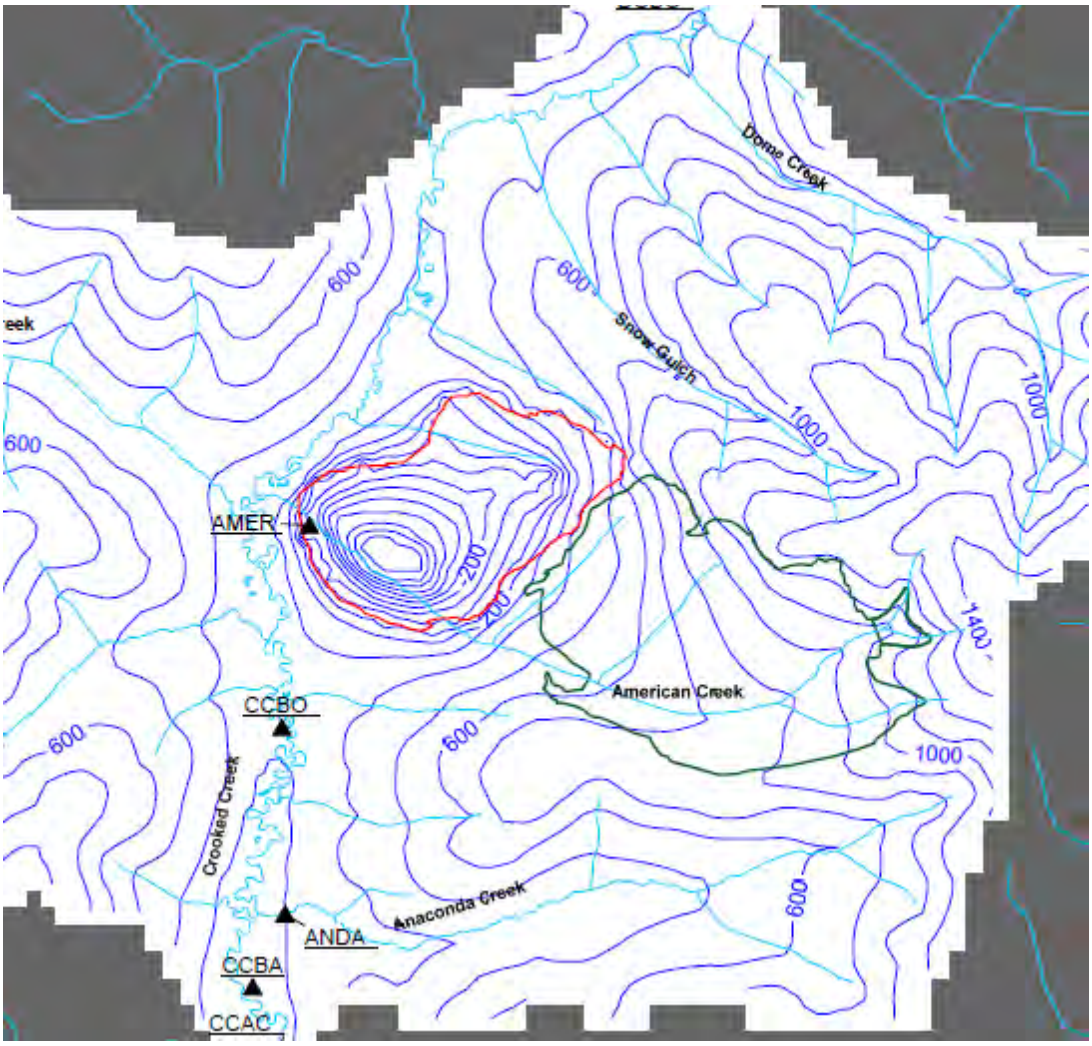


*Figure 6: Snapshot of a portion of Drawing 39 (BGC 2014c) showing the bedrock potentiometric surface at the end of mine operations.*

NEP 6

Some facilities are not within the predicted pit drawdown cone and the DEIS acknowledges a potential for contaminants to leach to Crooked Creek (DEIS, p 3.6-34). Mitigating measures include liners or other hydraulic containment and doing "further studies such as fate and transport groundwater modeling during final design" (Id.). These suggestions indicate the DEIS was issued prematurely since planning for the mine has not progressed far enough to even have completed all necessary studies or planned adequate mitigation.

- A supplemental DEIS is necessary to disclose important plans such as mitigation for seepage and to complete fate and transport modeling of contaminants leaching from mine facilities.

NEP 6 In closure, the pit lake would remain a hydraulic sink, but it would pull groundwater from much less of a distance during operations or early closure.

### 8.3 Failure Analysis

The Exec Summary notes that tailings are a "hazardous substance of concern" and that "focus is on high consequence, low probability occurrences [including] … partial tailings dam failure" (DEIS, p ES-44). DEIS section 3.24.3.5 notes such a failure as being a 1 in a thousand year event (DEIS, p 3.24-30), but a tailings impoundment must last forever so even events considered very rare or unlikely have a good chance of eventually occurring. The DEIS should complete a detailed flow routing of slurried tailings.

DAM 5

- The DEIS should analyze the risks associated with tailings dam failure. The analysis should consider the PMF occurring in the watershed because the facility will be there forever. The DEIS should present hydraulic routing of a reasonable portion of the half million tons of tailings down Anaconda Creek and Crooked Creek to show the potential damages.

The DEIS notes that "complete failure of the TSF SRS could lead to release of untreated water in a matter of weeks" (DEIS, p ES – 34). This is another example of a potential systems failure that could lead to substantial degradation in a short time period.

## 9.0 REVIEW OF GROUNDWATER MODEL DETAILS

Most of the numerical predictions of mine dewatering and impacts on stream flow rely on groundwater modeling. The details of groundwater modeling were presented in BGC (2014c) which is reviewed in this section. BGC (2014c) used the MODFLOW SURFACT code which is based on the MODFLOW code but has a proprietary numerical solver and a routine for simulating unsaturated seepage of recharge to the water table.

GRD 4

### 9.1 Model Structure

Layer 1 represents alluvium or colluvium up to 200 m amsl and is 5 to 10 m thick (BGC 2014c, p 22). Above 200 m amsl, layer 1 is bedrock, presumably representing an outcrop. Layers 2 through 9 are bedrock with layer 4 being about 70 m thick and layers 5 through 9 increasing from 100 m to 240 m thick (Id.). Layers are thickest in the uplands.

## 9.2 Parameter Zones

The geologic formations in an aquifer are delineated into zones for simulation. Each model cell is assigned a zone according to its geology. The properties include horizontal and vertical K, storage coefficients, and porosity. The values are initially set based on tests or literature values, and then adjusted during model calibration.

### 9.21 Conductivity

Within the pit area, the bedrock was delineated into 8 different sedimentary rock formations along with intrusives (BGC 2014c, p 24). Outside of the pit area, the bedrock was considered undifferentiated bedrock of the Kuskokwim group (Id.). Presumably this was done because the bedrock near the pit is better known than away from the pit. The figures showing parameter zones by layer show a complex square section near the pit that abuts against single parameters extending to the boundary; the single parameters are Kuskokwim – Valley and Kuskokwim – Ridge. There could be abrupt transitions among various parameter zones within a layer. This could have large effects on the flow patterns if the changes are substantial.

GRD 4

Basal Greywacke and Upper Greywacke have the same calibrated K values for the same layers (BGC 2014c, Table 7). For layers 1-4, 5, and 6-9 the K values are 0.1, 0.06, and 0.01 ft/d. These formations abut the Kuskokwim formation, which for layers 5, 6-7, and 8-9 have K equal to 0.03, 0,006, and 0.001 ft/d; above layer 5 the Kuskokwim (Ridge) K is 0.03 ft/d and the Kuskokwim (Valley) K varies from 0.1 to 0.3 ft/d (Id.). For layers 5 and lower the surrounding bedrock, undifferentiated Kuskokwim, has K about an order of magnitude lower than near the pit. The low calibrated K values away from the pit are not supported by the observed K values for bedrock near the pit area. The intrusive and shale formations within the pit area are also low K, but above layer 5 these will be removed within the pit. The detailed modeling occurs within the pit area and primarily is important during calibration because it would not be part of the simulation of either dewatering or pit lake development.

- The low K values away from the pit may prevent the expansion of drawdown away from the pit.

GRD 3 Zonation includes a trend of decreasing K with depth. Although they are extensive across the pit area (section 4.2), faults were not modeled except in the sensitivity analysis (Id.).

GRD 1 Calibrated horizontal and vertical K in the alluvium under Crooked Creek is 300 and 70 ft/d. These values are substantially higher than the colluvium which are respectively 0.2 and 0.06 ft/d. These K estimates for alluvium are about three times higher than the observed values.

The colluvium estimates are close to the observed values but the tests in colluvium are small scale. Colluvium K may be substantially underestimated because the thinness of the aquifer would bias the estimate of K through pump test or slug tests to be low.

BGC (2014c, p 8) describes the colluvium as "well-graded materials ranging from cobbles and gravel to sand, silt and clay". Unless the fine materials, silt and clay, fill most of the pores in the cobbles and gravel, K should be much higher. Low simulated K values in the colluvium could limit the amount of water that enters the bedrock due during recharge and could limit the amount drawn into the bedrock during dewatering as long as the colluvium remains hydraulically connected to the bedrock. The contrast between higher K in the colluvium and low K in the bedrock could cause the seepage from waste facilities to move laterally through the shallow groundwater rather than enter deeper bedrock. As discussed in section 7.0, the dewatering simulation could cause a hydraulic disconnect between the bedrock and shallow groundwater allowing a perched zone to form in the shallow groundwater.

Model layer 1 has a sharp transition from alluvium along Crooked Creek to colluvium surrounding the alluvium (Figure 7). Conductivity changes from 300 to 0.6 ft/d along a long reach of the stream. Such large changes in K between adjacent cells often leads to water balance errors in the model solutions. BGC should address the potential for local errors which
GRD 1 can lead to large inappropriate head changes. Conductivity of the valley Kuskokwim formation, which underlies the alluvium (Figure 8), ranges from 0.1 to 0.3 ft/d (BGC 2014c, Table 7). Effectively, the model simulates the high K alluvium as being surrounded by very low K bedrock or colluvium which essentially disconnects the alluvium from the rest of model domain; the model conceptualization as simulated here effectively isolates the alluvium. Using more appropriate K values to simulate the alluvium and surrounding formation would provide a more accurate simulation of flow across the formation boundaries and of the surface/groundwater interchange at Crooked Creek.

- The model simulates the alluvium with a very high K surrounded by low K bedrock and colluvium. This effectively isolates the alluvium and minimizes the effects of dewatering on the stream.

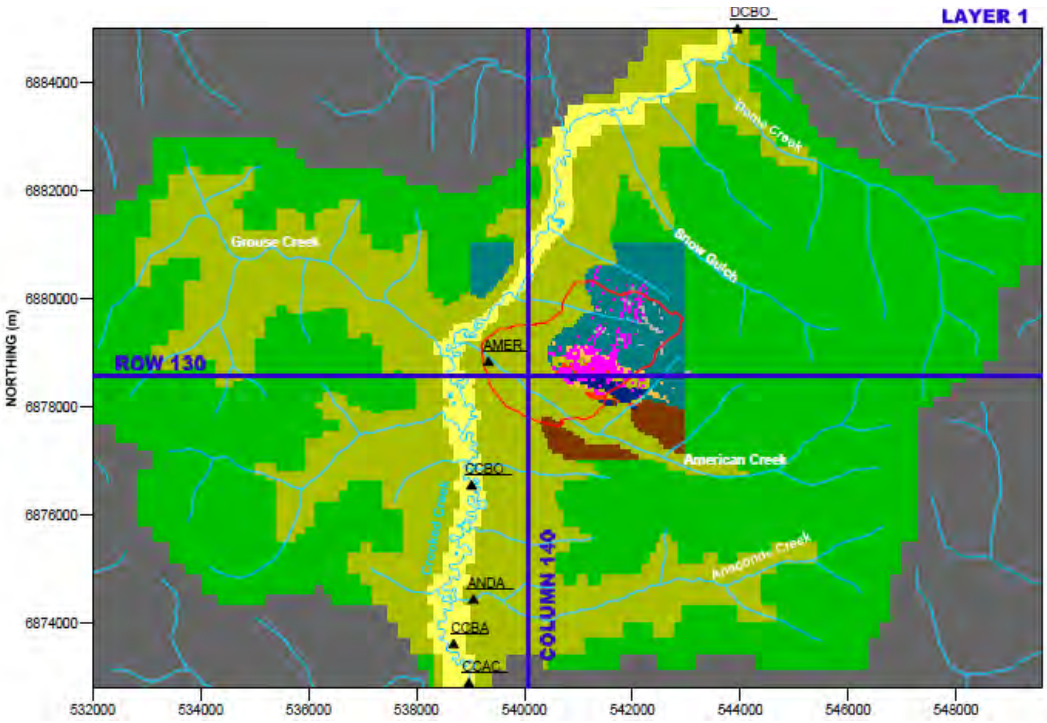


*Figure 7: Snapshot of a portion of BGC (2014c) Drawing 17 showing parameter zones in model layer 1. See Figure 9 for a legend.*

GRD 1

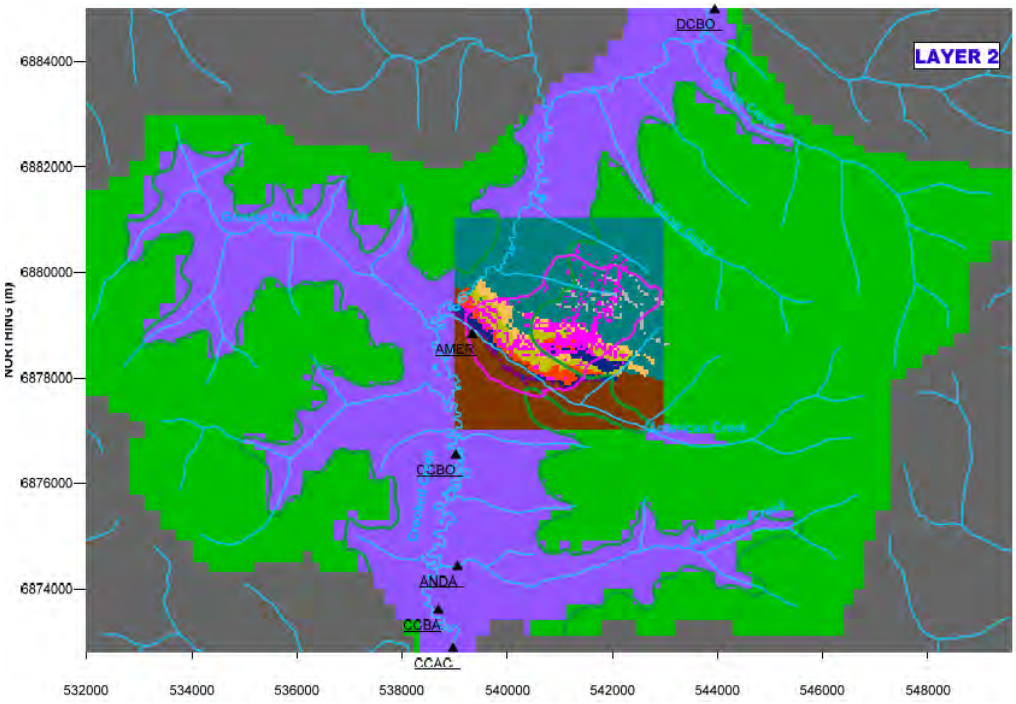


*Figure 8: Snapshot of a portion of BGC (2014c) Drawing 18 showing parameter zones in model layer 2. See Figure 9 for a legend.*

GRD 1

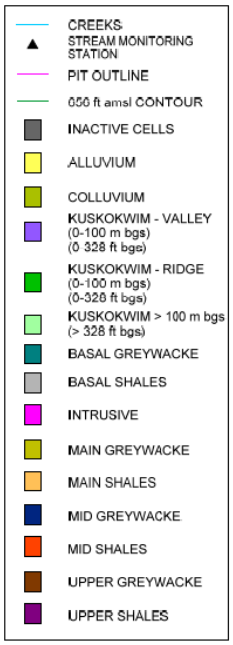


*Figure 9: Snapshot of the legend from BGC (2014c) Drawing 18 describing parameter zones used for all of the model drawings. This applies to Figure 7 and 8.*

GRD 2

The K estimates represent very small sections of their respective aquifers, but in setting the formation properties, the authors ignore important scale factors. In general, the representative volume of a pump test is the amount of water pumped, divided by the effective porosity (Schulz-Makuch et al. 1999); this effectively means a sample volume, including all pore spaces affected by the pumping. Short-term tests represent properties only over a very small volume. Figure 10 shows an example from the literature of variability for a fracture-flow media, the type of media that controls the flow near the pit. Hydraulic conductivity varies over seven orders of magnitude in the example (Figure 10), depending upon the volume of the aquifer represented in a given test. Setting K for the undifferentiated bedrock as a single value less than most of the tests violates these concepts of scale.

From the perspective of flow and transport prediction (as needed near the pit and waste rock dumps), small-scale properties control local flow while the larger-scale measurements control regional flow, which can be estimated without understanding localized details. A mine that intersects and excavates significant portions of a formation affects flow at a regional level, and therefore needs property measurements at that scale. The short-term tests in the crystalline bedrock presented by INTERA are not relevant at a regional scale.

- Most of the hydrogeologic properties estimated for the DEIS are for a small-scale and yield conductivity values that are much too low for regional flow analysis. This causes the DEIS to predict impacts limited to the areas closer to the Mine.

GRD 2

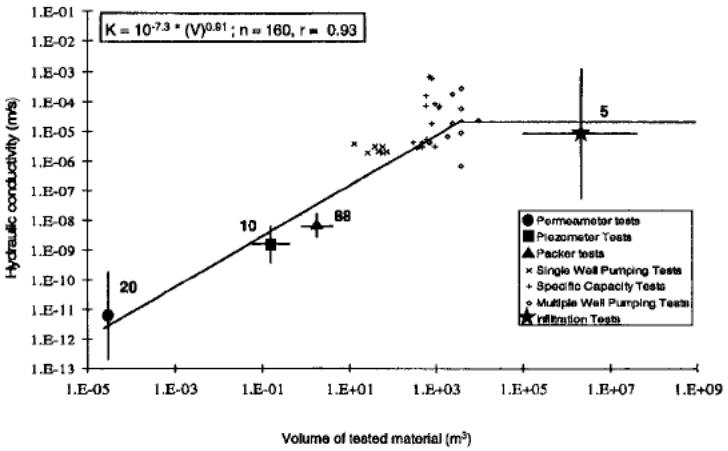


**Figure 6. Relationship of hydraulic conductivity to scale of measurement in the Racine Formation of the carbonate aquifer of southeastern Wisconsin. Permeameter, piezometer, packer, and passive infiltration tests were plotted as geometric means with 95% confidence intervals; pumping tests and specific capacity data as single values. Number of observations are given adjacent to means. Passive infiltration tests are derived from the infiltration of Lake Michigan water into the Racine Formation due to the construction of a sewage tunnel. The regression line is derived from all individual values (n = 160) below the infiltration scale. The 95% confidence interval about the slope is 0.91 ± 0.06, and r is the correlation coefficient.**

*Figure 10: Figure 6 from Schulz-Makuch et al. (1999) showing the variation of hydraulic conductivity with volume of material used for testing. The Racine Formation is a fracture-flow formation and is used here only as an example of the variability.*

## 9.22 Storage Coefficients

GRD 1

Specific yield (Sy) for the alluvium is extremely low, being set at 0.01 (BGC 2014c, Table 7). Sy is the amount of water that is released from storage for a unit drop in the water table; for Sy=0.01, a head drop of one foot would release just 0.01 foot of water from storage. Usually, Sy is much higher. Table 3.5 in Anderson and Woessner (1992) shows a range of 0.01 to 0.46 for categories from fine sand through coarse gravel, the particle sizes found in the alluvium along Crooked Creek. The published range of Sy technically includes the value used in this model for alluvium, but Sy = 0.01 is for fine sand (Id.). Crooked Creek alluvium includes a mixture of particle sizes and the estimates for fine sand have a mean of 0.33 (Id.). Without a substantial detailed pump test estimate of Sy for the alluvium, the value used for the Donlin groundwater model is suspect. Also, the very high K and low Sy in the alluvium are incongruous because Sy is often a surrogate for porosity, and having porosity equal 0.01 is inconsistent with K being 300 ft/d.

- A low Sy for the alluvium will cause the model to underestimate the amount of water drawn into the bedrock during dewatering.

GRD 1 Together the high K and low Sy in the alluvium would serve to minimize the simulated flux from the alluvium into the bedrock. The Sy value affects the simulated interchange of water between the stream and the alluvium and then between the alluvium and the bedrock beneath it. The amount of water drawn into the bedrock from the alluvium due to dewatering could be grossly underestimated. The very high K would allow the alluvium to provide water to the bedrock very easily, meaning without substantial change in head. The gradient at the stream boundary would change very little due to the high K. The streambed K was set equal to the alluvium K so the stream allowed water to pass easily, meaning it provided the necessary water with very little change in gradient. The simulated drawdown would be very low.

### 9.3 Recharge

The model assumes that recharge enters the model domain at a 28% of annual precipitation per year rate, with all 5.5 in/y applied all in the summer period. If the water surface is above the ground surface, the model does not accept the recharge and it becomes surface runoff to the stream network (BGC 2014c, p 25).

Three conceptual problems with this recharge simulation are obvious. The method does not account for recharge variability due to precipitation amount, slope, or geology. Studies from around the western US have shown variable rates of recharge as a proportion of precipitation, although none of the studies were based in Alaska.

GRD 17 Because recharge must first percolate through a soil zone it is likely that a higher proportion will do so for a higher precipitation because the amount of evapotranspiration is unlikely to increase linearly along with precipitation and because higher precipitation would more often have moister antecedent conditions leading to less precipitation being taken up to make up a soil water deficit.

Slope and geology controls the rate at which precipitation can enter the aquifers and unsaturated zone between the soils and aquifer. Fractured bedrock accepts more percolation than intact bedrock and the ground slope controls the rate at which the meteoric water may runoff or flow downslope as interflow, if a soil layer is available. Differences in conductivity and slope would lead to differences in the rate of recharge at a given point.

Combined, precipitation amount, slope and geology controls the amount of recharge at a location, with the remainder becoming runoff. Drainages would likely be sources of large amounts of water and recharge beneath the streams.

GRD 17

Very little recharge as simulated reaches deeply into the bedrock because the low simulated permeability of the deep bedrock significantly limits the deeper circulation of recharge. BGC (2014c) does not present the simulated amount of groundwater that percolates into the bedrock, the deep groundwater system, but it should. This would reflect the contrast in conductivity between shallow and deep aquifer systems, with lower conductivity at depth preventing deep percolation. The water that remains in the shallow system discharges to surface water quickly. This critical point controls the most important results of the model simulation as well. If the deep bedrock is a little more permeable and allows more recharge to circulate deeply, the required mine dewatering could be doubled without changing the discharge to the stream very significantly.

The comparison of premining baseflows shown in DSEIS Table 4-7 is not meaningful since presumably each model used similar recharge and if the inflow to each model domain is the same, so must be the outflow.

### 9.4 Calibration

There were about 182 observed groundwater elevations used for calibration. For a model of this size, this is a reasonable number, however, there was a definite bias in their distribution. As shown on BGC (2014c) Drawing 7, the majority of sites were in drainages and only a few were on the ridges. Groundwater converges into the drainages so there is likely an upward gradient in most of the areas that are most represented in the calibration.

GRD 5

Initial calibration for most models is by a steady state simulation wherein average fluxes are simulated and average head values are matched. BGC apparently skipped this step, opting instead for calibrating based on a seasonal transient model (BGC 2014c, p 27). This is reasonable if the model best fit was compared to an observed time series of groundwater observations (and stream flows). However, the "primary calibration target at each location" was the average value of multiple observations, if there were multiple observations (BGC 2014c, p 28). Average groundwater levels may not represent any given seasonal time period, so at best this calibration technique is difficult to evaluate.

BGC (2014c) does not provide necessary details for understanding the calibration simulation:

- BGC should describe the initial conditions used for the calibration scenario.
- BGC should specify how long the calibration scenario was run.
- BGC should specify the head value used for comparison to the average observed head. Is it the value for a given time period or an average for a multitude of simulated observations?

Given that the calibration scenario description is not very useful, the graph of simulated and observed head values (BGC 2014c, Drawing 24) shows some significant bias in the calibration. About 20 of the observations plot below the -25 m envelope line on the graph and just two plot above the +25 m line. At least eight of the observations below the -25m line are wells in the Upper Greywacke formation, layers 1 through 3. The Upper Greywacke may be seen south of and on the south side of the pit underlying much of the American Creek drainage. Simulated heads are about 50 m lower than observed in this area. The gradient driving flow to the American Creek is likely simulated lower than observed. This could lead to a higher K estimate which would lead to drawdown affecting the creek less than it actually would do.

A second calibration scenario was the simulation of the MW07-11 pump test (BGC 2014c, p 29). Other than stating that the grid size was changed for the simulation (Id.), BGC provides almost no details of the test, as follows: "Model stress period lengths or time steps were not specified. It is common to define a stress period based on pumping at specific rates, but the report does not specify how or whether this was done." (Id.)

The report does not explain how calibration was competed. In short term pump test simulations, it is common to adjust storage coefficients because short-term head changes are more sensitive to storage coefficients. The report does not specify whether test statistics were
GRD 5 determined for the pump test simulations, so it is difficult to objectively evaluate these transient calibrations.

The graphs that compare simulated water levels with observed show a very poor match (BGC 2014c, Drawings 26-29). There is no apparent consistency or bias, with some simulated levels exceeding observed and vice versa (Id.). BGC (2014c, p 29) suggests that "bedrock hydraulic conductivity is heterogeneous at the scale of the pumping test". This means that the model may not be accurate with respect to the details of the simulation. However, BGC also suggests that having simulated values "within a factor of two to three of measured drawdowns at the observations wells" (Id.) suggest the K values are reasonable for the scale of the modeling. There is no logic behind this statement because missing the target by a factor of three implies the K should have been set substantially different. It indicates there is substantial room for improvement.

The second transient calibration was of the pump test run to test properties between Crooked Creek and the proposed pit. The drawdown graphs for both alluvial and bedrock wells (BGC 2014c, Drawings 30-32), including both pumped and monitoring wells, show very little agreement between simulated an observed hydrographs. However, these tests were used to set the high alluvial K and low Sy values described above. The lousy match between the

observed and simulate groundwater levels does not provide justification for the alluvial parameters, the effects of which were described above.

Based on the overall calibration summary (BGC 2014c, p 32), the following bullet points suggest problems with the calibration.

GRD 5

- Modeled K of the alluvium is generally higher than observed and that of the colluvium is low for the model scale used here (Id.).
- Modeled bedrock K tended to be lower than the observed range, especially at distance from the pit.
- There is no evidence that storage parameters were even calibrated since they do not vary among formations and because the model fit during pump tests was so poor.
- Any agreement between simulated and observed flows (Drawing 25) is spurious due to the large difference in flow rates.
- It is not appropriate to claim there was a good seasonal match. Graphs for wells MW03-02, -03, -04, -05, -06, -07, -09, -12, -13, and -15, (BGC 2014c, Appendix A) show almost no simulated seasonal effect while the observed seasonal variation exceeds a meter. Some wells, such as MW07-05, and -06, show an observed trend with time that substantially masks the seasonal trend.

## 9.5 Simulating Mine Dewatering and Pit Development

BGC (2014c) chapter 7 describes the methods used to simulate mine dewatering and pit development. The modeling has three objectives that are of interest here:

GRD 1

- Estimate the dewatering extraction rate
- Evaluate the impacts on mine dewatering and pit development on local surface water
- Estimate the rate of pit lake formation and the recovery in groundwater levels and flow conditions after dewatering

Also of interest is how development of the tailings impoundment affects flows. Other objectives specified by BGC (2014c) are for design purposes.

GRD 17

BGC simulated dewatering using MODFLOW drain boundaries, and possibly also used the well package in advance of reaching a given pit level to remove some initial water. ET was appropriately set to zero within the enlarging pit. However, recharge should have continued to have been simulated because precipitation falls within the pit and if it does not runoff, it will percolate and become recharge. Runoff from within the pit may be captured and managed, but by definition recharge is precipitation that does not runoff. If not pumped it will flow into the

GRD 17 pit at lower levels; there is really no way to “manage” precipitation to prevent recharge (BCG 2014c, p 34).

Captured streams were appropriately turned off during the simulation. During operations, there would be some backfill in the pit. The simulation included simply turning off the drain boundary to the level of the backfill and allowing the groundwater level to recover.

The bedrock properties were not altered during the operations portion of the simulation (BGC 2014c, p 35). This was justified due to the relatively short time period simulated. However, not changing the bedrock properties was an error due to the large difference in storage properties between backfill (Sy = 0.33 for closure simulations) and in-situ bedrock (Sy = 0.003, BGC (2014c), Table 7). The amount of water necessary to fill the unsaturated bedrock with Sy=0.003 is miniscule, by two orders of magnitude, compared to that necessary to fill the backfill with Sy=0.33. During the five years of operations, groundwater levels would fill in the backfill while
GRD 1 removing very little water from the model. Presumably this would be the initial conditions for simulations of the operations period. Recovery would have occurred with too little water being removed. This would decrease the simulated losses to the streams and basically cause the model to underestimate flow losses to the streams. If it allows the backfill to become saturated prematurely, the initial conditions for the closure simulation will be too high and cause the model to simulate too little water removed from the model to be stored in the backfill; this would also reduce the simulated impacts to the streams.

The modeling predicted that total groundwater extraction rate from all wells and drains would initially equal 1700 gpm, increase to 2600 gpm by year 12 and average 1600 gpm over the mine life. The simulated rate decreases to about 1500 gpm after year 20 and some groundwater recovery into the backfill begins to occur (BGC 2014c, Drawing 36). Various factors, some already discussed, could make the dewatering rate higher than simulated:

- Bedrock K away from the pit has been underestimated. This slows the flow of groundwater to the pit and minimizes the simulated dewatering.

GRD 17
- Failure to simulate recharge within the pit boundary simply ignores a source of water that will be removed as dewatering water.

Dewatering dries much of layer 1 as can be seen by the 30 foot drawdown contour encircling much of the area (Figure 11). The model cells within that area would be dry. As noted in the
GRD 1 text (BGC 2014c, p 39), drawdown in the alluvium along Crooked Creek is less than two feet. The lack of drawdown corresponds to the high K and encirclement by low K bedrock and colluvium as described above. The alluvium is effectively isolated from the effects of dewatering (Figure 11) by the model design.

The model also simulates substantial reductions to streamflow in Crooked Creek and tributaries, which would have a large effect on the flows in those streams. However, the reductions have been underestimated for reasons as described herein. Primarily, all dewatering water is prevented from discharging to a groundwater sink which in this model would be a stream. For all of the reasons that dewatering rates have been underestimated, the reductions in streamflow has also been underestimated. Additionally, dewatering effects on Crooked Creek have been underestimated due to the simulation of K and storage properties, therefore Crooked Creek flows would be decreased much more than disclosed in the DEIS.

GRD 1

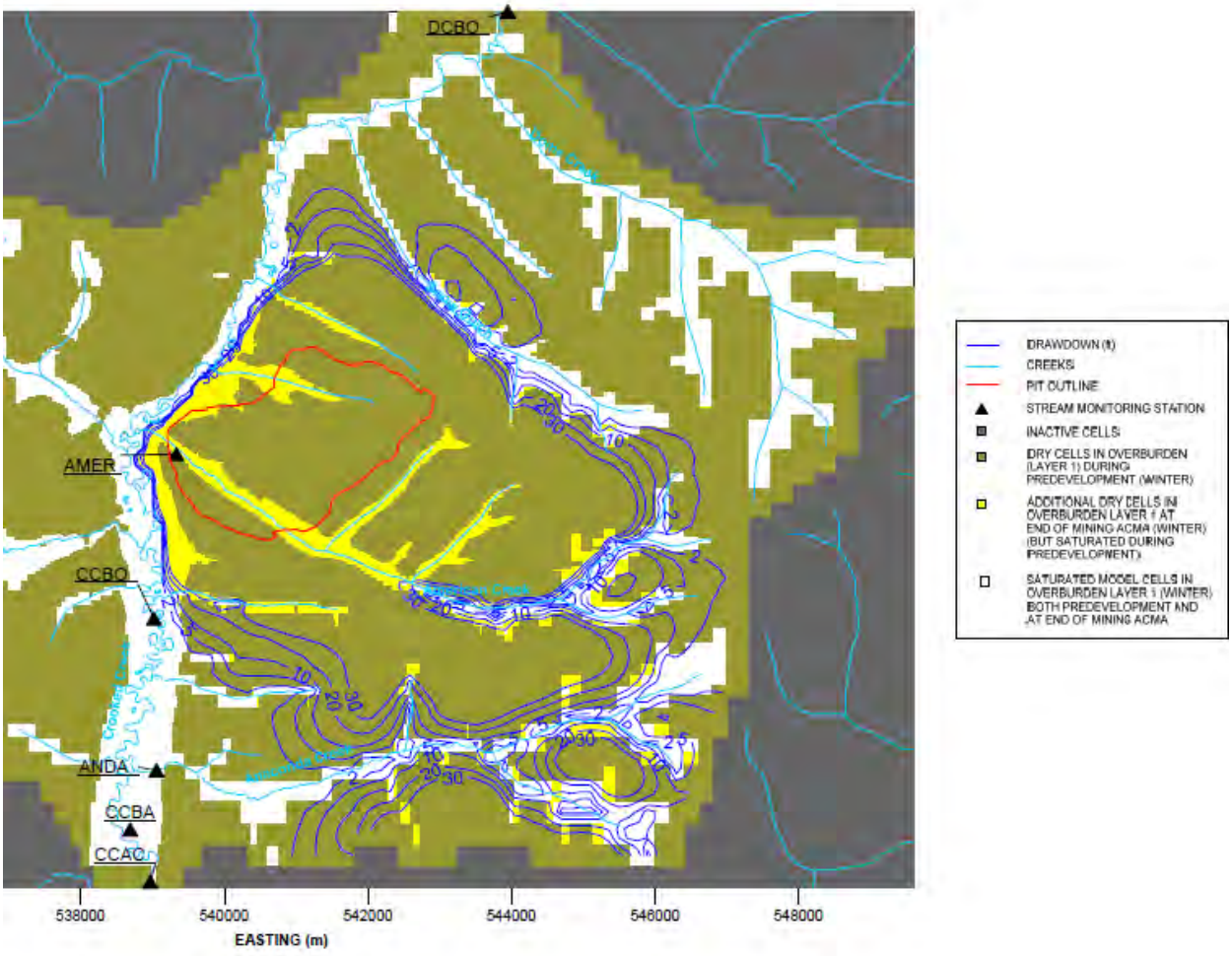


*Figure 11: Snapshot of a portion of BGC (2014c) Drawing 37 showing drawdown in model layer 1, the surficial aquifer.*

## 9.6 Simulating Pit Lake Formation

WAQ 11

BGC (2014c) used a special pit lake package to simulate the forming lake. In addition to groundwater flowing into the pit lake, there is inflow from precipitation, runoff, American

Creek flows, waste rock underdrain, contact pond water, and tailings impoundment discharge. The pit lake fills until it is just below its crest after which water would be pumped, treated, and discharged. It initially receives almost 33,000 af of excess tailings water (Lorax 2012, p 3-7), which is generally of poor quality (Lorax 2012, Table 3-3). Water from the tails and waste rock would be discharged to the bottom of the pit void "to encourage the more contaminated (i.e. denser) water to remain at depth within the pit lake and to foster chemically stratified or meromictic conditions within the pit lake" (Lorax 2012, p 3-7)). If this works as planned and the lake does not turn over, water at the bottom of the pit lake would be highly contaminated.

WAQ 11

Groundwater inflow to the pit lake will generally be of good quality compared to the inflows of waste or tailings seepage (Lorax 2012, Table 3-3). However, Lorax (2012) has not simulated different groundwater quality for groundwater entering from different levels or formations. Background groundwater quality is not homogeneous through the entire mass of rock surrounding the pit (BGC, 2011l) and inflows should not be simulated as if it is. This could affect the predicted pit lake water chemistry.

The pit lake would be almost full after 60 years. Although the pit is a sink, meaning the regional groundwater flows toward it from all directions, there is a significant groundwater outflow (BGC 2014c, Drawing 49). This outflow is to fill the backfilled waste rock and dewatered bedrock near the pit, presumably as the lake fills faster than the groundwater levels recover. The particle tracking (BGC 2014c, Drawings 50-53) does not suggest that any water would escape the pit and flow away into the groundwater, but BGC should verify this because escaping pit lake water would degrade surrounding groundwater.

GRD 6

The managed lake elevations is intended to provide adequate freeboard and maintain water levels that the groundwater would continue to discharge to the pit lake rather than creating a flow-through pit lake (BGC 2015g). The gradient is "slight" (BGC 2015g, p 2), however, which suggests that it could reverse so that pit lake water would discharge from the lake occasionally.

- The groundwater model should consider groundwater/pit lake relations when the pit fills to its crest as it could do during extreme wet conditions, as reviewed herein at section 5.2.

## 9.7 Sensitivity Analysis

A numerical model sensitivity analysis is designed to test the effects of changing various model parameters on the results of simulation. BGC (2014c) chapter 9 describes the sensitivity analysis completed for the Donlin numerical model. BGC's method is to simply make large adjustments to various factors and compare the change in the calibration and to show how it

GRD 1

changes the simulation of future conditions. I review only the sensitivity results that reveal important aspects of the model with respect to the environmental impacts of the proposed mine.

GRD 1

The model was not sensitive to raising and lowering the hydraulic K of the alluvium because the alluvium was essentially isolated from the rest of the system so that stream levels controlled the heads, as discussed above. Calibration statistics improved for three changes, decreasing bedrock K, increasing recharge and streamflow, and simulating faults as low hydraulic K faults (BGC 2014c, p 51). That these wholescale changes improved the calibrations shows the model is not unique but also suggests that the calibration as presented in BGC (2014c) is not as accurate as it could be. I argued above that bedrock K was underestimated so the improvement in calibration statistics for using even lower K suggests that some other aspect of the model is more important for matching head values. Recharge and streamflow were estimated external to the model so changing them would be inappropriate.

GRD 4

Including low K faults improved the calibration (BGC 2014c, p 51). This conceptualization suggests the groundwater system could be segmented. Details of the analysis are sparse, but the faults were only mapped in the pit area so it is likely that faults were only added in that area. This sensitivity analysis illustrates the importance of better understanding the faults and how they affect the groundwater flow.

GRD 3

- Faults could segment bedrock into higher or lower K zones better than formation maps.
- Faults could segment bedrock in ways that would allow dewatering to affect areas farther from the pit, especially if the segmentation includes areas with higher K.
- If the higher K segments extent under creeks, they could create zones in the streams that are much more affected by dewatering.

The model, and DEIS, requires much more information about the faults to be accurate.

Mine dewatering rates were sensitive to bedrock properties (BGC 2014c, p 52). Increasing bedrock K by a factor of 5 increased mine dewatering rates by 3.3 times; increasing bedrock storage coefficients by ten times increased mine dewatering rates by 1.5 (Id.).

GRD 4

High K faults could increase the mine dewatering rates up to 3.3 times depending on their location and the extent of connection with Crooked Creek (BGC 2014c, p 53). This could probably also result from the low-K faults segmenting high-K bedrock under the streams.

GRD 3

Changing bedrock K substantially affected stream flows. Reducing bedrock K reduced streamflows relative to the base case. If the model has bedrock K that is too low, as I argued above, impacts on the streams would be underestimated. Increasing bedrock K by a factor of 5

GRD 4

GRD 4

reduced winter streamflow by 86% and simulating high K faults decreased streamflows by 83% (BGC 2014c, p 54). Increasing bedrock K by a factor of 20 caused Crooked Creek to go dry by the pit (Id.). Increasing storage coefficient also reduced streamflows. The sensitivity of the model predictions to bedrock properties further indicates that the model could have grossly underestimated impacts to streamflow.

The sensitivity results regarding bedrock K verifies the points above about how low K estimates could have caused the model to underestimate dewatering, the extent of the drawdown, and impacts on streamflow.

GRD 3

Low K faults decreased the impacts that dewatering had on streamflow (BGC 2014c, p 54). This is probably due to the segmentation caused by the faults.

GRD 1

Changing alluvial K had little effect on the impacts dewatering had on streamflow (BGC 2014, p 54). This further reflects the comments above about how the alluvium under Crooked Creek is isolated from the bedrock. The isolated alluvium acts as a tub in which water is easily exchanged with the stream.

GRD 4

Pit lake refill time was also sensitive to bedrock K (BGC 2014c, p 55). The increased bedrock K causes the pit lake to fill from 14 to 30 years faster, reflecting the higher flow to the pit (Id.). Decreased K increased the fill time by about 12 years (Id.).

### 9.8 TSF underdrain predictions

The groundwater model (BGC 2014c) estimated discharge to the tailings impoundment underdrain (Figure 12). The only description of how the TSF was simulated was to note that ET and recharge was set equal to zero (BGC 2014c, p 16, 34).

GRD 8

> The TSF will be a fully-lined impoundment. Therefore, groundwater recharge to the underlying aquifer will cease within the footprint of the facility. In addition, the TSF underdrain will be installed beneath the **liner to capture groundwater discharge from the catchment and deliver it to the SRS downstream of the TSF dam**. Any seepage through the liner would also report to the SRS. SRS water will be used either as make-up water in the process or potentially treated and discharged to Crooked Creek. (BGC 2014c, p 16, emphasis added)

The DEIS describes it as follows: "The TSF would be designed with a rock underdrain that would serve two purposes: 1) capture and direct any TSF leakage to a Seepage Recovery System (SRS) located immediately downgradient of the TSF dam; and 2) collect groundwater from areas upgradient of the TSF and direct it to the SRS as TSF underflow" (DEIS, p3.6-31). The mine would obtain a water right for the diversion of groundwater by the TSF drain (DEIS, p 3.6-32).

The report does not describe the boundary used to simulate the drains, although if the underdrain is beneath the liner to capture groundwater discharge, the underdrain must be simulated as a drain in layer 1. An underdrain would allow groundwater discharging upward due to artesian pressure from undermining the TSF.

Decreased bedrock K in the sensitivity analysis increased flows to the tailings underdrain system (BGC 2014c, p 54, 55). This is because low bedrock K causes more groundwater to remain in the shallow groundwater.

> The reduction in recharge is predicted to lead to a progressive decrease in groundwater flow reporting to the foundation underdrain, from approximately 730 gpm (4,000m3/d) in Year -2 to approximately 440 gpm (2,400m3/d) at the end of mining" (BGS 2014c, p xiv). "Predicted groundwater discharge to the TSF underdrain for the post closure analysis fluctuates on a seasonal basis, and averages 370 gpm (2,000 m3/d) during the winter season, and 440 gpm (2,400 m3/d) during the summer season (BGC 2014c, p xv).

GRD 8

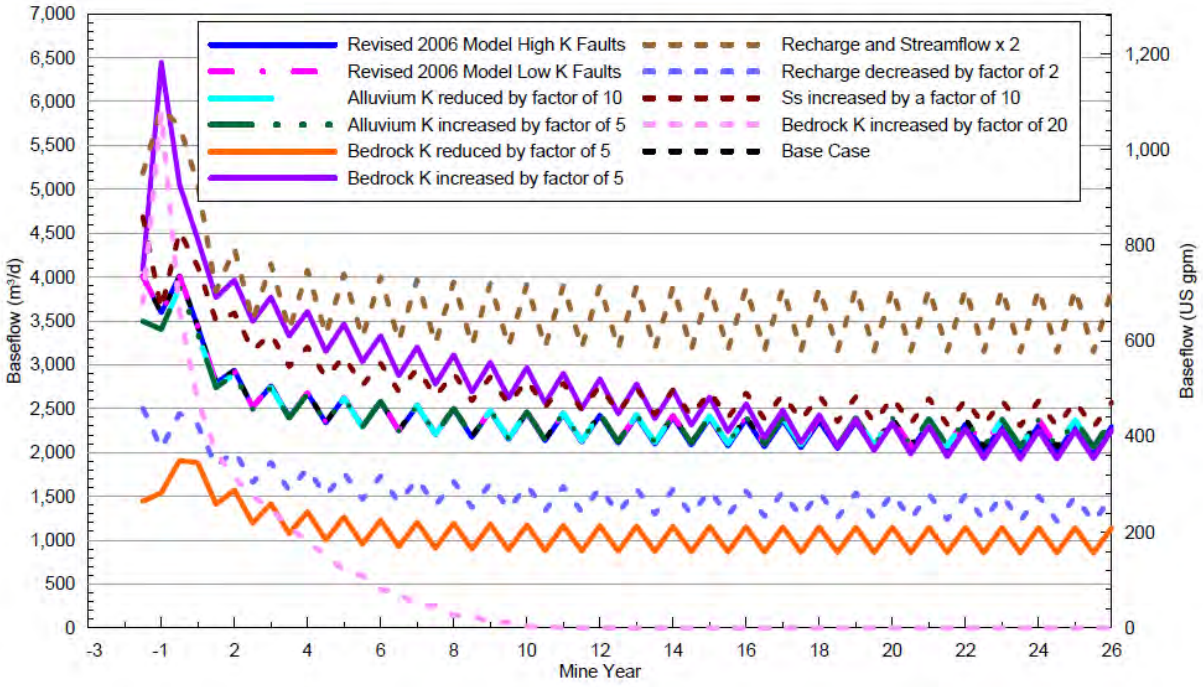


*Figure 12: Snapshot of BGC (2014c) Drawing G22 showing the discharge to the tailings impoundment underdrain for the base case and various sensitivity analysis simulations.*

## 10.0 MISCELLANEOUS

GRD 1

The potentiometric surface map (DEIS Figure 3.6-2) does not distinguish among aquifers which means there is an assumption that the groundwater pressure in the bedrock equals the water table in the overlying colluvial aquifer. It argues that "vertical gradients within the groundwater system are not large compared to the scale of the map and the overall relief of the potentiometric surface" (DEIS, p 3.6-8). A reference is to BGC 2011d. This can be an important assumption, driving recharge and discharge locations. What is meant by gradients "not large compared to the scale of the map"?

Groundwater discharge occurs only in creeks and gulches, not to wetlands away from the creeks and gulches (BGC 2014g, p 6). Permafrost is intermittent and generally limited to soils but does extend into bedrock up to 33 feet with an average of 14 feet (BGC 2014g, p 6-8). The only trends apparent in the permafrost mapping show that permafrost is more common in the drainages of American and Anaconda Creek.

## 11.0 REFERENCES


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BGC (2015l) Project Memorandum: RFAI #58 "Pit Lake Hydrology, Post Closure" Responses. Hamish Weatherly to James Fueg, Donlin Gold. March 15, 2015.

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Maest A, Kuipers J, Travers C, Atkins D (2005) Predicting Water Quality at Hardrock Mines: Methods and Models, Uncertainties, and State-of-the-Art. Available at: www.kuipersassoc.com.

Myers T (2016) A modeling approach to siting mine facilities in northern Minnesota USA. *J Hydrology* 533: 277-290. Doi: 10.1016/j.jhydrol.2015.12.020

Schulze-Makuch D, Carlson DA, Cherkauer DS, Malik P (1999) Scale dependency of hydraulic conductivity in heterogeneous media. *Ground Water* 37(6):904-920

# Attachment 1

# Tom Myers CV

**Tom Myers, Ph.D.**
Consultant, Hydrology and Water Resources
6320 Walnut Creek Road
Reno, NV 89523
(775) 530-1483
Tommyers1872@gmail.com

# Curriculum Vitae

**Objective**: To provide diverse research and consulting services to nonprofit, government, legal and industry clients focusing on hydrogeology specializing in mine dewatering, contaminant transport, natural gas development, groundwater modeling, NEPA analysis, federal and state regulatory review, and fluvial morphology.

## Education

| Years | Degree | University |
|---|---|---|
| 1992-96 | Ph.D.<br>Hydrology/Hydrogeology | University of Nevada, Reno<br>Dissertation: Stochastic Structure of Rangeland Streams |
| 1990-92 | | University of Arizona, Tucson AZ<br>Classes in pursuit of Ph.D. in Hydrology. |
| 1988-90 | M.S.<br>Hydrology/Hydrogeology | University of Nevada, Reno<br>Thesis: Stream Morphology, Stability and Habitat in Northern Nevada |
| 1981-83 | | University of Colorado, Denver, CO<br>Graduate level water resources engineering classes. |
| 1977-81 | B.S., Civil Engineering | University of Colorado, Boulder, CO |

## Professional Experience

| Years | Position | Duties |
|---|---|---|
| 1993-Pr. | Hydrologic Consultant | Completion of hydrogeology studies and testimony focusing on mine dewatering, groundwater modeling, natural gas development, contaminant transport, NEPA review, and water rights for nonprofit groups and government agencies. |
| 1999-2004 | Great Basin Mine Watch, Exec Director | Responsible for reviewing and commenting on mining projects with a focus on groundwater and surface water resources, preparing appeals and litigation, organizational development and personnel management. |
| 1992-1997 | Univ of NV, Reno, Res. Assoc. | Research on riparian area and watershed management including stream morphology, aquatic habitat, cattle grazing and low-flow and flood hydrology. |
| 1990-1992 | U of AZ, Res. and Teach. Assistant | Research on rainfall/runoff processes and climate models. Taught lab sections for sophomore level "Principles of Hydrology". Received 1992 Outstanding Graduate Teaching Assistant Award in the College of Engineering |
| 1988-1990 | U of NV, Reno Res. Asst | Research on aquatic habitat, stream morphology and livestock management. |
| 1983-1988 | US Bureau of Reclamation Hydraulic Eng. | Performed hydrology planning studies on topics including floodplains, water supply, flood control, salt balance, irrigation efficiencies, sediment transport, rainfall-runoff modeling and groundwater balances. |

## Peer-Reviewed Publications


Myers, T., 2016. A modeling approach to siting mine facilities in northern Minnesota USA. *J Hydrology* 533: 277-290. Doi: 10.1016/j.jhydrol.2015.12.020

Myers, T., 2013. Remediation scenarios for selenium contamination, Blackfoot Watershed, southeast Idaho, USA. *Hydrogeology J.* DOI 10.1007/s10040-013-0953-8

Myers, T., 2013. Reservoir loss rates from Lake Powell and their impact on management of the Colorado River. *Journal of the American Water Resources Association*. DOI: 10.1111/jawr.12081.

Myers, T., 2012. Potential contaminant pathways from hydraulically fractured shale to aquifers. *Ground Water* 50(6): 872-882. doi: 10.1111/j.1745-6584.2012.00933.x

Myers, T., 2009. Groundwater management and coal-bed methane development in the Powder River Basin of Montana. *J Hydrology* 368:178-193.

Myers, T.J. and S. Swanson, 1997. Variation of pool properties with stream type and ungulate damage in central Nevada, USA. *Journal of Hydrology* 201-62-81

Myers, T.J. and S. Swanson, 1997. Precision of channel width and pool area measurements. *Journal of the American Water Resources Association* 33:647-659.

Myers, T.J. and S. Swanson, 1997. Stochastic modeling of pool-to-pool structure in small Nevada rangeland streams. *Water Resources Research* 33(4):877-889.

Myers, T.J. and S. Swanson, 1997. Stochastic modeling of transect-to-transect properties of Great Basin rangeland streams. *Water Resources Research* 33(4):853-864.

Myers, T.J. and S. Swanson, 1996. Long-term aquatic habitat restoration: Mahogany Creek, NV as a case study. *Water Resources Bulletin* 32:241-252

Myers, T.J. and S. Swanson, 1996. Temporal and geomorphic variations of stream stability and morphology: Mahogany Creek, NV. *Water Resources Bulletin* 32:253-265.

Myers, T.J. and S. Swanson, 1996. Stream morphologic impact of and recovery from major flooding in north-central Nevada. *Physical Geography* 17:431-445.

Myers, T.J. and S. Swanson, 1995. Impact of deferred rotation grazing on stream characteristics in Central Nevada: A case study. *North American Journal of Fisheries Management* 15:428-439.

Myers, T.J. and S. Swanson, 1992. Variation of stream stability with stream type and livestock bank damage in northern Nevada. *Water Resources Bulletin* 28:743-754.

Myers, T.J. and S. Swanson, 1992. Aquatic habitat condition index, stream type, and livestock bank damage in northern Nevada. *Water Resources Bulletin* 27:667-677.

Zonge, K.L., S. Swanson, and T. Myers, 1996. Drought year changes in streambank profiles on incised streams in the Sierra Nevada Mountains. *Geomorphology* 15:47-56.

## Representative Reports and Projects

Myers, T., 2015. Conceptual Flow and Transport Model, Uranium Plume near the Homestake Millsite, Milan, NM. Prepared for Bluewater Valley Downstream Alliance. Marcy 16, 2015.

Myers, T., 2015. Hydrogeology of the Humboldt River Basin, Impacts of Open-pit Mine Dewatering and Pit Lake Formation. Prepared for the Progressive Leadership Alliance of Nevada and Great Basin Resource Watch, Revised June 2015.

Myers, T., 2015. Letter Report: Comments on the Draft Supplemental Environmental Impact Review for the Panoche Valley Solar Project. Prepared for Adams Broadwell Joseph and Cardozo, San Francisco CA

Myers, T., 2015. Technical Memorandum – Review of Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. Prepared for Delaware Riverkeeper Network. August 24, 2015.

Myers, T., 2015. Technical Memorandum – Review of Finger Lakes LPG Storage, LLC, Proposed LPG Storage Facility. Prepared for Earthjustice, New York. January 13, 2015

Myers, T., 2015. Technical Memorandum – Review of Pennsylvania Governor's Executive Order Concerning Hydraulic Fracturing in Pennsylvania State Parks and Forest. Prepared for Delaware River Keeper, January 9, 2015.

Myers, T., 2015. Technical Memorandum – Review of Water Supply Assessment, Village at Squaw Valley. Prepared for Sierra Watch, July 13, 2015.

Myers, T., 2014. Expert Report: In the Matter of California Department of Parks and Recreation v. Newmont Mining Corporation, et al. Prepared for the California Department of Justice, February 2014.

Myers, T., 2014. Groundwater Flow and Transport Modeling, NorthMet Mine and Plant Site. Prepared for the Minnesota Center for Environmental Advocacy.

Myers, T., 2014. Letter Report: Comments on the Environmental Assessment for the Proposed Photovoltaic Array Proposed for Ft Irwin CA. Prepared for Adams Broadwell Joseph and Cardozo, San Francisco CA, October 13, 2014

Myers, T., 2014. Review of the Water Quality Modeling, NorthMet Mine and Plant Site, Minnesota. Prepared for Minnesota Center for Environmental Advocacy.

Myers, T. 2014. Technical Memorandum: Review of Performance Standards, Center for Sustainable Shale Development. Prepared for Delaware River Keeper. May 8, 2014.

Myers, T. 2014. Technical Memorandum: Review of the Hydrogeologic Aspects of the Draft Environmental Impact Statement, Haile Gold Mine, Lancaster County, South Carolina. Prepared for Southern Environmental Law Center, May 8 2014.

Myers, T., 2014. Technical Memorandum: Review of the Supplemental Draft Environmental Impact Statement, NorthMet Mining Project and Land Exchange. Prepared for Minnesota Center for Environmental Advocacy. March 10, 2014

Myers, T. 2014. Technical Memorandum: Twin Metals and the Boundary Waters Canoe Area Wilderness, Risk Assessment for Underground Metals Mining. Prepared for Northeastern Minnesotans for Wilderness. August 8 2014

Myers, T. 2012-3. Participation in EPA Potential Impacts of Hydraulic Fracturing on Drinking Water Resources Study. US Environmental Protection Agency, Washington DC.

Myers, T., 2013. DRAFT: Chapter 5.1: Water Quality. Initiative for Responsible Mining.

Myers, T., 2013. DRAFT: Chapter 5.2: Water Quantity. Initiative for Responsible Mining.

Myers, T., 2013. Technical Memorandum: Comments on Encana Oil and Gas Inc.'s Application for the Madison Aquifer to be Exempt Wyoming Oil and Gas Conservation Commission Docket No. 3-2013. Prepared for Natural Resources Defense Council, Powder River Basin Council. June 12, 2013.

Myers, T. 2013. Technical Memorandum: Impact Analysis: Wishbone Hill Water Right Application. Prepared for Trustees for Alaska

Myers, T, 2013. Technical Memorandum: Review of Montanore Mine Dewatering Instream Flow Methodology. Prepared for Save our Cabinets, Earthworks. March 26, 2013

Myers, T. 2012. Technical Memorandum: Chuitna Coal Mine Project, Review of Arcadis DRAFT Hydrogeologic Conceptual Site Model Update and Associated Documents. Prepared for Cook Inletkeeper. May 11, 2012.

Myers, T., 2012. Technical Memorandum, Review of DRAFT: Investigation of Ground Water Contamination near Pavillion Wyoming Prepared by the Environmental Protection Agency, Ada OK. April 19, 2012.

Myers, T., 2012. Participation in: Keystone Center Independent Science Panel, Pebble Mine. Anchorage AK, October 1-5, 2012.

Myers, T., 2012. Technical Memorandum, Review and Analysis, Revised Draft, Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program, Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs. Prepared for Natural Resources Defense Council.

Myers, T., 2012. Technical Memorandum, Review of the Special Use Permit PP2011-035-Camilletti 21-10, Groundwater Monitoring Requirements. Prepared for Routt County Board of Commissioners and the Routt County Planning Department. June 19, 2012.

Myers, T., 2012. Testimony at Aquifer Protection Permit Appeal Hearing, Rosemont Mine. Phoenix AZ, August and September, 2012.

Myers, T., 2012. Drawdown at U.S. Forest Service Selected Monitoring Points, Myers Rosemont Groundwater Model Report. Prepared for Pima County, AZ. March 22, 2012.

Myers, T. 2011. Baseflow Conditions in the Chuitna River and Watersheds 2002, 2003, and 2004 and the Suitability of the Area for Surface Coal Mining. January 14, 2011.

Myers, T., 2011. Hydrogeology of Cave, Dry Lake and Delamar Valleys, Impacts of pumping underground water right applications #53987 through 53092. Presented to the Office of the Nevada State Engineer On behalf of Great Basin Water Network.

Myers, T., 2011. Hydrogeology of Spring Valley and Surrounding Areas, Part A: Conceptual Flow Model. Presented to the Nevada State Engineer on behalf of Great Basin Water Network and the Confederated Tribes of the Goshute Reservation.

Myers, T., 2011. Hydrogeology of Spring Valley and Surrounding Areas, Part B: Groundwater Model of Snake Valley and Surrounding Area. Presented to the Nevada State Engineer on behalf of Great Basin Water Network and the Confederated Tribes of the Goshute Reservation.

Myers, T., 2011. Hydrogeology of Spring Valley and Surrounding Areas, PART C: IMPACTS OF PUMPING UNDERGROUND WATER RIGHT APPLICATIONS #54003 THROUGH 54021. Presented to the Nevada State Engineer on behalf of Great Basin Water Network and the Confederated Tribes of the Goshute Reservation.

Myers, T., 2011. Rebuttal Report: Part 2, Review of Groundwater Model Submitted by Southern Nevada Authority and Comparison with the Myers Model. Presented to the Nevada State Engineer on behalf of Great Basin Water Network and the Confederated Tribes of the Goshute Reservation.

Myers, T. 2011. Rebuttal Report: Part 3, Prediction of Impacts Caused by Southern Nevada Water Authority Pumping Groundwater From Distributed Pumping Options for Spring Valley, Cave Valley, Dry Lake Valley, and Delamar Valley. Presented to the Nevada State Engineer on behalf of Great Basin Water Network and the Confederated Tribes of the Goshute Reservation.

Myers, T., 2011. Baseflow Selenium Transport from Phosphate Mines in the Blackfoot River Watershed Through the Wells Formation to the Blackfoot River, Prepared for the Greater Yellowstone Coalition.

Myers, T., 2011. Blackfoot River Watershed, Groundwater Selenium Loading and Remediation. Prepared for the Greater Yellowstone Coalition.

Myers, T., 2011. Technical Memorandum Review of the Proposed Montanore Mine Supplemental Draft Environmental Impact Statement and Supporting Groundwater Models

Myers, T., 2010. Planning the Colorado River in a Changing Climate, Colorado River Simulation System (CRSS) Reservoir Loss Rates in Lakes Powell and Mead and their Use in CRSS. Prepared for Glen Canyon Institute.

Myers, T., 2010. Technical Memorandum, Updated Groundwater Modeling Report, Proposed Rosemont Open Pit Mining Project. Prepared for Pima County and Pima County Regional Flood Control District

Myers, T., 2009. Monitoring Groundwater Quality Near Unconventional Methane Gas Development Projects, A Primer for Residents Concerned about Their Water. Prepared for Natural Resources Defense Council. New York, New York.

Myers, T., 2009. Technical Memorandum, Review and Analysis of the Hydrology and Groundwater and Contaminant Transport Modeling of the Draft Environmental Impact Statement Blackfoot Bridge Mine, July 2009. Prepared for Greater Yellowstone Coalition, Idaho Falls, Idaho.

Myers, T., 2008. Hydrogeology of the Carbonate Aquifer System, Nevada and Utah With Emphasize on Regional Springs and Impacts of Water Rights Development. Prepared for: Defenders of Wildlife, Washington, D.C.. June 1, 2008.

Myers, T., 2008. Hydrogeology of the Muddy River Springs Area, Impacts of Water Rights Development. Prepared for: Defenders of Wildlife, Washington, D.C. May 1, 2008

Myers, T., 2008. Hydrogeology of the Santa Rita Rosemont Project Site, Numerical Groundwater Modeling of the Conceptual Flow Model and Effects of the Construction of the Proposed Open Pit, April 2008. Prepared for: Pima County Regional Flood Control District, Tucson AZ.

Myers, T., 2008. Technical Memorandum, Review, Record of Decision, Environmental Impact Statement Smoky Canyon Mine, Panels F&G, U.S. Department of the Interior, Bureau of Land Management. Prepared for Natural Resources Defense Council, San Francisco, CA and Greater Yellowstone Coalition, Idaho Falls, ID. Reno NV.

Myers, T., 2007. Groundwater Flow and Contaminant Transport at the Smoky Canyon Mine, Proposed Panels F and G. Prepared for Natural Resources Defense Council, San Francisco, CA and Greater Yellowstone Coalition, Idaho Falls, ID. Reno NV. December 11, 2007.

Myers, T., 2007. Hydrogeology, Groundwater Flow and Contaminant Transport at the Smoky Canyon Mine, Documentation of a Groundwater Flow and Contaminant Transport Model. Prepared for Natural Resources Defense Council, San Francisco, CA and Greater Yellowstone Coalition, Idaho Falls, ID. Reno NV, December 7, 2007.

Myers, T., 2007. Review of Hydrogeology and Water Resources for the Final Environmental Impact Statement, Smoky Canyon Mine, Panels F and G and Supporting Documents. Prepared for Natural Resources Defense Council, San Francisco, CA and Greater Yellowstone Coalition, Idaho Falls, ID. Reno, NV. December 12, 2007.

Myers, T., 2007. Hydrogeology of the Powder River Basin of Southeast Montana Development of a Three-Dimensional Groundwater Flow Model. Prepared for Northern Plains Resource Council. February 12 2007.

Myers, T., 2007. Hydrogeology of the Santa Rita Rosemont Project Site, Conceptual Flow Model and Water Balance, Prepared for: Pima County Flood Control District, Tucson AZ

Myers, T., 2006. Review of Mine Dewatering on the Carlin Trend, Predictions and Reality. Prepared for Great Basin Mine Watch, Reno, NV

Myers, T., 2006. Hydrogeology of Spring Valley and Effects of Groundwater Development Proposed by the Southern Nevada Water Authority, White Pine and Lincoln County, Nevada. Prepared for Western Environmental Law Center for Water Rights Protest Hearing.

Myers, T., 2006. Potential Effects of Coal Bed Methane Development on Water Levels, Wells and Springs of the Pinnacle Gas Resource, Dietz Project In the Powder River Basin of Southeast Montana. Affidavit prepared for Northern Plains Resource Council, April 4 2006.

Myers, T., 2006. Review of Hydrogeology and Water Resources for the Draft Environmental Impact Statement, Smoky Canyon Mine, Panels F and G, Technical Report 2006-01-Smoky Canyon. Prepared for Natural Resources Defense Council.

Myers, T., 2006. Review of Nestle Waters North America Inc. Water Bottling Project Draft Environmental Impact Report / Environmental Assessment. Prepared for McCloud Watershed Council, McCloud CA.

Myers, T., 2005. Hydrology Report Regarding Potential Effects of Southern Nevada Water Authority's Proposed Change in the Point of Diversion of Water Rights from Tikapoo Valley South and Three Lakes Valley North to Three Lakes Valley South. Prepared for Western Environmental Law Center for Water Rights Protest Hearing

Myers, T., 2005. Review of Draft Supplemental Environmental Impact Statement, Ruby Hill Mine Expansion: East Archimedes Project NV063-EIS04-34, Technical Report 2005-05-GBMW. Prepared for Great Basin Mine Watch.

Myers, T., 2005. Hydrogeology of the Powder River Basin of Southeast Montana, Development of a Three-Dimensional Groundwater Flow Model. Prepared for Northern Plains Resource Council, Billings, MT in support of pending litigation.

Myers, T., 2005. Nevada State Environmental Commission Appeal Hearing, Water Pollution Control Permit Renewal NEV0087001, Big Springs Mine. Prepared for Great Basin Mine Watch, Reno NV.

Myers, T., 2005. Potential Effects of Coal Bed Methane Development on Water Levels, Wells and Springs In the Powder River Basin of Southeast Montana. Prepared for Northern Plains Resource Council, Billings, MT.

Myers, T., 2004. An Assessment of Contaminant Transport, Sunset Hills Subdivision and the Anaconda Yerington Copper Mine, Technical Report 2004-01-GBMW. Prepared for Great Basin Mine Watch.

Myers, T., 2004. Technical Memorandum: Pipeline Infiltration Project Groundwater Contamination. Prepared for Great Basin Mine Watch.

Myers, T., 2004. Technical Report Seepage From Waste Rock Dump to Surface Water The Jerritt Canyon Mine, Technical Report 2004-03-GBMW. Prepared for Great Basin Mine Watch.

Myers, T., 2001. An Assessment of Diversions and Water Rights: Smith and Mason Valleys, NV. Prepared for the Bureau of Land Management, Carson City, NV.

Myers, T., 2001. Hydrogeology of the Basin Fill Aquifer in Mason Valley, Nevada: Effects of Water Rights Transfers. Prepared for the Bureau of Land Management, Carson City, NV.

Myers, T., 2001. Hydrology and Water Balance, Smith Valley, NV: Impacts of Water Rights Transfers. Prepared for the Bureau of Land Management, Carson City, NV

Myers, T., 2000. Alternative Modeling of the Gold Quarry Mine, Documentation of the Model, Comparison of Mitigation Scenarios, and Analysis of Assumptions. Prepared for Great Basin Mine Watch. Center for Science in Public Participation, Bozeman MT.

Myers, T., 2000. Environmental and Economic Impacts of Mining in Eureka County. Prepared for the Dept. Of Applied Statistics and Economics, University of Nevada, Reno.

Myers, T., 1999. Water Balance of Lake Powell, An Assessment of Groundwater Seepage and Evaporation. Prepared for the Glen Canyon Institute, Salt Lake City, UT.

Myers, T., 1998. Hydrogeology of the Humboldt River: Impacts of Open-pit Mine Dewatering and Pit Lake Formation. Prepared for Great Basin Mine Watch, Reno, NV.

## Selected Abstracts, Magazine and Proceedings Articles

Myers, T., 2014. Reservoir Loss Rates, Lakes Mead and Powell and Fill Mead First. INVITED PRESENTATION at 2014 Future of the Colorado Plateau Forum – Drought and the Colorado River. http://musnaz.org/educational-programs/public-programs/future-of-the-colorado-plateau-forums/

Myers, T., 2013. Three-dimensional Groundwater and Contaminant Flow around Marcellus Gas Development. INVITED PRESENTATION at 2013 Associated Engineering Geologists Conference, Seattle WA.

Myers, T., 2012. Mine Dewatering: Humboldt River Update. INVITED PRESENTATION at 2012 Nevada Water Resources Association Annual Conference.

Myers, T., 2012. Reservoir loss rates from Lake Powell, and long-term management of the Colorado River system. 2012 Nevada Water Resources Association Annual Conference

Myers, T., 2011. Reservoir loss rates from Lake Powell, and long-term management of the Colorado River system. 2011 Fall Conference, American Geophysical Union.

Myers, T., 2006. Modeling Coal Bed Methane Well Pumpage with a MODFLOW DRAIN Boundary. In MODFLOW and More 2006 Managing Ground Water Systems, Proceedings. International Groundwater Modeling Center, Golden CO. May 21-24, 2006.

Myers, T., 2006. Proceed Carefully: Much Remains Unknown, *Southwest Hydrology 5(3)*, May/June 2006, pages 14-16.

Myers, T., 2004. Monitoring Well Screening and the Determination of Groundwater Degradation, Annual Meeting of the Nevada Water Resources Association, Mesquite, NV. February 27-28, 2004.

Myers, T., 2001. Impacts of the conceptual model of mine dewatering pumpage on predicted fluxes and drawdown. In MODFLOW 2001 and Other Modeling Odysseys, Proceedings, Volume 1. September 11-14, 2001. International Ground Water Modeling Center, Golden, Colorado.

Myers, T., 1997. Groundwater management implications of open-pit mine dewatering in northern Nevada. In Kendall, D.R. (ed.), Conjunctive Use of Water Resources: Aquifer Storage and Recovery. AWRA Symposium, Long Beach California. October 19-23, 1997

Myers, T., 1997. Groundwater management implications of open-pit mine dewatering in northern Nevada. In Life in a Closed Basin, Nevada Water Resources Association, October 8-10, 1997, Elko, NV.

Myers, T., 1997. Uncertainties in the hydrologic modeling of pit lake refill. American Chemical Society Annual Meeting, Las Vegas, NV, Sept. 8-12, 1997.

Myers, T., 1997. Use of groundwater modeling and geographic information systems in water marketing. In Warwick, J.J. (ed.), Water Resources Education, Training, and Practice: Opportunities for the Next Century. AWRA Symposium, Keystone, Colo. June 29-July 3, 1997.

Myers, T., 1995. Decreased surface water flows due to alluvial pumping in the Walker River valley. Annual Meeting of the Nevada Water Resources Association, Reno, NV, March 14-15, 1995.

## Special Coursework

| Years | Course | Sponsor |
|---|---|---|
| 2011 | Hydraulic Fracturing of the Marcellus Shale | National Groundwater Association |
| 2008 | Fractured Rock Analysis | MidWest Geoscience |
| 2005 | Groundwater Sampling Field Course | Nielson Environmental Field School |
| 2004 | Environmental Forensics | National Groundwater Association |
| 2004 and -5 | Groundwater and Environmental Law | National Groundwater Association |

# EARTHJUSTICE

May 27, 2016

**VIA EXPRESS MAIL**

Sheila Newman
Jason Brewer
U.S. Army Corps of Engineers, Alaska District
CEPOA–RD–Gordon
P.O. Box 6898
JBER, AK, 99506–0898
E: POA.donlingoldeis@usace.army.mil

Re: Donlin Gold Project Draft Environmental Impact Statement

Dear Ms. Newman and Mr. Brewer,

DATA 1 Enclosed is a DVD containing sources in support of the May 31, 2016, comments submitted by Earthjustice on the Donlin Gold Project Draft Environmental Impact Statement. Please include these sources in the administrative record for this project.

Thank you,

Sarah Saunders
Litigation Assistant

ALASKA 441 WEST 5TH AVENUE, SUITE 301 ANCHORAGE, AK 99501

T: 907.277.2500 F: 907.277.1390 AKOFFICE@EARTHJUSTICE.ORG WWW.EARTHJUSTICE.ORG

| | |
|---|---|
| **From:** | Craig, Bill |
| **To:** | Evans, Jessica; Bellion, Tara |
| **Subject:** | FW: [EXTERNAL] Re: Donlin Extension Request |
| **Date:** | Thursday, April 14, 2016 8:30:47 AM |
| **Attachments:** | Extension Request.pdf |

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-----Original Message-----
From: Gordon, Keith POA [mailto:Keith.Q.Gordon@usace.army.mil]
Sent: Thursday, April 14, 2016 8:04 AM
To: Craig, Bill
Subject: FW: [EXTERNAL] Re: Donlin Extension Request

-----Original Message-----
From: Bonnie Gestring [mailto:bgestring@earthworksaction.org]
Sent: Thursday, April 14, 2016 7:36 AM
To: Gordon, Keith POA <Keith.Q.Gordon@usace.army.mil>
Subject: [EXTERNAL] Re: Donlin Extension Request

Mr Gordon:

Please see the attached letter requesting an extension of the comment period for the proposed Donlin Mine.

Regards
Bonnie Gestring

Bonnie Gestring | Northwest Circuit Rider EARTHWORKS
140 South 4th Ave. West, Unit 1
Missoula, MT 59801
(406) 549-7361 | (406) 546-8386 (c)
<mailto:nmagel@earthworksaction.org> bgestring@earthworksaction.org
<mailto:nmagel@earthworksaction.org> | <http://earthworksaction.org/> earthworksaction.org
<http://earthworksaction.org/>

EARTHWORKS

April 14, 2016

Keith Gordon  Project Manager
U.S. Army Corps of Engineers,
Alaska District CEPOA-RD-Gordon,
P.O. Box 6898  JBER, AK 99506-0898
Email address: Keith.q.gordon@usace.army.mil

Dear Mr. Gordon:

I am writing on behalf of Earthworks, a national non-profit organization dedicated to protecting communities and the environment against the adverse effects of mineral development.

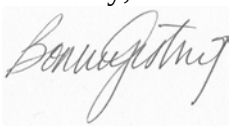
NEP 1 We request a six-month extension of the April 30, 2016 deadline to submit comments on the Draft Environmental Impact Statement (DEIS) prepared by the U.S. Army Corps of Engineers (Corps) for the Donlin Gold Project.

We fully support the requests of local communities (e.g. Native Village of Napaimute, City of Bethel) and organizations (e.g. Northern Alaska Environmental Center and Earth Justice), who have also submitted requests for a six-month extension on the public comment period for the DEIS.

NEP 1 We believe that our requests are warranted in order to ensure full and meaningful public involvement, especially in light of the magnitude of the proposed project as well as the length and complexity of the DEIS. The proposed project will have significant effects on the environment and public health. Therefore, it is crucial to provide the public sufficient time to thoroughly review and develop informed opinions concerning the project.

Thank you for your consideration of this request. Please acknowledge receipt and indicate the timing for a decision about our request for an extension.

Sincerely,



Bonnie Gestring
Earthworks
140 South 4th St. West
Missoula, MT 59801
bgestring@earthworksaction.org

| | |
|---|---|
| **From:** | Bonnie Gestring |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Friday, May 27, 2016 11:20:59 AM |
| **Attachments:** | FINAL TAILINGS DAM LETTER.pdf<br>2016 05 23 CSP2 comments, Donlin DEIS.FINAL.pdf |

US Army Corps of Engineers:

Please accept the attached comments on the Donlin Draft EIS on behalf of Earthworks, ACAT, Northern Center, The Wilderness Society, SEACC, Inside Passage Waterkeepers, Cook Inlet Waterkeepers, and Friends of Alaska National Wildlife Refuges.

I also incorporate by reference the comments submitted by the Center For Science and Public Participation (also attached).

Regards

Bonnie Gestring

Bonnie Gestring | Northwest Circuit Rider
**EARTHWORKS**
140 South 4th Ave. West, Unit 1
Missoula, MT 59801
(406) 549-7361 | (406) 546-8386 (c)
bgestring@earthworksaction.org |
earthworksaction.org

May 30, 2016

US Army Corps of Engineers
Keith Gordon, Project Manager
PO Box 6898
JBER, Alaska, 99506-0898

Dear Mr. Gordon,

Re: tailings dam design at proposed Donlin Mine

We are writing on behalf of the organizations listed below in response to the tailings dam designs outlined in the Draft Environmental Impact Statement (DEIS) for the proposed Donlin gold mine.

There have been numerous catastrophic tailings dam failures in recent years, and new research has determined that tailings dam failures globally are increasing in severity and rate, driven by the use of larger and higher tailings dams to accommodate the waste generated by mining increasingly lower grade deposits.[1] The two following examples of modern mine failures demonstrate just how severe the consequences can be to public health and safety, fish and water, and the economies that rely on these resources for their health and well-being. In addition to the acute impacts resulting from the immediate effects of a tailings dam failure, chronic long-term impacts can result from non-recoverable tailings that result in irremediable effects.

**Mount Polley, BC**

On August 4, 2014, a tailings dam failure occurred in British Columbia at the Mt. Polley Mine, where an estimated 25 million cubic meters of tailings were released into Hazeltine Creek and Quesnel Lake – salmon habitat and a tributary of the Fraser River. The spill

1 Chambers, David M., and Newland Bowker, Lindsey. "The risk, public liability and economics of tailings storage facility failures," July 21, 2015. Available at: http://csp2.org/files/reports/Bowker%20%26%20Chambers%20-%20Risk-Public%20Liability-Economics%20of%20Tailings%20Storage%20Facility%20Failures%20%E2%80%93%2023Jul15.pdf

occurred at a modern mine, built in 1997. The tailings dam, which failed during mine operations, lasted for less than 20 years. Originally designed as a centerline construction dam, it was later allowed to construct an additional raise using an entirely upstream construction.[2] Mine safety experts and media articles have called the spill one of the biggest environmental disasters in modern Canadian history.[3]

*A member of BC First Nation observes the inundation of Hazeltine Creek by mine tailings from Mount Polley mine.*

*Tailings failure at the Mount Polley Mine in B.C.*

2 Independent Expert Engineering Investigation and Review Panel: Report on Mount Polley Tailings Storage Facility Breach, January 30, 2015. Available at: https://www.mountpolleyreviewpanel.ca/sites/default/files/report/ReportonMountPolleyTailingsStorageFacilityBreach.pdf

[3] https://www.salmonbeyondborders.org/uploads/3/9/0/1/39018435/enviro_disaster_cbc.pdf

**Samarco, Brazil**

On November 5, 2015, a major tailings dam burst at the Samarco Mine in Brazil, sending 150 million tons of tailings slurry and contaminated water into the Rio Doce. The tailings buried an entire village, killing at least seventeen people.[4] The spill migrated down the Rio Doce, killing fish, destroying river banks, and eventually reaching the Atlantic Ocean over 200 miles away. Hundreds of thousands of people have been affected – their drinking water sources destroyed and their agricultural operations heavily compromised.

*Fish kill from the Sanmarco tailings dam failure.*

The mine is owned by a joint partnership between mining giants Vale and BHP Billiton, and best available data indicates the tailings dam was constructed in 2009.[5] A lawsuit between the Brazil government and the mine puts the damages related to the dam disaster at roughly $4.8 billion.[6]

[4] http://www.cnbc.com/2016/01/21/samarco-brazil-move-closer-on-48b-dam-disaster-settlement.html
[5] http://blogs.agu.org/landslideblog/2015/11/10/fundao-dam/
[6] http://www.cnbc.com/2016/01/21/samarco-brazil-move-closer-on-48b-dam-disaster-settlement.html

**Tailings Dam Expert Panel**

As a result of the Mount Polley tailings dam failure, the BC government convened a panel of independent technical experts to investigate the cause of the failure and provide recommendations for how to reduce the potential for catastrophic failures in the future.[7] The panel made a number of key recommendations, including:

- ❖ Using Best Available Technology to fundamentally shift tailings storage away from tailings ponds that store water to dry tailings, including recommendations to:

- Eliminate surface water from the impoundment,
- Promote unsaturated conditions in the tailings with drainage provisions, and
- Achieve dilatant conditions (setting to a solid) throughout the tailings deposit by compaction.

According to the Mount Polley expert panel, "Improving technology to ensure against failures requires eliminating water both on and in the tailings: water on the surface, and water contained in the interparticle voids."[8] Only this can provide the kind of redundancy that prevents catastrophic releases.

**U.S. Tailings Dam Failures**

Tailings dam failures are an issue at U.S. mines as well. A recent analysis of U.S. copper mines operating in 2010, representing 89% of U.S. copper production, found that 28% had experienced partial or full tailings dam failures.[9] Given these statistics, partial and/or total tailings dam failures should be considered a reasonably foreseeable outcome in the NEPA context, particularly since tailings dams become a permanent feature of the landscape, after mining ceases.

DAM 3

Previous research pointed out that most tailings dam failures occur at operating mines, and that 39% of the tailings dam failures worldwide occur in the United States, significantly more than in any other country (Rico, et. al., 2008a, p. 848). A recent Alaska example of a tailings release involves the overtopping of the Nixon Fork dam in 2012.[10]

**Donlin Tailings Dam Design**

The expert panel's recommendations have significant implications for the proposed Donlin tailings dam design. Donlin Gold is proposing a tailings storage facility that allows for the storage of water along with tailings, or "wet" tailings. Thus creating the potential for catastrophic conditions if a failure occurs during operations. The proposed

[7] Independent Expert Engineering Investigation and Review Panel: Report on Mount Polley Tailings Storage Facility Breach, January 30, 2015. Available at: https://www.mountpolleyreviewpanel.ca/sites/default/files/report/ReportonMountPolleyTailingsStorageFacilityBreach.pdf

[8] Id.

[9] Earthworks, U.S. Copper Porphyry Mines Report: the Track Record of Water Quality Impacts Resulting from Pipeline Spills, Tailings Failures and Water Collection and Treatment Failures. 2012. Available at: https://cfpub.epa.gov/ncea/bristolbay/recordisplay.cfm?deid=182065

[10] Alaska Department of Natural Resources, "Warning for Violation of Certificate of Approval to Operate a Dam Nixon Fork Tailings Dam," March 19, 2012.

DAM 3

tailings facility would encompass an area of 2,351 acres with a total capacity of approximately 335,000 acre-feet (413 million cubic meters) of mill tailings, decant water, and stormwater. Total tailings are estimated at 568 million tons to be placed behind a single dam, with a final height of 464 feet. A pond would develop on top of the tailings. The mine tailings would contain contaminants such as arsenic and mercury.

**Partial Tailings Dam Failure – Donlin Mine**

WAQ 27

If the tailings dam fails during mine operations, highly polluted water and/or tailings will be released. The Draft Environmental Impact Statement (DEIS) analyzed the effects of a partial tailings dam failure that releases just 0.5 percent (2.6 million cubic yards) of the tailings storage facility capacity. Under this scenario, tailings would stop at Crooked Creek but contaminated mine wastewater would continue to the Kuskokwim. The DEIS predicts that a spill in the summer would result in surface water impacts above water quality standards for arsenic and antimony extending from the Anaconda and Crooked Creek drainages to the Kuskokwim confluence.[11] Arsenic and antimony would likely persist above water quality standards in the Crooked Creek drainage after mine closure for an indefinite period of time. Drinking water in Crooked Creek and other communities closest to the mine site could be adversely impacted if a release infiltrated groundwater.[12]

The DEIS states that mitigation measures are not likely to address the complete removal of all tailings deposited in the Crooked Creek drainage. Since dissolved arsenic and antimony concentrations above standards could potentially persist on a seasonal basis after mine site closure, the intensity of impacts is considered high. A summer release could potentially result in permanent adverse impacts to surface water quality resulting from deposition of large quantities of non-recoverable tailings.

DAM 4

The DEIS also evaluated a tailings dam failure that only releases tailings water. Under this scenario, wastewater would reach the Kuskokwim and arsenic and mercury concentrations in the water would be above water quality standards all the way to the mouth of the Kuskokwim River.[13] However, the DEIS concludes that chemical impacts to surface water quality from a water only release scenario are comparatively less than those of tailings and water mixture because the water only release would have less lasting impacts as the spill becomes diluted by river water.[14]

The DEIS severely underestimates the risks of a tailings dam failure by analyzing a release of just 0.5 percent, rather than 20-40% release that is typically experienced.[15] This should be done to provide a more accurate understanding of the potential impacts of a tailings dam breach.

[11] U.S. Army Corps of Engineers, Draft Environmental Impact Statement (DEIS), Donlin, November 2015, page 3.24-91.
[12] Id., page 3.24-203.
[13] Id., page 3.24-93.
[14] Id., page 3.24-94.
[15] Klohn Crippen Berger, "Estimation of Tailings Dam Break Discharges," August 26, 2011. Available at http://www.infomine.com/publications/docs/Dalpatram2011.pdf

**Risks to the Kuskokwim**

The Kuskokwim River is especially vulnerable to the risks of a tailings dam failure at the proposed Donlin Gold mine. The proposed tailings facility is located near the top of the headwater creeks flowing in Crooked Creek, less than 15 miles from its confluence with the Kuskokwim. The Kuskokwim River serves as a migration corridor for resident and anadromous fish species and provides diverse, year-round habitat for various life stages of some of these species. Due to the diversity and seasonal abundance of these species, the river supports subsistence, commercial, and sport fisheries for the region.

FISH 10

The Kuskokwim River king salmon subsistence fishery is the largest in Alaska (Carroll and Patton 2010; Merritt 2001). In some communities, fishes of all species have contributed as much as 85 percent of the total pounds of the annual fish and wildlife harvested, with salmon comprising 53 percent (Brazil et al. 2013). As reported by ADF&G, the Kuskokwim drainage contains 38 communities and approximately 4,600 households within the river's lower, central, and upper regions. Of these, more than 1,500 households currently subsistence fish with additional households involved in fish processing.

The risks to the Kuskokwim watershed from a potential failure of the Donlin tailings dam include acute and chronic effects to fish populations from metals pollution (e.g., mercury), sediment and increased turbidity; the burial and elimination of fish habitat from tailings deposition; scouring and destruction of stream banks from the wave of tailings and water released from the dam failure; and long-term contamination of stream sediment from mercury and selenium.

**Alternatives Tailings Dam Designs:**

DAM 6

The Draft EIS includes an alternative to the company's wet tailings dam design proposal - a dry stack facility. Water would be squeezed out of the tailings and sent to an operating pond. "Dry" (19% moisture) tailings would be laid down in lifts and compacted. The operating pond would be separate from the tails by a 218-foot high dam. This alternative would prevent a catastrophic tailings spill during operations, but could still result in a spill of toxic process water from the operating pond that stores the water that is separated from the tailings. The EIS should provide a comparison of the probability of and impact of failure of the operating pond. This would provide a more thorough analysis of the two mine alternatives.

**Operator Error**

DAM 2

One of the most significant risks identified by the Mount Polley expert panel relates to the role of human error in technological failures. This has already been a substantial problem at another Alaska mine managed by Nova Gold, the company proposing the Donlin Gold Project.

At the Rock Creek gold mine near Nome, which was owned and operated by Nova Gold, problems with the design and management of the tailings impoundment are documented

in a 2012 memo by David Chambers Ph. D.[16] At this mine, tailings water almost overtopped the tailings dam, and the dam itself was not designed to impound water, only tailings solids.

A substantially higher volume of seepage than anticipated in the design of the tailings impoundment was observed after the actual operating and construction in 2007 and 2008. In order to prevent overtopping of the dam, the water balance model appeared to be dependent on the successive construction of the dam, and continuous mining and milling operations to manage the water. There was no spillway in the design configuration of the dam at any operating stage before closure. The water balance model showed that Stage II construction was required to prevent the dam from overtopping.

DAM 2

ADNR–Dam Safety said that without Stage II construction or other mitigation, the risk of exceeding the operating limitations of the Commissioning Dam was extremely high, and was influenced by the fresh groundwater component of the seepage, as well as precipitation, with either amount relatively uncertain at this point. Dam Safety issued a Notice of Violation on December12, 2008. (Notice of Violation of Certificates of Approval, Rock Creek Tailings Storage Facility Dam (AK00309), Department of Natural Resources, Division of Mining, Land and Water, Dam Safety and Construction Unit, December 12, 2008) After the second shutdown in two months, Nova Gold decided to close down the project for an indefinite period of time.[17]

**Seismic Uncertainty**

The site proposed for the Donlin Mine is an area where the risk of large earthquakes has only been minimally studied by geologists. Accurately assessing earthquake risk is difficult, and in an area where so little is known, engineering constraints should incorporate a large margin for error. The DEIS does not consider earthquakes on faults that have not been mapped, nor on blind faults that do not rupture the earth surface. For this reason, an earthquake might occur closer to the mine than assumed. Additionally, blind faulting in the area beneath the mine could cause tilting or other deformation of the earth surface that is not considered in the DEIS. Given the geologic history of the extension that led to the mineralized deposits targeted by the Donlin proposal, active tectonic deformation at the mine site should not be discounted. Uncertainty about seismic hazard compounds other uncertainties related to tailings dam failure.

**Conclusion:**

DAM 4

Given the increased rate of tailings dam failures globally, and the significance of the downstream resource, tailings dam safety is of paramount concern at the proposed Donlin gold mine. We respectfully call upon agencies and governments involved with the Donlin DEIS to:

[16] David Chambers, Ph. D., Center or Science in Public Participation, Rock Creek Mine Problems, April 2012. Available at: http://www.groundtruthtrekking.org/Documents/Rock%20Creek%20Mine%20Problems%20%20Apr12.pdfhttp://www.groundtruthtrekking.org/Documents/Rock%20Creek%20Mine%20Problems%20-%20Apr12.pdf

[17] http://www.adn.com/article/20081124/novagold-forced-suspend-operation-rock-creek-mine

DAM 4

1) Incorporate the model results of a tailings failure that involves a partial tailings spill of 20-25% of the tailings dam capacity to more accurately understand the risks, and thoroughly evaluate the long-term risks of mercury and selenium loading to fisheries from a tailings spill.

2) Include full consideration of life cycle costs including the risk costs of failure, direct and indirect, and other externalities to provide a more complete economic picture.

3) Adopt the recommendations of the Mount Polley expert panel to prioritize public health and safety over economics as the driving factor in determining the preferred alternative.

4) Incorporate a regulatory requirement for an Independent Tailings Review Board.

DAM 6

5) Provide a comparison of the probability of and impact of failure of the operating pond in the Dry Stack alternative relative to the probability and impact of failure of different-sized spills at the proposed wet slurry tailings impoundment. This would provide a more thorough analysis of the two mine alternatives.

DAM 8

6) Include analysis of blind earthquakes and earthquakes on currently unknown faults in estimates of peak ground acceleration and other seismic impacts that might be experienced by Donlin facilities.

Sincerely,


Elisabeth Dabney
Executive Director
Northern Alaska Environmental Center
830 College Road
Fairbanks, AK 99701
Dabney@northern.org

Bonnie Gestring
Northwest Circuit Rider
Earthworks
140 South 4th St. West
Missoula, MT 59801
bgestring@earthworksaction.org

Pamela Miller
Executive Director
Alaska Community Action on Toxics
505 W. Northern Lights Blvd., Ste. 205
Anchorage, Alaska 99503
pamela@akaction.org

Bretwood Higman (Hig) PhD
Ground Truth Trekking
PO Box 164
Seldovia, AK 99663
Hig314@gmail.com

Nicole Whittington-Evans
Alaska Regional Director
The Wilderness Society
705 Christensen Drive
Anchorage AK 99501
Nicole23@tws.org

Emily Ferry
Acting Director
Southeast Alaska Conservation Council
224 Gold St.
Juneau AK 99801
emily@seacc.org

Bob Shavelson
Executive Director
Cook Inletkeeper
3734 Ben Walters Ln.
Homer AK 99603
bob@inletkeeper.org

Guy Archibald
Inside Passage Waterkeepers
224 Gold St.
Juneau AK 99801
info@insidepassagewaterkeeper.org

David C. Raskin, Ph.D
President
Friends of Alaska National Wildlife Refuges
59975 Eider Ave
Homer, AK 99603
Davidc.raskin@me.com

Tom Waldo
Senior Staff Attorney
Earth Justice
325 Fourth St.
Juneau AK 99801
twaldo@ej.org

CC:

Bureau of Land Management
Alan Bittner, Field Manager, Anchorage Field Office
abittner@blm.gov

Environmental Protection Agency
Mark Jen, NEPA Project Coordinator
jen.mark@epamail.epa.gov

Pipeline and Hazardous Materials Safety Administration
Steve Nanney, Project Manager
steve.nanney@dot.gov

US Fish and Wildlife Service
Jennifer Spegon, Ecological Services
jennifer_j_spegon@fws.gov

Alaska Office of Project Management and Permitting
Jeff Bruno, OPMP Large Project Coordinator
jeff.bruno@alaska.gov

**CENTER for SCIENCE in PUBLIC PARTICIPATION**
PO Box 1250 Chickaloon, AK 99674
Phone (907) 354-3886 / web: www.csp2.org / e-mail: kzamzow@csp2.org
"Technical Support for Grassroots Public Interest Groups"

May 24, 2016

US Army Corps of Engineers
Keith Gordon, Project Manager
PO Box 6898
JBER, Alaska, 99506-0898
POA.donlingoldeis@usace.army.mil

Re: Donlin draft EIS, public comments

Dear Keith:

The Center for Science in Public Participation provides technical advice to public interest groups, nongovernmental organizations, regulatory agencies, mining companies, and indigenous communities on the environmental impacts of mining. CSP2 specializes in hard rock mining, especially with those issues related to water quality impacts and reclamation bonding. This letter represents our comments regarding the Donlin draft EIS (DEIS).

## Introduction

The Donlin mine, if approved, will be the largest mine in Alaska. Similar to other gold mines, the gold is bound with arsenic and antimony in the ore. Unique to Alaska, the gold is also bound with mercury sulfides, necessitating a process of heating ore under pressure to release the gold – and in doing so also liberate the mercury. Barrick, a 50% partner in Donlin Gold LLC, has experience in processing this type of ore and capturing mercury in Nevada – however, those mines were not adjacent to wetland habitat. Additionally, mine ownership frequently changes hands. This is important to consider in the operation of mercury-capture equipment and in maintaining a facility that will need to pump and treat water in perpetuity.

In addition to the mine footprint, risks spread across an almost unimaginable breadth of landscape – over 300 miles of pipeline corridor east-west from Cook Inlet across the Alaska Range, and 200 miles of river transport north-south through a wildlife refuge and along one of the most important subsistence rivers in Alaska.

In addition to chemical risks at the mine site, pipeline, and barge route, there are physical risks associated with the tailings dam and financial risks.

The scale of infrastructure and ore processing, and the unique character of the ore, require a thoughtful environmental analysis process. It would not be unreasonable for the process to take substantially longer than previous mine proposals in order to best analyze chemical, physical, and financial impacts and alternatives.

Key Findings

PAA 22

- There is not enough information to compare the impacts of Alternative 2 (proposed by the mine proponent) and Alternative 4 (Birch Tree Crossing – an alternative with a shorter barge transport route but longer road). In particular there is not enough information to compare the impacts on fish, wildlife, wetlands, and subsistence.

FSR 15
- The Spill section needs to be re-worked with clear quantifiable information and maps. The discussion of impacts is difficult to read as it is split between impacts to specific resources.

PAA 16
- The DEIS does not appear to compare closure of the tailings storage facilities (Alternative 2, wet slurry; Alternative 5A, dry stack) in comparable manners (covers, progressive reclamation), making it difficult to assess and adequately compare the potential long-term impacts of the alternatives.

FSR 15
- Low probability-high risk project components such as a tailings dam failure, mercury deposition, or barge spills deserve a detailed third party review.

NEP 6
- Incomplete analysis of Financial Assurance, Wetlands, and other key components of the DEIS may warrant a supplemental EIS.

BER 4
- No Reclamation and Closure Plan is included in the Appendices, making it difficult to find and digest the closure components and impacts.

## Incomplete and Inadequate Sections

Wetlands (Appendix J)

CWA 1
The 404 application is incomplete. The amount of wetlands impacted may be 7,000 acres or closer to 10,000 acres – a significant difference in acreage and potentially significant in wetland functional value. Additional field work will be needed, and it is anticipated that the final will be submitted in the fourth quarter of 2016.

CWA 1
This provides no opportunity for public review, and may make the DEIS incomplete. The DEIS would be well-served to have a complete, and substantially less confusing, section on the Rivers and Harbors Act/Clean Water Act permits than is provided in Appendix J.

A significant portion of wetlands would be beneath the TSF (over 1,700 acres) and WRF (over 1,400 acres), which are unlikely to be placed in different locations. However, five stretches of the pipeline remove over 1,100 acres – two 50 mile stretches remove over 500 acres each – and a public review could provide information relative to pipeline routing to reduce the area of impacted wetlands.

CWA 1
There are also questions regarding the value of the wetlands, which is critical to establishing mitigation, and an updated wetland Reclamation and Closure plan which would replace outdated information (Table 1 in Appendix J, p5-6, lists several outdated figures, tables, and statements).

- **Recommendation: Provide a complete and consistent 404 application, including wetland acreage, wetland value, reclamation plans, and compensatory mitigation plans. These need to be provided in a manner that allows public review and comment.**

Alternative 4 (Birch Tree Crossing)

PAA 22 There has been only a cursory analysis of potential impacts of the 76 mile road that would be required for the Birch Tree Crossing Alternative, primarily on the number of borrow sites needed. There is no description of the fish species or abundance in the 40 streams that would need to be crossed (8 large enough to require bridges), no description of the vegetative communities or wetlands that could be impacted, no discussion of wildlife movement through the area that would be crossed. Although a list of possible borrow sites is provided, there is no discussion of whether there is likely to be enough non-leaching material available to build the road (DEIS p 3.15-54).

**Impacts on fish, habitat, and wetlands**

1. Is it appropriate to have only a draft of Essential Fish Habitat (EFH) at this stage? Preparing a final *after* the draft EIS comment period allows no opportunity for the public to comment.

FISH 11 2. This statement appears to be incorrect:

> *Under Alternative 4, many of the drainages crossed by the mine access road originating from the BTC Port site are used by anadromous and resident fishes for rearing and spawning and are classified as EFH under the Magnuson-Stevens Act. Appendix Q contains the Draft Essential Fish Habitat Assessment, which includes an assessment of potential effects on these resources.* (DEIS p 3.13-66)

There is no assessment of essential fish habitat for Alternative 4 in Appendix Q.

3. There does not appear to be any assessment of fish along the Alternative 4 BTC road (DEIS 3.13.2.2.2), although it will cross 40 streams, with 8 large enough to require bridges. Without an assessment, it is difficult to see how the following statement in the DEIS can be substantiated, particularly given that some areas are, apparently, Essential Fish Habitat:

FISH 11

> *Similar to Alternative 2, potential impacts to anadromous and resident fish populations and EFH would be of a medium intensity and noticeable at certain times and locations, affecting localized sections of drainages downgradient of stream crossings on a long-term basis.* (DEIS p3.13-174)

4. Similarly there did not appear to be a comparison of riparian areas or wetlands. It is also difficult to understand how the Comparison of Impacts table (Table 3.13-31, p3.13-181) is able to state that the impacts on the roads for Alternatives 2 and 4 are identical ("minor") for aquatic resources, with only a higher probability due to higher road length without some of this basic information.

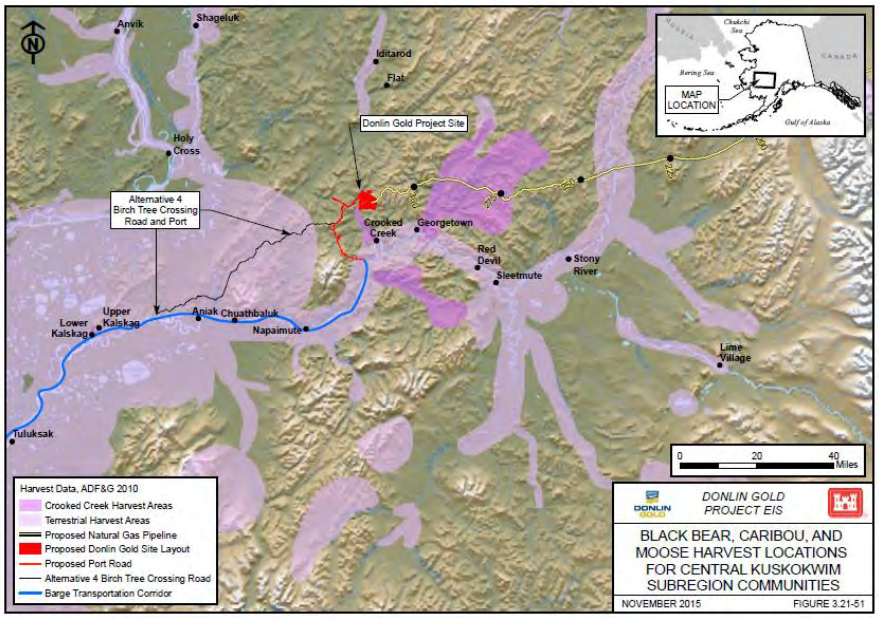
With no assessment of fish resources or EFH for Alternative 4, there is no way to compare the potential impacts of Alternatives 2 and 4.

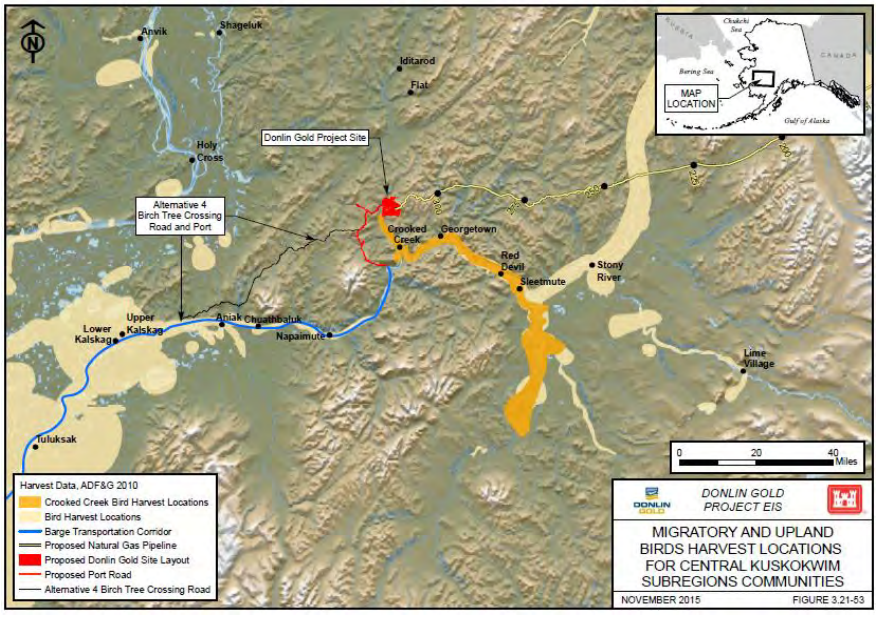
**Impact on subsistence use**

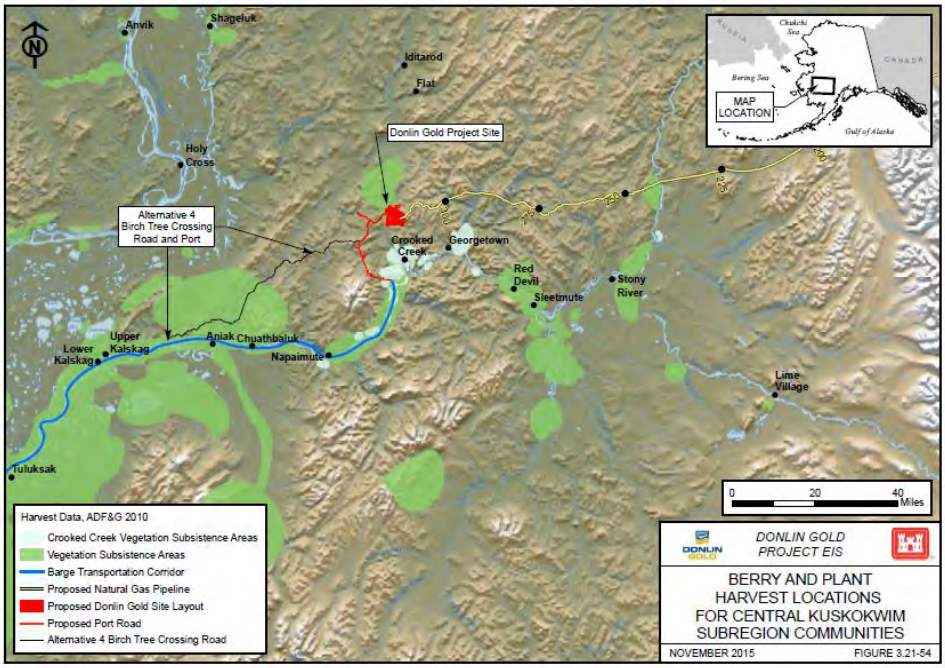
SUB 10

The statement "the summary impact of Alternative 4 on subsistence would be minor" and that the area is only for "casual summer subsistence use" (p 3.21-190, 3.21-194) belittles the importance of the area to the Native Village of Chuathbaluk and Aniak. There will be permanent impacts that will restrict subsistence use first by prohibiting hunting and trapping in the road area and then by increasing competition by opening up access to other users through the permanent maintenance of the BTC port and road. Rather, what the BTC port/road option does is trade temporary impacts to fish (in the Kuskokwim River, reduced in Alternative 4) for permanent impacts on hunting, trapping, and gathering at a very large subsistence use area.

It is important to note the extensive use of the BTC road area for subsistence relative to the very minor subsistence use along the proposed road from the Jungjuk port (Figures 3.21-51, 3.2.1-53, and 3.21-54, shown below).






**Land ownership and management**

*Land ownership*

A series of maps in Chapter 3.15 (Figures 3.15-1A to 1E) show general land ownership, but there is no map that adequately shows the ownership along the BTC road. A detailed ownership map, such as is provided for the proposed Crooked Creek Road in Alternative 2 (Figure 3.15-3) should be provided for the BTC road.

LAND 2 This is particularly important given that much of the area is heavily used for subsistence, and the road will become a permanent feature providing access for hunting, fishing, recreation, and mineral development that could impact current users, particularly the Native Village of Chuathbaluk and Aniak. Table 3.15-4 shows that under Alternative 2 ownership along the Crooked Creek road is 277 acres under Kuskokwim Corporation and/or Calista Corporation ownership; under Alternative 4, the Birch Tree road, there are 490 acres owned by these corporations. Calista corporation ownership includes the subsurface. Depending on the geologic resources, there could be greater potential for mineral development if the BTC road is built.

Because there will be people that may benefit and people that may be negatively impacted by increased access and/or mineral development along a proposed BTC road, a clear map of ownership should be provided.

*BLM management*

LAND 10 There is no discussion of how BLM management plans could impact the road; BLM owns 914 acres of land that the road would cross in Alternative 4 while it owns no land in the road used in Alternative 2. The DEIS states:

*BLM lands in this area are managed by the Southwest MFP which acknowledges that the development of renewable and non-renewable resources within the planning area would require the development of a surface transportation network, and makes public lands available for such purposes (BLM 1981).* (DEIS p 3.15-53)

However, this is inaccurate. The 1981 Southwest MFP is outdated and undergoing revision:

*The new Bering Sea-Western Interior (BSWI) Resource Management Plan (RMP) and associated Environmental Impact Statement (EIS) will replace portions of the existing Southwest Management Framework Plan (MFP), approved in 1981 and portions of the Central Yukon RMP Record of Decision (ROD), approved in 1986.*

LAND 10

*Although the 1981 Southwest MFP provides land and resource use and development recommendations, it fails to establish the conditions under which land and resource use and development may occur throughout the entire Planning Area. The MFP is considerably outdated, is not in compliance with current planning regulations and policies, and was never analyzed under the National Environmental Policy Act (NEPA). Consequently,* ***some of the decisions in the MFP are no longer valid*** *or have been superseded by requirements that did not exist when the MFP was prepared.* *https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=36665&dctmId=0b0003e8804de363*

The BSWI is mentioned in DEIS Cumulative Impacts, Table 4.2-1.

- **Recommendation: Provide adequate information for comparison of Alternatives 2 and 4.** There will be permanent and potentially substantial impacts to subsistence users who hunt, fish, and gather in the BTC road area (Chapter 21 p 3.21-189-190); this may provide BLM with a reason to revise land management in the area. Without an assessment of fish, fish habitat, wildlife and wetlands, and with the potential for land management decisions to change, it is not possible to compare potential impacts of Alternative 4 with Alternative 2, particularly regarding impacts to subsistence.

Financial Assurance (Appendix A)

**Coordinated State Process**

BER 2

Establishing the value of the financial assurance for the project is very important for several reasons. First, just the magnitude of the financial assurance is so large that it needs to disclosed and analyzed as a part of the EIS. There is no valid reason for segmenting this analysis, other than to make the work of the regulatory agencies easier. This should not be adequate reason for delaying this important analysis, which could easily be presented for the EIS, then amended when the final permits are issued. The Alaska Department of Natural Resources has established a separate arm for the purpose of coordinating large

mine projects to facilitate permit review and issuance, yet this significant element, for which multiple agencies are required to issue permits, is not included in the EIS process.

A detailed analysis of the financial assurance that would be required for the project is NOT presented in the DEIS. The rationale for not including this analysis is:

> *ADNR (Alaska Department of Natural Resources) and ADEC (Alaska Department of Environmental Conservation) generally wait to issue the final authorizations and permits until after the final EIS is issued since this provides clarity in the selected alternative and allows the State to incorporate applicable mitigation measures into its authorizations and approvals. At this point (after the Final EIS is issued), more accurate and complete reclamation and closure costs can be developed.*

However, it is also noted:

BER 2

> *Financial assurance must be established to cover the cost of implementing the Reclamation Plan. A mining operation cannot commence until the Reclamation Plan and financial assurance are approved by ADNR.*

and;

> *The waste management regulations require that proof of financial responsibly be established to cover the costs of closure and monitoring (18 AAC 60.265). A mining operation cannot begin until the IWMP (Integrated Waste Management Permit – ADEC) is issued and financial assurance is established.*

and;

> *The Dam Safety regulations require that applicants obtain approval of the method of demonstrating or providing financial assurance after submitting the preliminary design package and before submitting the final construction package (11 AAC 93.171(d)). After ADNR reviews and approves the type of financial assurance, then the final construction package must include a certified cost estimate and posting of approved financial assurance (11 AAC 93.171(f)(4)(F)).*

Three major permits depend on the analysis of the financial assurance, but this analysis is not included in the EIS process.

**Long-Term Post-Closure Cost Estimate**

To illustrate two of the issues that need to be discussed before the permits are issued, consider:

BER 7

> *Costs for long-term post closure activities were estimated out to 200 years after closure of the operation. The 200-year time period is sufficient to demonstrate that the post-closure trust fund can be self-sustaining in perpetuity, should long term water management be required post closure. To make the trust fund self-sustaining and able to cover annual post-closure costs, a total of approximately $73 million dollars is required to be in place at the time of mine closure. ...*

*In order to build the trust fund to $73 million dollars at closure, Donlin would make annual contributions of approximately $2.3 million per year into the trust fund during Project construction and operations.*

First, a 200-year time period for analysis of the net present value calculation is adequate only if the net interest rate on the money in the long-term trust fund is typically higher than most public institutions can earn because of risk-avoidance requirements. The interest rate assumed is not disclosed in Appendix A.

BER 7 Second, to underwrite the trust fund, an annual $2.3 million contribution is proposed. However, if the mine were to go into bankruptcy after several years of operation, the trust fund would likely not be large enough to cover the now-perpetual costs of treating water that have been incurred by early mine operation. How large is this amount and is the public now liable for this difference? Why wasn't a financial assurance required to cover the difference until the mine contributions to the post-closure trust fund are large enough to cover the financial obligation?

These are several, but not nearly all, of the issues that can be easily discussed at this stage of the mine analysis, and there is no practical reason why they shouldn't be open to public discussion now.

- **Recommendation: Provide a detailed analysis of the financial assurance, including estimated operational costs, estimated closure and long-term costs, and interest rates.**

Spill Scenarios

**Partial Tailings Dam Failure**

The tailings dam failure modeling scenario chosen for the DEIS only assumes a spill of 2.6 million cubic yards of tailings (2 million $m^3$) (DEIS 3.24.2.5.9). The capacity of the tailings storage facility is 568 million metric tonnes, which translates into approximately 355 million cubic yards.[1] Using this conversion factor, the 2.6 million cubic yards represents 0.73% release of tailings.

DAM 4 In a typical catastrophic rupture of a tailings impoundment, approximately 20% of the tailings are released from the impoundment.[2] The mitigation of dam design does not remove from the proponent the need to analyze the environmental impacts should there be a tailings facility accident. First the impact needs to be assessed, then the mitigation needs to be proposed. There can be no assurance that the original dam design will be followed as new lifts are added over the years, nor that the current water management plans to reduce water volume in the TSF will be followed throughout mine life and throughout any potential mine expansion. For example, plans currently call for the area under the dam foundation to be excavated to bedrock – but there can be no guarantee that this will be followed through when lifts are added. Therefore, for EIS analyses, a failure of the impoundment at maximum capacity should be assumed. There is no justification given for the assumption of a partial tailings dam failure.

[1] Assume 1.6 metric tonnes per cubic meter (~100 pounds per cubic foot) for tailings at closure.

[2] Floods from tailings dam failures, M. Rico, G. Benito, A. D´ıez-Herrero, Journal of Hazardous Materials, 2008, Figure 4, p. 83.

A more substantial failure than the modeled 2.6 million cubic yards has implications for exceptionally high environmental damage: scour, erosion, deposition of tailings along a long stretch of Crooked Creek with resulting long term water quality degradation and habitat loss, potential blockage to tributaries to Crooked Creek (Getmuna, Bell, etc.) that have high fish populations, etc. Such an event would cause much greater impact to fish and aquatic resources than the current assessment of loss to "relatively few spawning redds" (DEIS p 3.24-156).

A larger spill also has implications for human risk. The Emergency Response section for a tailings dam failure focuses entirely on earthmoving equipment (e.g.):

> *This area is not currently being mined; therefore, no plan or capacity for response is presently available for this area. New plans and response capacities would be required for the proposed project, which would be detailed in the EAP required under ADNR dam safety permitting (Section 3.24.1.5). These would involve the extensive use of excavation and earthmoving equipment from the mine itself.* (DEIS p 3.24-11)

DAM 4

Modeling a 0.73% release estimates that released water would reach Crooked Creek within a day, and raise the creek by one foot (Table 3.24-10); a greater release could reach the village much sooner and raise the creek much higher. To understand the times and depths, and therefore appropriate emergency actions for human health and safety, would require modeling. Should there be greater risk than is currently estimated, the Emergency Action Plan (EAP), which is not available for review, should require a communication and alert system to be in place that is sufficient to warn people in Crooked Creek and boaters on the Kuskokwim near Crooked Creek of the potential need to move out of the area.

**DSTF Operating Pond Spill**

Although a Dry Stack Tailings Facility (DSTF) is provided as an alternative to the proposed mine plan (indeed, it is the ONLY mine plan alternative), there is no assessment of the potential impact of a failure of the DSTF operating pond. Although one section of the DEIS says

> "*Under Alternative 5A, the volumes of water and slurry stored behind the tailings main dam during the operational period would be lower relative to Alternative 2 (DEIS p 3.7-194)",*

another section says the DSTF operating pond would be approximately 131,500 acre-feet (42.8 billion gallons) (DEIS Figure 2.3-43), significantly **larger** than the TSF pond of 24,000 acre-feet (7.8 billion gallons) (Table 3.7-37 footnotes 5 and 6). If the sentence in italics above refers to water entrained in the tailings, not water in the operating pond, which would be behind a dam, this should be clarified.

DAM 6

Presumably the water quality would be similar to the TSF pond, although that has not been modeled (DEIS p 3.7-192).

A discussion of the relative risks of a potential failure of the TSF dam "water only release" to the DSTF pond would better allow reviewers to assess the potential risks. Is the DSTF dam built all at once, or in stages like the TSF dam? What are the potential failure modes for the DSTF operating pond? Just as the TSF spill scenario needs to be redone with a realistic volume failure, certainly something much higher

than the 0.73% modeled, a DSTF pond failure should also be modeled with a realistic figure – a 2 million $m^3$ water release would represent only 0.0012% of the volume the pond is anticipated to need to hold.

DAM 6

- **Recommendation: Provide a scenario of dam failures at both the TSF and DSTF, with at least a 20% release of material from the storage facility.**

**Fuel spill (3.24.3.1)**

The section on fuel spill scenarios is entirely lacking in quantification of spill frequency and in detail on fate and transport of the spilled material, which would be needed to determine potential impacts and mitigation.

*Spill frequency*

There is no quantification of expected "rates of occurrence" of different sized spills (Table 3.24-1). Footnotes say "very high relative rate of occurrence has a probability approaching one….very low has a probability approaching zero."

First, what is a "*relative* rate"? Relative to what? Why is it not simply a rate based on miles traveled or per-ton mile. The reference for this section is ERM 2014, which notes that the rate of petroleum product spills averages 4.78 x $10^{-7}$ spills per ton-mile in the State of Alaska, and that 90% of these were less than 50 gallons of product (ERM 2014, Executive Summary). This is quantitative. This is a rate (not a "relative rate"). It would be helpful to know the range of rates as well as the average, to be able to bound a worst and best case scenario, but at least we have a figure we can work with.

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The table below shows what is in the DEIS (Table 3.24-1) and what ERM actually said in their report:

| Relative rate of occurrence (DEIS) | Spill size < 10 gal | Spill size 10-99.9 gal | Spill size 100-1,000 gal | Spill size 1,000 – 10,000 gal | Spill size >10,000 gal |
|---|---|---|---|---|---|
| Vessels (Barges) | High | Medium | Low | Very Low | Very Low |

| Spill record (ERM 2014) | Spill size < 5 gal | Spill size 5-50 gal | Spill size 50-1,000 gal | Spill size 1,000 – 10,000 gal | Spill size >10,000 gal |
|---|---|---|---|---|---|
| # of spills per year, historical | 1-9 per year | 0.01-2.5 per year | (not found in ERM) | 1 in 33 years to 1 in 1,000 years | Has not occurred |
| % from a total of 1,705 spills, 1995-2013 | 74% | 20% | 5.7% | 0.2% | na |

*Table 4-2 in ERM 2014 on ADEC historical records of fuel spills from barges in Alaska

Notice the difference? The upper table tells us nothing. In fact, when ERM developed a similar table (Table 5-1, ERM 2014), it was done to determine if there was a spill size that was "Not Reasonably Foreseeable" – not to categorize the sizes in qualitative terms.

The lower table is something we can use. For example, we could calculate that if 5.7% of 1,705 spills of size 50 gallon to 1,000 gallon spill occurred over 18 years (1995-2013), this is 97 spills that occurred. We could estimate based on this that – without additional mitigation – 146 spills between 50 and 1,000 gallons would occur during the 27 year life of mine. The estimate would actually be higher, as construction time pre-mine and construction barges (running on diesel) for the entire mine life should be included.

However, there is critical information missing – of the historic number of spills per year, what percent of vessel trips (or ton-miles) does this represent? That is, of the vessels carrying fuel, how many had spills?

Also, the range stated of "1 in 33 years to 1 in 1,000 years" is an extraordinary range of variability. The spill size should be narrowed to smaller ranges to provide something more useful. One can imagine a mine life extending to 33 years (indeed, in reality with construction and reclamation, it will reach that), and possibly to 50-70 years if more of the deposit is developed, but not 200, 500, or 1,000 years.

While the DEIS is quick to point out that a 1,000 – 10,000 gallon spill would not be expected to occur during the 27 year mine life, they do *not* note the potential for 146 spills between 50-1,000 gallons.[3] The difference between cleaning up a 50 gallon spill and a 1,000 gallon spill is significant. Would ocean barges delivering to Bethel or river barges delivering to an upriver port carry and maintain equipment to clean up a 1,000 gallon spill?

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Presumably with mitigation (double hulls, pilots on ocean barges, channel markers in the river, etc.) the risk would be reduced, but since we do not know how many of the historical spills used to come up with the probabilities had these mitigations in place, we do not know the extent to which the risk will be reduced.

Despite caveats, the ERM method is useful. It uses a defensible factor, spills per ton-mile. The rate of spills appears to be reasonably calculated as $4.78 \times 10^{-7}$ spills per ton-mile for petroleum barges and $3.37 * 10^{-8}$ spills per ton-mile for all cargo (ERM 2014 Table 4-4). They estimated 144,281 tons of petroleum will be transported annually at Donlin (based on 40 million gallons of petroleum), and the number of river miles can be estimated base on the distance from the mouth to Bethel added to the distance from Bethel to Jungjuk or Birch Tree port. This is a method that allows us to also see how changing the location of the upstream port could change the potential number of spills on the river. ERM states that without Donlin, about 5 spills could be expected on the river annually; with Donlin, there could be about 18 spills annually. Of the additional potential spills related to Donlin, nine would be less than 5 gallons, three would be 5-50 gallons, and one would be 50 gallons-1,000 gallons (ERM 2014 p57-58). Spills of less than 50 gallons should not be difficult to clean up or pose a large environmental hazard, although multiple annual spills could potentially cause cumulative damage if they occur in the same location. It would be useful to know what the risk of a 500-1,000 gallon spill would be, as that is likely to be more difficult to contain.

[3] 5.7% of 1,705 spills = 97 spills in 18 years. ((97 spills/18 years) * 27 year mine life) = 146 spills over mine life

Lastly, ERM found that most spills were caused by human error (overfilling, poorly secured loads, etc.) or equipment malfunction (corrosion, valve failures, hull failures, etc.), particularly overfilling; the largest human-error spill in the 1995-2013 Alaska data set was 500 gallons and the largest due to equipment failure was 2,604 gallons (ERM 2014 p39-40). Nationwide for 2002-2013 the largest human-error spill was 1,690 gallons and the largest equipment malfunction spill was 2 million gallons (ERM 2014 p47).

It will never be possible to eliminate risks from these causes. It is helpful that the steps to be taken if a barge grounds are provided in the DEIS (DEIS p2-46); this page should be referenced in the Spills chapter. As just one example of human error, there was a recent spill of 6,000 – 7,500 gallons (20,000 – 30,000 liters) at the Victoria (BC) port. Of interest in the article are these points (http://www.timescolonist.com/news/local/cleanup-underway-after-barge-runs-aground-in-esquimalt-harbour-1.2249845):

FSR 17

- the spill occurred even though the barge company had a 100 year history of no spills,
- construction barges can spill diesel (and should be included in a ton-mile spill frequency risk analysis),
- it took two hours to lay out boom even though the spill occurred IN a major harbor,
- shoreline assessment team was deployed after the spill,
- and no statement that the area was "clean" would be made until all stakeholders, including First Nations, agreed

➢ **Recommendation: State the probability for spills greater than 50 gallons in a meaningful way, include construction barges in the ton-mile spill frequency calculations, and clearly state how the probabilities were determined. Note whether construction barges will be double-hulled.**

*Spill distribution*

The 109 page ERM 2014 "Oil Spill Risk Assessment" report devotes about 1.5 pages of text to the fate and transport of spilled fuel at Jungjuk or Birch Tree Crossing ports. Although the method appears to be adequate, there is only a table to indicate how quickly a spill could move downstream (no map or text) and even this information does not seem to be in the DEIS. Depending on flow, a spill could travel 62 miles in 10-20 hours. A map and description of the distance the spill could travel should be provided in the DEIS.

FSR 13

Additionally, there was no analysis of an ocean barge spill below Bethel in the ERM report. There are no references for the Ocean Barge scenario (DEIS 3.24.5.1) so we have no idea where the material for this section came from.

NOAA has a method for determining the fate of spilled fuel (http://response.restoration.noaa.gov/about/media/how-does-noaa-model-oil-spills.html?utm_source=OR%26R+Update%3A+May+2016&utm_campaign=OR%26R+Update+May+2016&utm_medium=email).

> *To better prepare response communities for oil spills, OR&R develops several software and map tools for spill response and planning. These include **GNOME**, a trajectory forecasting tool; **ADIOS**, an oil weathering model; **Environmental Sensitivity Index (ESI) maps**, that identify vulnerable resources and habitats; and **ERMA®**, a GIS-based tool that consolidates key response data.* (http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills)

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These methods should be applied to analyze a lower Kuskokwim spill to determine where a spill could travel under different weather conditions, the fate of the oil, and vulnerable habitats in the lower and middle Kuskokwim and at Dutch Harbor. It should also be applied to middle Kuskokwim locations – at Jungjuk or Birch Tree to see how similar the results are to the ERM analysis, and at a narrow reach, which could be a location more at risk for groundings.

- **Recommendation: Apply NOAA software and map tools for a spill scenario in the lower and middle Kuskokwim, including in a narrow reach.**

*Impact versus mitigation*

The spill scenarios (3.24.5.1 and 3.24.5.2) do not describe how far a spill could travel (and what influences that distance) or what resources would be put at risk. Instead, they describe how a spill would be responded to. While this is useful, it confuses *assessment of impact* with mitigation. First the impact must be described (spill frequency, size, fate of material, resources impacted), *then* mitigation proposed and evidence that mitigation will reduce the impact.

FSR 15

The impacts of a fuel spill are scattered throughout section 3.26 (which makes it very difficult to get a good sense of the impact) and summarized in the DEIS 3.24.7 table. In the table it is stated that the seafloor could be contaminated with diesel, but there is no mention of that for the river. Why would the river bottom not be contaminated with diesel? This is important, as diesel contamination could impact fish eggs. Under impacts to sediment, this statement is confusing: "*Impacts could result from adsorption of diesel in the water column, and could exceed sediment quality guidelines.*"

Possible mitigations to prevent fuel spills include double hulled barges, placing pilots on barges traversing the lower Kuskokwim River up to Bethel, marking river channels, keeping spill response equipment on board, and having capacity with each 4-barge tow to transfer fuel from one leaking barge to an intact barge (ERM 2014 p75). Is there specific information on how double hulled barges and/or adding pilots prevent or reduce spills? If these change the rate of spills, we should see the rate before and after double hulled barges are placed in service.

FSR 11

There are other statements that need supporting material.

FSR 15

*The likelihood of a large spill from a barge going to Donlin is very low for several reasons. The potential effects of severe weather will be minimized because the season for shipping is limited to the ice-free period on the Kuskokwim River.* (DEIS p3.24-13)

FSR 15

- **Recommendation. Provide information on what defines "severe weather" and the difference in the number of severe weather days between June 1 – October 1.** Given that break up is likely going to be earlier than June 1 on most years with the impact of climate change (note, for example, the very early breakup this year in April), **also provide the number of severe weather days historically from May 1 – June 1.** Again, this will help provide a more quantitative picture of the difference in risk.

*From 1990 to 2011, only 10 instances of a vessel suffering hull failure, grounding, or sinking were recorded on or in the vicinity of the Kuskokwim River. Eight of the 10 incidences resulted in the release of 20 gallons or less of petroleum products (ARCADIS 2013a).* (DEIS p3.24-13)

What were the sizes of the other two spills? What were the impacts – at a minimum anecdotal information must be available. Also, a vessel that sunk near Bethel continues to remain a shipping hazard – how many other shipping hazards are there now along the route? When (when may be more likely than "if") vessels unrelated to the mine project sink along the barge route, how will that be addressed? There does not appear to be a state mechanism to pay for removal of derelict vessels (APRN May 13, 2016 http://www.alaskapublic.org/2016/05/13/what-can-be-done-about-alaskas-derelict-vessels).

*Double hulled tank vessels provide an additional layer of spill prevention—in the case of hull rupture caused by a grounding or collision, usually the outer hull absorbs the damage and the inner hull remains unharmed with contents intact (NOAA 2014c).*

FSR 11

The reference is a news article (NOAA. 2014c. A Final Farewell to Oil Tankers with Single Hulls. Accessed August 13, 2015. http://response.restoration.noaa.gov/about/media/final-farewell-oil-tankers-singlehulls.html) which does not appear to be on the main page any longer. Something more in the way of a report would be more re-assuring. There is a reference that is relevant to loads less than 5,000 gallons (NOAA. 2014a. Small Diesel Spills (500 – 5,000 gallons). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service. Office of Response and Restoration. http://response.restoration.noaa.gov/oil-and-chemical-spills/oilspills/resources/small-diesel-spills.html -- link is broken). Barges will be carrying 300,000 – 2.94 million gallons each (ERM 2014 p4-5). Are there references on the effectiveness of double hulls when these larger volumes are carried? Possibly there may be references along for transport along the Mississippi or Ohio rivers for river barges, or in the Galveston/Gulf Coast area for ocean barges carrying refined fuel or crude oil (although the impact of a spill of crude is different than one of diesel, the rate of failures of vessels carrying the oil should not be different).

- **Recommendation: Provide clear information on the effectiveness of double hulls in reducing oil spills.**

*In general, small and medium-sized spills evaporate and disperse naturally within a day or less, even in cold water (NOAA 2006)* (DEIS p3.24-32)…… *For example, almost all (more than 90 percent) of the diesel in a small spill incident from a barge in marine waters would evaporate or naturally disperse into the water column in a matter of hours or days*. (DEIS p3.24-33)

FSR 15 This mis-represents what was stated in the ERM 2014 report and in the DEIS impacts section (DEIS p 3.24-65), which was: *"After 4 days, approximately 39% and 59% of the diesel has been evaporated for 0 °C and 13°C, respectively. The rate of evaporation may increase depending on wind speed*." (ERM 2014 p70). The two sections of the DEIS should be reconciled, and maps of where a spill could travel over 6, 12, 24 hours should be provided if a spill occurred at Bethel, Jungjuk, Birch Tree, or a narrow reach.

- **Recommendation: Provide supporting material, clarify, reconcile, or change the sections noted above.**

**Transportation route**

PAA 22 Alternatives

The description of Alternative 4 does not mention how many river miles are traversed on the route from Bethel to Birch Tree Crossing (DEIS Section 2.3.5.2).

Impacts to Wildlife

BIRD 4 Bank erosion may be accelerated due to barges (DEIS p 3.12-149). Bank swallows, a species protected under the Migratory Bird Treaty Act, are one of the birds found in the study area (DEIS p 3.12-147, Table 3.12-15). Why are they not listed in Table 3.12-33 as "Species …known to nest along shorelines", and therefore potentially impacted by the increase in barge traffic?

According to the University of Alaska, in the Wood-Tikchik State Park, they nest along river-cut banks, and bank collapse – potentially made worse by additional barge traffic – is a common source of nest failure (http://aknhp.uaa.alaska.edu/wp-content/uploads/2013/05/Riparia_riparia_report.pdf).

PAA 22
- **Recommendation: Provide road and river mile lengths and descriptions of pertinent sections (stream crossings, narrow river reaches, essential fish habitat, etc.) in the descriptions of each Alternative.**

BIRD 4
- **Recommendation: Ensure adequate impact analysis for birds that utilize river banks.**

**Mine Design**

Earthquakes (3.3.3.2.1)

**Seismic Hazard Analyses and Selection of MCE/MDE**

The proponent has conducted both a deterministic and probabilistic study to determine the Maximum Credible Earthquake (MCE) for seismic analysis for the Tailings Storage Facility dam. Use of the MCE is appropriate for seismic analysis for the dam. However, it is noted in the DEIS:

> *The probabilistic analysis simply says there is a 1 in 10,000 chance that the pga will be 0.44g.*
>
> *Donlin Gold has elected to rely on the deterministic model, using the MCE of 0.36g (5,000-year event) to generate the MDE for the purposes of numerical seismic deformation analyses. This decision is consistent with the relevant guidance and regulations; however, final acceptance of the MDE decision would be made by ADNR as part of dam safety permitting.*

GEO 3 Seismologists know that there are many active faults that have not been mapped or have been mapped inaccurately, that some faults believed to be inactive may actually be active, and that there are many inactive faults that may become active again. Because of these considerations, probabilistic methods are the more conservative way to determine the magnitude of a Maximum Credible Earthquake for dam analysis.

For tailings dams the most conservative choice for the location of the Maximum Design Earthquake would be what is sometimes referred to as a 'floating earthquake' on an undiscovered fault that passes very near the site of the dam. This is a way of recognizing that we do not know the present, future, and even the past locations of significant faulting, and associated earthquakes.[4]

There is a significant difference in the magnitude of the 0.44g established from the probabilistic analysis, than the "0.36g (5,000-year event)" established from the deterministic analysis, and chosen by the proponent as the Maximum Design Event (MDE). In addition to the inappropriate choice of the deterministic 0.36g for the MDE, a "5,000-year event" is not a Maximum Credible Earthquake, which is considered a 10,000-year event.[5]

- **Recommendation: The probabilistic method-determined 10,000-year MCE of 0.44g should be used as the Maximum Design Event for the Donlin dam.**

Climate (3.26.3.2.1)

CLIM 4 Hydrology and permafrost melt will be impacted by climate change. The DEIS uses University of Alaska SNAP data to look at precipitation through 2099, which indicates a 17-25% increase in precipitation in the latter part of that time frame, which would be during post-closure.

[4] Safety of Dams, Flood and Earthquake Criteria, Committee on Safety Criteria for Dams, Water Science and Technology Board, Commission on Engineering and Technical Systems, National Research Council, National Academy Press, Washington, D. C., 1985, pp. 67-68

[5] Earthquake Safety of Existing Dams for Irrigation and Water Supply in Rural Areas, Dr. Martin Wieland, Chairman, Committee on Seismic Aspects of Dam Design; International Commission on Large Dams (ICOLD), December 2001

This winter and spring we are experiencing temperatures greater than those predicted by SNAP for the 2090-2099 period. Models should assume that, at a minimum, the 2090-2099 predictions will be in effect in the early years of the mine, affecting hydrology and potentially permafrost melt.

CLIM 4 In addition to applying the 2090-2099 expectations to streamflow (and resulting temperature in summer, freezing reaches in winter), they should be applied to determine the risk for waste rock slumping due to permafrost melt. Although waste rock itself may insulate the ground, seepage from waste rock could accelerate any thawing initiated by temperature increases due to climate change and weather patterns.

- **Recommendation: Assume SNAP 2090-2099 precipitation and temperatures as a base case for mine design.**

**Mine Site – Operations**

Impacts to Wildlife

Hair (moose, vole), feathers, fish tissue, and sculpin whole body grind should be required as part of the monitoring system. Analysis should be conducted for arsenic, antimony, selenium. If uranium is present
WILD 3 in dust, surface water, or groundwater, then the suite of analytes should also include uranium.

- **Recommendation: An adequate selection of species should be monitored for key contaminants throughout mine life. Non-invasive sample collection should be used whenever possible (hair, feathers, carcasses).**

Water Quality

**Baseline water quality**

The DEIS notes that surface water quality data has been collected through 2015 (DEIS p 3.7-9); however, the reference they cite throughout the section is Arcadis 2012b, which only contains data from 2005-2010. Summary water quality tables have no citation at all. The dates are relevant in that additional sites (CCBB, BELL, GETM2) were added in 2013 (DEIS p 3.7-9) and additional analytes (dissolved mercury,
WAQ 29 methyl mercury) were added in 2013 and 2014 (DEIS p 3.7-32).

Additionally, there appears to be no documents that have the actual water quality results. Arcadis 2012b provides only a summary, not tables of data, and there is no section in the DEIS or DEIS appendices that has the data.

- **Recommendation: Provide up-to-date water quality data in both a summary form and in tables that show actual location/date/analyte results. Tables should preferably be provided in an Excel or Access format that can be manipulated.**

**AWT operation**

This sentence is misleading:

> *The effluent water from the previous step may have TDS and some other constituents at concentrations above AWQC. In that case, RO will be used as the final polishing step.* (DEIS p 3.7-140)

WAQ 25 The Reverse Osmosis (RO) system will be required to remove virtually all trace elements. The first step (high rate clarifier, HRC) removes iron, most of the aluminum and arsenic, and some antimony and manganese. The next step (Greensand Filter) removes the remaining manganese and some arsenic. The RO is expected to remove to water quality criteria: aluminum, ammonia, antimony, arsenic, cadmium, lead, manganese, mercury, molybdenum, selenium, sulfate, and total dissolved solids (Table 1 attached at end of letter, based on Hatch 2015, Section 4.4.3, Tables 4-12 to 4-14).

The treatment process will produce waste from three different treatment units: sludge from the high rate clarifier and greensand is to be placed in the TSF, with RO brine returned to the process plant (DEIS p 3.7-140). Where will the HRC and greensand waste be placed if the DSTF (Alternative 5A) is the preferred alternative? Presumably these waste products would be placed in the pit lake at closure; how could this change pit lake water quality? This is an important question since the WTP may need to be operated in perpetuity and the "bad water" in the pit lake cannot be expected to be isolated at the bottom of the pit lake in perpetuity.

- **Recommendation: Provide a complete comparison of Alternatives 2 and 5A.** This should include implications for water treatment and disposal of treatment waste. Provide information on the risks of relying heavily on an RO system, including frequency and cost of maintenance under different pit lake water quality scenarios.

**AWT sizing**

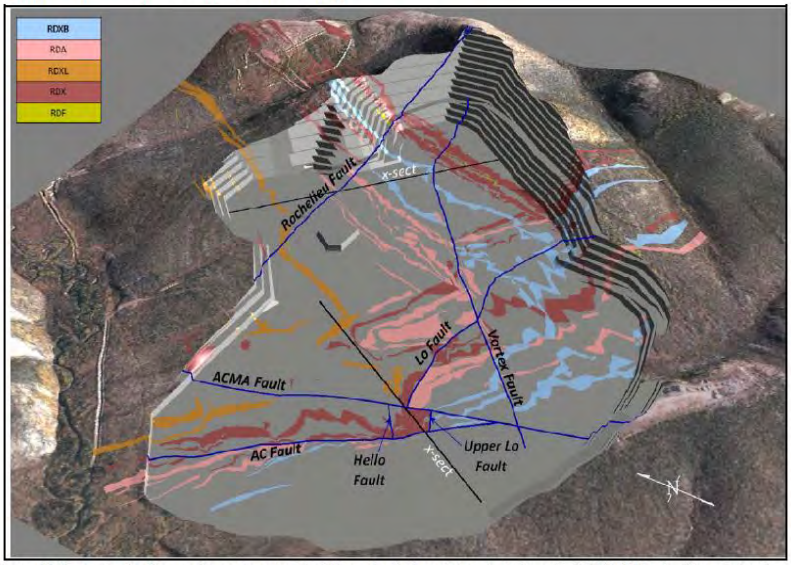
WAQ 10 The volume / rate of pit dewatering is dependent on bedrock conductivity, which can vary from 500 to 5,000 gallons per minute (gpm). The other potentially major source of water to the AWT water treatment plant (WTP) is the seepage recovery system (SRS), which is partly seepage through the TSF liner (2-16 gpm) and partly water captured from the mine area in the tailings facility underdrain (800-1,000 gpm for ten years declining to 575 gpm in year 25).

The WTP is not designed to have the capacity to be able to treat high flow periods or treat dewatering volumes if high conductivity bedrock is encountered. Even if the AWT expanded to the maximum design capacity (1,500 $m^3$/h = 6,604 gpm, DEIS p 3.7-141), it would not be able to deal with the volume of pit water, if high conductivity bedrock is encountered, from years 3-19; the design of 1,061 $m^3$/h (4,672 gpm)

would not be able to deal with the volume of pit water, if high conductivity is encountered, in ANY year (see Tables 2 and 3 in attachment at end of letter).

The pit contains many fault lines (figures below, from NovaGold 2012 NI 43-101 Technical Report on the Second Updated Feasibility Study); these could increase or pose barriers to fluid movement. The nature of conductivity along the faults is not understood well enough, and is critical to understanding water management.

**Figure 7-4: 100 m Bench Level Geology**




Note: Oblique view looking north-eastward of the 3D geological model projected on the 328 ft (100 m) pit bench level and the Mineral Reserves (DC9) pit outline. Note: Figure courtesy Donlin Gold.

WAQ 10

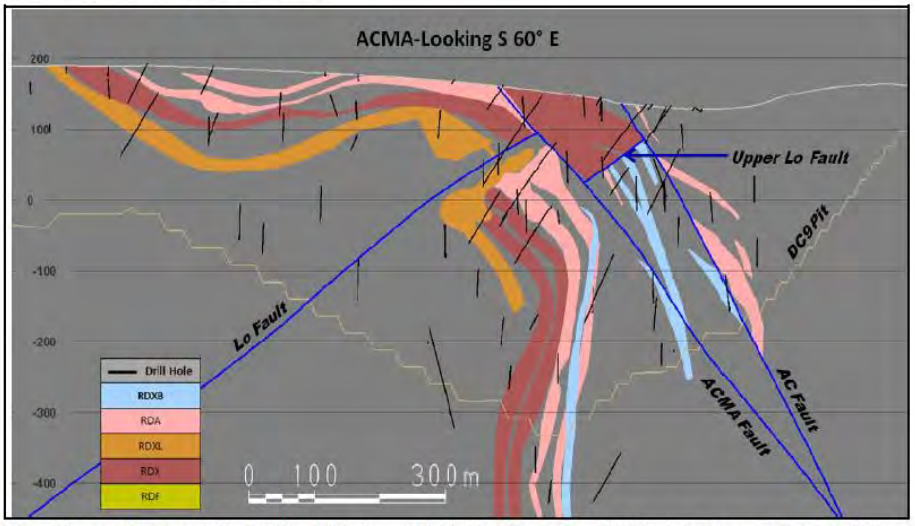
Possible mitigations could involve running the water treatment plant for 12 months a year, instead of the proposed 8 months, and/or storing water in the Contact Water pond or TSF; however, this potential increases the risk of overflow or failure at the TSF. Also, there may be operational issues at the WTP:

*"To eliminate potential issues with operation and maintenance of the WTP during the winter months, it is assumed that treatment is restricted to the April to November period"* (BGC 2015j, p2).

If the Dry Stack Tailings Facility becomes the preferred option, the DSTF operating pond or the Contact Water pond could need to be expanded to hold the additional dewatering water if the WTP is not sized appropriately.

- **Recommendation: Discuss adaptive measures under high conductivity scenarios.**

**Figure 7-6: ACMA Area Section**




Note: Shows intrusive rocks, faults, drill holes, and Mineral Reserves (DC9) pit, looking southeast. Note: Figure courtesy Donlin Gold.

Mercury assessment

There has been a good effort at understanding the current sources of mercury to the Crooked Creek watershed, modeling has been conducted to estimate the potential increase in mercury concentrations to soil and water, and sampling has been conducted to determine the potential for methylation in the watershed.

The environmental impact is dependent on

- Is the estimated amount of local and regional deposition (wet and dry, including drivers such as fog, clouds, rain, and snow) from mercury gas emissions at the processing plant correct?
- Is the potential for methylation in depositional environments accurate?

The DEIS notes the importance of source (historic mine sites as sources to sculpin and juvenile Dolly Varden) and hints at the importance of wetlands as methylation regions by noting the high concentrations of mercury in grayling, pike, and burbot at the George River– presumably this is due to the extensive wetlands, although this is not mentioned (DEIS Section 3.13.2.2.4, p 3.13-66 to 3.13-67).

If gaseous plant emissions do not deposit, or deposit in locations without methylation potential, then the mass of mercury emitted is globally important but not locally important and therefore not necessary to assess in the EIS.

The modeling and sampling has been conducted by contractors hired by Donlin Gold (Enviromin, Arcadis). Because of the importance of these issues, a competent third party should review the information. Some potential reviewers to look at the atmospheric chemistry of mercury per potential to deposit locally might be Dan Jaffe or Sarah Strode (at one time both were with University of Washington).

WAQ 21

- **Recommendation: Have an independent third party review mercury deposition modeling and reports on the potential rates of mercury methylation.**

The results of such a review should produce a map showing the probable or potential range of deposition. Methylation potential should be assessed *within this range.* For example, if there is potential for deposition in the George River wetlands, that environment should be included in the assessment of methylation rates. The potential reactions if fugitive dust containing HgS enters the environment should also be discussed – if it enters low pH wetland/riparian areas, is there potential for the sulfide to break down, releasing mercury to the soil and water?

An assessment should discuss the current levels of mercury in different fish species within different environments within the depositional area, and the potential for those concentrations to increase. Such an assessment would be assisted by the information in the upcoming report by the BLM on fish metal concentrations and fish population movements in the Central Kuskokwim (Matthew Varner, BLM, personal communication), which would be more recent and updated information from the studies conducted 2010-2011 (DEIS Section 3.13.2.2.4).

Some fish, such as grayling, move significant distances. There could be potential for them to take up mercury in environments in areas such as the George River wetlands and “deposit” mercury in other

locations where they spawn and die. The ecological food web and the human connections within it should be part of the conceptual model of mercury that an environmental impact would be based upon.

Currently, the information to assess the potential impacts from mercury are scattered throughout the Soils (DEIS Section 3.2), Surface Water Quality (DEIS Section 3.7), Wildlife (DEIS Section 3.12), Fisheries/Aquatic Resources (DEIS Section 3.13), and Human Health (DEIS Section 3.22) sections. While this conforms to the chapter format required by the EIS, it makes it difficult to understand and comment on potential impacts due to mercury.

WAQ 21

- **Recommendation: Provide an independent third party review assessment of mercury – dust and processing plant emissions (including atmospheric chemistry related to deposition) as sources to soil, water bodies, and wetlands with potential impacts to fish, wildlife, and human health – as a companion document to the DEIS.**

Some statements do not seem to have any data supporting them:

> *It is anticipated that only a small fraction of the inorganic mercury dispersed from the mine site would be available for methylation (Marvin-Dipasquale et al. 2009)* (DEIS p 3.13-122).

This reference is a general one, and is not based on a site specific study in the Donlin area.

> *Due to higher concentrations of mercury and higher flow rates, the mercury load in Crooked Creek increases during spring flow and storm flow conditions relative to base flow (Tetra Tech 2013). Higher stream discharge is usually associated with higher flow velocity, which entrains particulate material from the substrate (Tetra Tech 2013). Thus the data suggest that a substantial fraction of the total mercury load in the Crooked Creek watershed (measured as total mercury in the water) is associated with particles entrained from the substrate during high flow events.* (DEIS p 3.7-32).

The hypothesis could be easily verified by analyzing total and dissolved mercury in water samples. Indeed, the DEIS notes that total mercury, methylmercury (MeHg) on unfiltered (total fraction) samples, and dissolved mercury were analyzed in surface water samples in 2013-2014, at least a year prior to release of the DEIS, but results are not presented or utilized to verify the quote above (DEIS p 3.7-32).

WAQ 21

While other statements may misrepresent the citations:

> *Wetland systems studied elsewhere that have similar C:N ratios and lower soil pH also show relatively low methylmercury production rates. For example, Tjerngren et al. (2012) showed that systems with a C:N ratio of approximately 35 to 38, and soil pH approximately 4.5, were characterized as "nutrient poor" and were less productive in terms of methylation activity relative to systems with lower C/N ratios.*(DEIS p 3.7-149).

First, a soil pH of 4.5 should not inhibit the activity of sulfate reducing bacteria (SRB) that methylate mercury (personal experience).

Second, with regards to the C/N ratio, a thorough reading of Tjerngren shows that the sites that were "nutrient rich" were the same ones that had higher sulfate and higher temperatures – factors known to increase the activity of the SRB. Tjerngren notes:

*the availability of electron donors and acceptors for methylating and demethylating bacteria may play a role behind the link between acidity/nutrient status and net MeHg production and yield….the interrelations are clearly not simple* (Tjerngren et al 2012, p 8057).

Third, ALL wetlands in the Tjerngren study, except an alder swamp, generated (exported) methylmercury.

WAQ 21 Lastly, the study did not track wetlands from before and after inputs from a nearby industrial source of mercury, which is essentially what Donlin will be, generating both dust containing mercury and gaseous emissions that could deposit mercury. While the study has relevance, suggesting that the high C/N ratio in soils will keep methylation rates from Donlin mercury emissions low is not substantiated. The C/N ratio as a reason for "low rate of methylmercury production" in this section and in the Cumulative Effects chapter (DEIS section 4.3.1.7.2) should be removed.

- **Recommendation: Remove unsubstantiated statements or provide data to support them.**

The argument that sulfate is low in soils (DEIS p 3.7-149, citing Arcadis 2014) is more relevant to methylation rates than the C/N ratio argument. Soils were collected at four sites, which were also surface water quality sampling sites, and analyzed for sulfate, sulfide, and different forms of mercury (Arcadis 2014). However, there appears to have been a bias in site selection.

First, the mean highest sulfate was at Category 2 (mineralized background) sites (DEIS p 3.7-26, also Arcadis 2012b p 14), but Arcadis did not sample any Category 2 sites (see figure below, from TetraTech 2013).

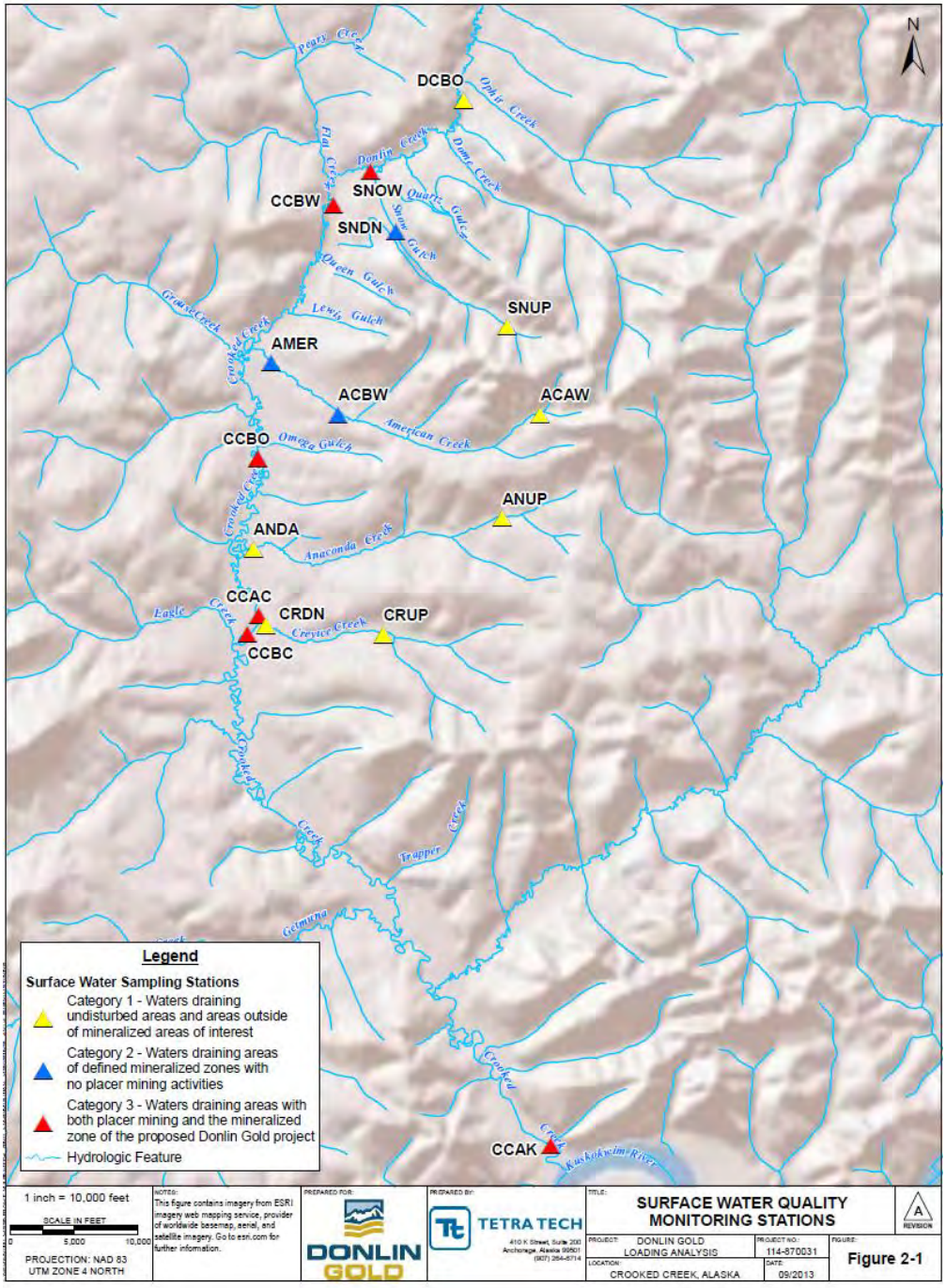
Second, a comparison of sulfate concentrations in surface water at soil sample sites indicate the soil sites were biased to low sulfate locations (Arcadis 2012b, TetraTech 2013). Sulfate concentrations in surface water samples at Arcadis sample sites averaged 3-17 mg/L (TetraTech 2013). The averages for spring runoff and baseflow were: DCBO (8, 11 mg/L), CCAC (10,13 mg/L), CCBW (10, 17), ANUP (3 mg/L).

SOL 3

Sulfate concentrations in surface water at other sample sites averaged 22-42 mg/L. Averages during spring runoff and baseflow were: ACAW (22, 29 mg/L), SNDN (31, 40 mg/L), SNOW (32, 38 mg/L), SNUP (37, 42 mg/L).

Although photographs are provided in the report, it is difficult to determine if samples were collected in environments that could promote methylation (wet, anaerobic terrestrial sites; backwaters, muddy stream sites). If environments likely to promote methylation are within the geographical grid of a potential deposition area (dust or atmospheric), they should be sampled. Sulfate, dissolved organic carbon, and redox are all good indicators to assess for methylation potential, in addition to direct measurement of different forms of mercury (total, dissolved, methyl).

- **Recommendation: Sampling should not exclude sites that could promote methylation.** Sample sites for analysis for sulfate in soils, and other indicators relevant to methylation rates should be based on a geographical grid of environments that mercury may enter, through dust or atmospheric deposition.


N
DCBO
SNOW
CCBW
SNDN
SNUP
AMER
ACBW
ACAW
CCBO
ANUP
ANDA
CCAC
CRDN
CRUP
CCBC
CCAK
Peary Creek
Donlin Creek
Ophir Creek
Flat Creek
Dome Creek
Quartz Gulch
Snow Gulch
Queen Gulch
Lewis Gulch
Granite Creek
Crooked Creek
American Creek
Omega Gulch
Anaconda Creek
Eagle Creek
Crevice Creek
Trapper Creek
Geimina Creek
Kuskokwim River
Legend
Surface Water Sampling Stations
Category 1 - Waters draining undisturbed areas and areas outside of mineralized areas of interest
Category 2 - Waters draining areas of defined mineralized zones with no placer mining activities
Category 3 - Waters draining areas with both placer mining and the mineralized zone of the proposed Donlin Gold project
Hydrologic Feature
1 inch = 10,000 feet
SCALE IN FEET
0
5,000
10,000
PROJECTION: NAD 83
UTM ZONE 4 NORTH
NOTES:
This figure contains imagery from ESRI imagery web mapping service, provider of worldwide basemap, aerial, and satellite imagery. Go to esri.com for further information.
PREPARED FOR:
DONLIN GOLD
PREPARED BY:
TETRA TECH
410 K Street, Suite 200
Anchorage, Alaska 99501
(907) 264-5774
TITLE:
SURFACE WATER QUALITY MONITORING STATIONS
PROJECT:
DONLIN GOLD
LOADING ANALYSIS
PROJECT NO.:
114-570031
LOCATION:
CROOKED CREEK, ALASKA
DATE:
09/2013
FIGURE:
Figure 2-1
A
REVISION

Human Health

The ADHSS definition of "health" does not allow for an assessment of what it is that keeps a community together in a healthy manner. It allows for the examination of quantifiable "mortality, morbidity, and disability" – where health is therefore necessarily the *absence* of these. The "determinants" of health focus on access to food, clean water, and healthcare; income; accidents; exposure to hazardous materials. While these are important, the ***positive*** aspects of community are not stressed – sharing (of food, childcare, equipment, etc.), ties with the same friends for many years or a lifetime . A stakeholder was quoted as wanting a health assessment in part to know the health status of "physical health, emotional health, spiritual health" (DEIS Section 3.22.3.2).

PHL 6

It seems that a change in "health" could be determined by whether these negative aspects increase, but can a change in health be observed by a decrease in the positive aspects that tie a community together? For example, "Maternal and Child Health" is assessed by infant mortality or birth weight, teen pregnancies, and substance abuse during pregnancy. There is no assessment of positive aspects such as the ability to be with your child, or have a trusted network of people to provide care (DEIS Section 3.22.3.4.1).

In general, I would be interested in knowing how communities that have different likely exposures to mine impacts (Lower Kuskokwim – exposure via ocean barge traffic, Middle Kuskokwim – exposure via worker influx, river barge traffic and potentially the BTC road, villages nearest the mine – perceived exposure to chemical risks) view their own current health status, both the positive and negative, and what they would consider to be an improvement in health patterns in the future.

**Baseline**

*Hazardous chemicals*

Under "Air Quality", one possible measure of baseline health would be the number of homes reporting problems with black mold.

Regarding "Water Quality", the following statement

> *In 2005, out of the 60 regulated public water systems in the Y-K basin, 19 exceeded arsenic screening levels (ADEC 2010, as cited in NewFields 2015).* (DEIS p3.22-19)

PHL 16

is not very helpful without knowing the locations, how much above screening levels the concentrations were, whether the water treatment systems required additional equipment, whether such equipment has been installed; that is, are there currently still 19 public water systems that are at risk, and how much of an issue is this for health? It would also be helpful to know how this compares to other parts of Alaska – for example, Fairbanks and parts of southcentral Alaska are known to have elevated arsenic in groundwater.

*Food*

The fact that there are no signs of nutritional deficiency and low diabetes is very good, and likely reflects the extent to which wild food make up diets, although *"it is not known what percent of residents' food supply comes from subsistence activities (NewFields 2015)"* (DEIS p3.22-21). It is distressing to see that

PHL 12

"food security" is relatively low. It would be helpful to understand why this is the case – is it related to declines of fish in the Kuskokwim River or other changes to subsistence food patterns, due to a lack of money to pursue subsistence habits, or due to a shift towards store foods that are expensive?

PHL 12 This information should be provided in the final Health Impact Assessment, to make it easier to evaluate *why* changes occur in the future, if they do. It would be helpful to understand how communities themselves view food sources, variety, and abundance now, and what they would like to see in the future. An increase in income *could* increase food security, but may not; it could be important to know if communities' perceptions of whether they have sufficient and sufficient variety changes over time. If there is an interest in more gardens, that would take little funding. If there is lack of money to pursue subsistence, then employment would help. I don't know that it should be assumed that more income (presumably related to the mine) would increase food security or nutrition.

*Water and Sanitation*

PHL 8 It is good to have the baseline information on water and sanitation; providing more communities with these services, or upgrading current ones, could be an important benefit of income from the mine to villages. This aspect of health may tie into Climate. That is, could sewage lagoon situations get worse due to river erosion, flooding, and more extreme events?

*Mental Health*

PHL 10 This is based on "self-reported" mental health, and it is noted that these may be artificially low. Again it seems that it would be important to know from people what contributes to them feeling happy, fulfilled, "mentally healthy". It seems odd that the "positive" mental health is simply the lack of negative reports.

*Lack of comparison*

PHL 19 Under Table 3.22-5 "Accidents and Injuries", how is it that there is only data for the Y-K and not for Alaska or the nation for most categories?

PHL 19 Under Table 3.22-7 "Exposure", how is it that there is not information on child blood levels for Alaska, or regions in Alaska outside the Y-K?

PHL 19 Under Table 3.22-9, "Infections diseases", how is it that there is not information on the immunization rate for Alaska children statewide?

PHL 19

- **Recommendation: Discuss the positive aspects of current baseline health. Provide information on the root causes of current health/lack of health. Where possible, aggregate information on what communities themselves see as "health". All tables should provide information on local quantifiable determinants in comparison with statewide or other regions.**

**Mitigation**

*Protection of foods that affect human health*

PHL 12 All the design features listed (DEIS p3.22-97) are required of the mining company regardless of any human health issues. Other design features that are likely required regardless of human health probably include including impacts to fish and wildlife populations or movements due to noise, changes in soil or vegetation from dust or atmospheric emissions, and changes in water quality (turbidity, chemical, salinity, temperature) or quantity (lower creek levels, elimination of ponds and wetlands during groundwater drawdown).

To address community health concerns, monitoring fish tissue (as suggested by the Corps, DEIS p3.22-97) and bird carcasses should be conducted in a manner that examines them for changes that could be related to mining activity – primarily increases in mercury or selenium and determining whether physical deformities are occurring in birds or fish related to selenium.

*Increasing opportunities and social health*

PHL 11 Additional design features that could be included might be: cultural training for non-Native employees to ensure a respectful and good working environment, sexual harassment training, employing Alaska Natives as counselors at the work site, and providing apprenticeship and other training opportunities to ensure local people have a pathway to the best jobs on site (including management jobs).

Other mitigations might include: financial training and financial advisors for employees and their families, opt-in for automatic paycheck deduction or 401(k) for savings, and training modules that could be completed at home during time off the work site which would improve skills or opportunities.

*Water and sanitation*

PHL 8 Regarding health benefits and/or mitigation, is there a potential for increased health through some funding mechanism that allows for planning, upgrading, and moving (if necessary) basic water and sanitation structures?

*Exposure to hazardous chemicals*

MIT 27 Spill prevention and response plans should have annual drills that include local people and their boats from all up and down the river, similar to the "Spill Drills" conducted in Prince William Sound. This will provide a means for the people closest to a spill to be able to respond while waiting for larger response units to arrive, if necessary. These should include spill scenarios at ports, spills from ocean barges, and spills from river barges. They should include fuel spills, but also training in what to expect if there is a spill of hazardous chemicals – where it may or may not be advisable for people to attempt to respond.

Although workers at the mine site are excluded from this analysis (DEIS p3.22-58), the "Health and Safety Plan" that protection for workers would fall under is not available. Therefore this seems the best

MIT 27 place to note that mercury monitors should be placed at locations in the workplace where mercury vapor is collected, to ensure that workers are not exposed by inhalation.

- MIT 2 **Recommendation: Consider additional mitigations that reduce fear of subsistence foods, confront racism and increase the successful integration of local residents into mine operations and auxiliary activities.**

**Alternative 4 (Birch Tree Crossing)**

The sentence "human health impacts to surface transportation would be similar to Alternative 2 since the road would not be accessible from communities in the vicinity or open to the public" seems unrealistic (DEIS Section 3.22.4.5.2). First, snowmachines would likely access the road in winter. Second, mineral exploration could occur in that area and make it unrealistic to maintain a private road.

PHL 13 Similarly the impact on subsistence resources, summarized as "similar to Alternative 2, except for lower intensity of effects to subsistence fishery resources and greater impact from the mine access road to habitat for terrestrial subsistence resources" (DEIS Section 3.22.4.5.3) does not acknowledge that the BTC road goes through an area that is utilized a great deal more for subsistence than the area the Crooked Creek-Jungjuk port road would cross.

Impacts related to climate change (DEIS Section 3.22.4.5.4) should state whether the increase in truck emissions would be similar to the reduction in barge emissions. There may also be a difference in climate impacts related to the amount and type of wetland removed to build the roads.

**Alternative 5 (Dry Stack Tailings)**

There is likely to be more dust with the Dry Stack than with the wet slurry tailings beach; it would be helpful to put some information on expected dust amounts, directions, and mitigations for worker health
PHL 17 and the health of nearby residents in this section (DEIS Section 3.22.4.6).

- **Recommendation: Further consider the impacts of the BTC road. Provide a better comparison of dust impacts to human health for Alternatives 2 and 5A.**

**Mine Site – Closure, Reclamation, and Monitoring**

Revegetation

Why is the "Summary of Impacts for Alternative 2" regarding vegetation (DEIS p 3.10-57) primarily a litany of mitigation efforts? Impacts should be listed in one section, mitigation in another.

The proposed "additional mitigation" idea to

> *"Develop and maintain a native species seed bank for reclamation and restoration practices. Develop and implement test vegetation plots to determine potential revegetation success with native and local plant material and seeds (including lichens and mosses)"* (DEIS p 3.10-59)

MIT 20 should be put into place this summer. This is the type of activity that could and should involve local elders and local youth, possibly in conjunction with a local college course as part of educational outreach and training. A seed bank could be nurtured through a local nursery as part of promoting small business in the region.

The proposed "additional mitigation" idea to

> *"Promote allowing native vegetation and native seed planting vegetation growth (on overburden piles) to keep topsoil viable until it is needed during final reclamation"* (DEIS p 3.10-60)

should be done, not only to keep soil viable, but also to reduce the ability of invasive plants to take hold.

- **Recommendation: Discuss impacts, then mitigation. Coordinate with local colleges or businesses to implement revegetation studies.**

Tailings Storage Facility

**Reclamation (2.3.2.1.12)**

On closure the tailings pond will have a synthetic liner on the bottom, with an underdrain system meant to pass seepage from the buried Anaconda Creek. Any seepage that makes it through the lower tailings pond liner will report to the Anaconda Creek underdrains. This underdrain seepage will be monitored, and collected and treated post-closure if necessary.

PAA 46 Post-closure the tailings pond will be drained and reclaimed so that runoff will not be contaminated, and infiltration of meteoric waters will be restricted, but still allowed. This means that a portion of the tailings will remain saturated indefinitely. Since gravity will largely drive the movement of water in the tailings over the long term, the tailings in the lowest part of the impoundment – nearest the dam itself – are most likely to remain saturated.

> *The Mt Polley Expert Panel, convened to critique the tailings dam failure in 2014, recommends:*[6]
>
> *The goal of BAT for tailings management is to assure physical stability of the tailings deposit. This is achieved by preventing release of impoundment contents, independent of the integrity of any*

[6] Report on Mount Polley Tailings Storage Facility Breach, Independent Expert Engineering Investigation and Review Panel, Province of British Columbia, January 30, 2015, p. 121.

*containment structures. In accomplishing this objective, BAT has three components that derive from first principles of soil mechanics:*

*1. Eliminate surface water from the impoundment.*

*2. Promote unsaturated conditions in the tailings with drainage provisions.*

*3. Achieve dilatant conditions throughout the tailings deposit by compaction.*

PAA 46 The current design in Alternative 2 – to drain the tailings pond and pump water from the tailings facility to the open pit over an estimated 52 years – will not remove as much water as mechanical compaction, which can achieve 95-98% of the maximum density (as noted in BGC 2015d, where placement of dry stack tailings was estimated to be at 97% saturation). Additionally, the presence of saturated tailings may mean the pumping system, required to move water to the open pit, cannot be decommissioned. As long as the pumping system is in place, there is a risk of water contamination through the failure of pumps and pipelines, particularly as the system ages.

Dry tailings was considered as an alternative (Alternative 5A), but in reality it was analyzed in a way that all but made it impossible to succeed.

PAA 9 Another "dry" alternative that will work, but which could require more water treatment is much safer in the long run than the wet closure which is planned for the Tailings Storage Facility. Drains can be placed under the tailings, on top of the liner, and after closure of the mine the drains can be used to dewater the tailings in the impoundment. The dewatered tailings will now be significantly more stable than the saturated tailings under the present proposal. The objective of this disposal alternative is to significantly reduce the potential for mobilizing the tailings in the impoundment in the event the tailings dam should fail.

The downside to this alternative is that it could require the treatment of more water in perpetuity. The objective then becomes minimizing the amount of seepage through the tailings impoundment. This can be best accomplished by integrating a low permeability cover, such as a geomembrane clay layer (GCL), with the drainage system on top of the impoundment.

This approach combines best practice for long-term impoundment safety, while minimizing the leaching of acid rock drainage and metals leaching contaminants.

BER 4 Reclamation and closure information appears to be dispersed throughout the DEIS documents. It is very difficult to locate all of the information on the Tailings Storage Facility without reading the entire document. Logically it may make sense to discuss reclamation issues when they come up in consideration of the alternatives, but it makes reviewing the reclamation and closure objectives and planning virtually impossible.

This is why there should be at least an appendix on the Reclamation and Closure Plan which is required by the Alaska Department of Natural Resources prior to mine operation and is mentioned in the DEIS (e.g. p 3.10-42).

PAA 9 ➢ **Recommendation: Consider alternatives that reduce saturation in tailings.**

BER 4 ➢ **Recommendation: Provide an appendix containing the Reclamation and Closure Plan.**

**Risk to Wildlife (3.12.2.1, Appendix H)**

The DEIS Chapter 3.12.2.1 "Attraction to mine site open water areas" summarizes the findings of Arcadis 2013 and ERM 2015. Arcadis examined the ecological risk at the pit lake while the ERM document was to consider exposure to tailings pond and contact water pond during operations.

However, this was a cursory exercise and did not consider the ecological risk of these water bodies during a temporary closure scenario. The pit lake will have contributions from the tailings facility, waste rock facility, groundwater and clean runoff/precipitation and is therefore not the same water quality as the tailings pond. For example, the tailings pond would be expected to contain cyanide in higher concentrations than would be found in the pit lake.

WILD 5

The Lower CWD also represents a potential risk if there is a temporary closure. About 11% of the lower CWD water comes from the waste rock seepage (Appendix H, Section 3.4), which will be heavily influenced by how well the waste rock NAG and PAG are mixed (Appendix H, Section 3.2). Additionally, selenium concentrations could increase dramatically, from one prediction of about 150 ug/L (Appendix H, Table H-5) to a prediction of 80,000 ug/L (Appendix H, p H-19 and Table H-5 footnote 3). The year at which potential water quality could be at its worst in the CWD should be modeled to determine potential risk to wildlife at a temporary closure, given the extreme toxicity of selenium to birds.

- **Recommendation: Perform an ecological risk analysis of the tailings pond and CWD, considering the expected water quality and period of worst potential water quality, to determine potential risk during temporary closure.**

Dry Stack Tailings Facility Closure (2.3.6.1; 3.7.3.6.2)

The section describing the closure of the DSTF (DEIS p 2-160 to 2-161 and p 3.7-196 to 3.7-197) needs substantial reworking to determine what is going on and to be able to appropriately compare Alternative 5A to Alternative 2.

- There is no comparison of the covers that would be placed on the TSF and DSTF, but it appears that the covers assessed were different. DEIS Section 2.3.2.1.12 makes no mention of the TSF cover, although according to DEIS Section 3.7.3.2.2 it would be

WAQ 25

> *"an engineered cover overlain by a peat/mineral growth media mix. The engineered cover would promote runoff and reduce the potential for runoff or precipitation to contact the consolidated tailings*" (DEIS p 3.7-157).

There is a cursory description of the DSTF cover in DEIS Section 2.3.6.1:

> *During closure, the tailings would be covered with soil, an LLDPE cover, and vegetated* (DEIS p 2-161).

Were the infiltration rates for the TSF and DSTF modeled assuming the same kind of cover? It appears that one reference (BGC 2015d, cited at DEIS p 3.7-197) presumes a low-permeability (BGC 2015d p1) or impermeable (BGC 2015d p3) cap on the DSTF – but it did not make a comparison of the DSTF cover with the TSF cover. In fact, it specifically noted that it would not do a comparison with the type of engineered cover discussed in DEIS 3.7.3.2.2.

- The three paragraphs devoted to Dry Stack Seepage (DEIS p 3.7-197) are insufficient to provide an image of what is occurring. A cross section of the proposed Option 1 and Option 2 would be much more useful than a plan layout figure in this section. At a minimum, the diagram from BGC 2015d should be included:

WAQ 25

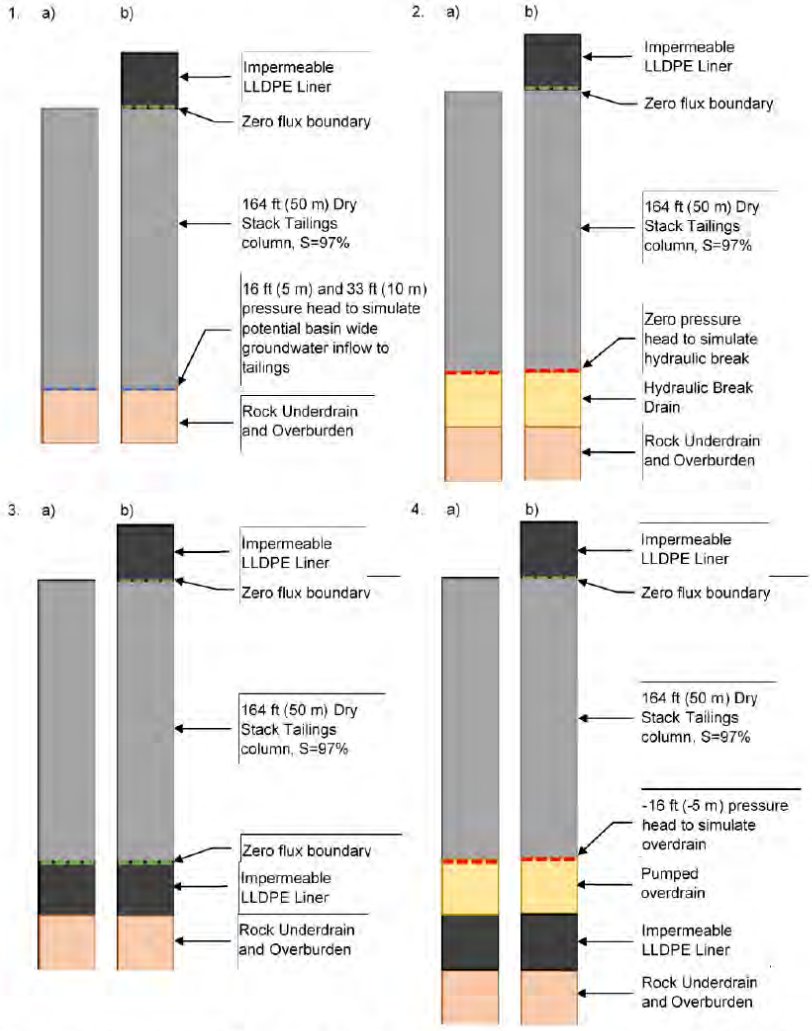



**Figure 4-1. Scenarios for tailings facility configurations, illustrating conceptual model of materials and boundary conditions applied to the top and bottom of the tailings column; at a) operation conditions, b) closure conditions. Not to scale.**

- BGC 2015d assumes the liner for Alternative 5A Option 2 would have hydraulic conductivity of $8.5 \times 10^{-10}$ ft/day. How does this compare to the liner leakage for the TSF liner, which was determined using EPA methods – but the rate was not provided (DEIS Section 3.7.3.2.2, p 3.7-135)?

- BGC 2015d (p14) notes that if an impermeable LLDPE liner is placed under the DSTF, it will cause water to mound up to a height of 100 feet during the 27 years of operation; although the mounding would stop when the cover was placed, it would not go down. It is not clear whether this statement considered the progressive reclamation of the DSTF that is proposed (so that covers are continually being placed, limiting the surface area that can receive infiltration). The document did say that if an engineered soil cover was placed, as apparently is proposed for the TSF, the height of the water mound would flux or increase. It is also not clear whether this mounding could pose stability issues. This is important information that should be included in the DEIS description of closure of the DSTF.

- The required time to closure for the TSF and DSTF is based on the amount of leakage/seepage from the covered and reclaimed tailings – at a specific rate, it is estimated to be low enough that dilution from groundwater and upstream runoff that enters the underdrain will allow water quality to be clean enough to discharge. This concept is not at all clearly explained in the DEIS.

    - With no cap, DSTF seepage is 78 gpm. At this rate, there is so much "bad" water that dilution by other water in the underdrain will not achieve water quality criteria. I was unable to find a clear statement of the seepage rate if an engineered soil cover cap were to be placed, in either BGC 2015d or in the DEIS.

WAQ 25

    - With a cap, the DSTF seepage reduces to 18 gpm over 200 years (BGC 2015d p 15), the rate achieved by the TSF in years 11-51 (DEIS Figure 3.5-27 and 3.5-28); this could be much more clearly stated and compared. Also, the BGC 2015d estimates did not transfer to the DEIS. In the water balance schematics, Alternative 5A Option 1 and Option 2 show seepage at the much higher rate of 39 gpm (DEIS Figure 3.5-37, Figure 3.5-41).

    - Presumably the goal is to achieve seepage that is a small percentage of the total; BGC 2015d notes that groundwater in the underdrain is expected to be 400 gpm, although the schematics in the DEIS show lower rates of around 200 gpm (DEIS Figures 3.5-35 and 3.5-36). For the TSF, DEIS Figure 3.5-27 estimates 431 gpm.

Importantly, the DEIS statement that

> "*Thus, the main difference between Alternative 5A-Option 1, Alternative 5A-Option 2, and Alternative 2 with respect to surface water quality is the time it takes for the SRS water to clean up to the point that it can be discharged to Anaconda Creek, that is, roughly 200 years under Option 1, and about 10 to 50 years under Option 2 and Alternative 2"*

seems to be at odds with BGC 2015d. If I understand the BGC document correctly, an unlined option (Option 1) will achieve the low, desired seepage rate of 18 gpm in about 200 years, but the time for

draindown with the lined option (Option 2) is complicated by the mounded water inside the tailings and no time to an 18 gpm seepage rate was provided. I do not understand how the DEIS comes to an estimate of 10 years to the time when the SRS can be decommissioned under a pumped overdrain scenario. The surface water hydrology section seems to indicate that pumping will be needed for at least 47 years (DEIS Section 3.5.3.6.1, p 3.5-144), if not in perpetuity (DEIS Figure 3.5-37 of Option 1 shows 498 gpm pumped from the SRS to the pit from year 42 on; DEIS Figure 3.5-41 of Option 2 shows 39 gpm pumped from the tailings overdrain to the pit from year 47 on; DEIS Figure 3.5-28 of the TSF Alternative 2 option shows no water pumped to the pit after year 52).

WAQ 25

- **Recommendation: It is imperative to reconcile Chapter 3.5 (Hydrology) with Chapter 3.7 (Water Quality) with regards to the volume of flows and the length of time that tailings water would need to be pumped to the pit.**

- **Recommendation: Provide a clear description of TSF and DSTF closure.** This should include the time to the decommissioning of the SRS at the TSF compared to DSTF Option 1 and DSTF Option 2, along with clear explanations of the tailings covers at closure, infiltration rates (and covers used to determine the infiltration rates, and whether progressive reclamation was considered) and the liner seepage rates.

One of the key differences in Alternative 2 and Alternative 5A is that the Dry Stack can be progressively reclaimed during operations while the wet slurry TSF cannot. This provides an opportunity to place an impermeable cover on sections of the DSTF, which would stop meteoric water from entering those sections and allow those sections to begin to drain down. By the time the mine begins closure, there may only be a small section that has not been covered. Therefore, the volume of water entrained in tails in a traditional TSF could be much higher than that entrained in a DSTF at the end of mine life, resulting in a difference in the amount of time needed to achieve a low rate of seepage (18 gpm). Was this considered?

GRD 7

Lastly, there needs to be a better discussion of two related topics: the time until the seepage pump system for the DSTF or TSF can be decommissioned (thus removing this risk of failure/water contamination) and the time until the water treatment plant needs to begin treating pit lake water (thus beginning the risk of water contamination from pit overflow or WTP breakdown).

With the current DEIS, it is not possible to reasonably compare the risks of Alternative 2 and Alternative 5A.

<u>Pit Lake Closure -- Risks to Wildlife (2.3.2.1.12, 3.12.3.2.2)</u>

The pit lake is anticipated to be maintained at 33' below the spill crest to maintain enough freeboard to contain high precipitation/snowmelt events. However, this will pose a risk to terrestrial wildlife. No mitigation to protect wildlife from the open pit after closure has been proposed (p3.12-38).

WILD 5

- **Recommendation: Provide mitigation measures to reduce risk to wildlife at the pit lake.** Closure plans should consider blocking the area to wildlife, through placement of boulders around the pit edge or fencing. Initial construction or closure activities could design upper

benches to be laid back to heights that would allow wildlife to leave and haul roads could be left and/or new ramps added to allow wildlife to walk up and out of the pit.

WILD 5

There are also chemical risks that have not been fully considered. Ecological risk assessment by Arcadis (Arcadis 2013) notes that there is "large uncertainty in the predicted concentrations of pit lake water". To what degree was this uncertainty reduced with the Lorax 2015 modeling? Although the ecological risks are considered minimal (some risk to waterfowl and voles) and conservatism has been built into the model (e.g. assuming waterfowl spend all year on the pit lake), there has been no assessment of the risk of exposure to multiple metals.

- **Recommendation: Provide a multiple metals ecological assessment.** This can be done with bioassays using water that would mimic pit lake metals concentrations after the lake is full.

WAQ 9

The DEIS (Appendix H, Geochem) notes that the upper layer of the pit lake is likely to become more dilute (snowmelt) as the lower layers become more dense, and while this is a good thing in maintaining stratification, it could eventually allow the worse water to get shallower and promote overturn. They suggest (page H-13):

> *"Thus, in order to maintain the surface water concentrations within a relatively narrow band of water quality over the long term, it may be necessary to seasonally adjust the depth from which water is pumped, for example, to pump water from below the icemelt layer each spring."*

But this just addresses keeping input WQ to WTP relatively similar, not the potential for overturn.

There is a near certainty that the pit lake will overturn, and that the water quality will be worse in the surface layers, even after the pycnocline re-establishes (DEIS p 3.7-132).

There is no "overturn" scenario.

WILD 5

- Overturn would expose wildlife to worse water than was modeled
- Could overturn expose the backfilled waste rock to oxygen (from the formerly reduced, anoxic state) and how could that change pit lake chemistry? Would it at all impact the surface chemistry that wildlife is exposed to?

- **Recommendation: Discuss the implications of pit lake overturn on the water treatment plant (reagent consumption, sludge volume and disposal, potential need for expansion) and on ecological risk.**

BER 6

<u>In-perpetuity water treatment</u>

Alaska is entering new territory with mine permitting – proposed mines are bigger than ever before (Pebble, Donlin, Chuitna), disposing of tailings in natural lakes (Kensington), and requiring water treatment "*in perpetuity"*(Pebble, Donlin), that is, for at least hundreds of years into the future.

Alaskans should think hard about whether they are comfortable with *in perpetuity* water treatment being allowed and permitted. DNR will consider what will constitute adequate financial assurance to fund

water treatment, but Alaska residents need to consider fully what *in perpetuity* means and the precedent that would be set.

The pit lake will fill and overflow if a pump and treat system is not operating. Pit lake water is very poor, and will not improve over time – indeed, it could worsen on a time span of hundreds of years. The pit lake will contain high concentrations of arsenic, cadmium, copper, aluminum, lead, selenium, mercury and more. There is no assessment of what will happen if pit lake water spills over into Crooked Creek,
BER 6 allowing arsenic, cadmium, copper and other contaminants to flow into the Kuskokwim.

There is no clear statement in the DEIS that this will be the FIRST mine in Alaska to require *in perpetuity* water treatment.

- **Recommendation: The DEIS should state that, if permitted, this will be the first time Alaska has permitted a mine that will need water treatment for hundreds of years or longer. The DEIS should discuss mines that have allowed this, and how many have operated water treatment plants after mine closure, along with the water quality requiring treatment, any financial or technical issues encountered and for how long the plants have operated.**

## Cumulative effects

Briefly, it should be noted that not all the impacts from cumulative effects of the Donlin project – which includes the transportation and pipeline infrastructure – can possibly be analyzed or understood. The full cumulative impacts – on biological, physical, and social resources – of the industrialization of the regions of which the Donlin project is part will not be analyzed in this project application but will certainly be greater than what is analyzed in this DEIS.

Reasonably Foreseeable Actions

**Reasonably Foreseeable Actions Considered (Table 4.2-1)**

*Self – determination*

CLA 32 Governmental capacity should be expanded to include the Kuskokwim River Inter-Tribal Fisheries Commission and/or the Kuskokwim River Salmon Management Working Group (http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.kswg) as bodies for co-management of fisheries.

*Energy and Utilities*

WILD 4 Table 4.2-1 (DEIS p 4-6) should include the impact on marine mammals that will be expected due to oil and gas exploration and production. An example of this is the "takings" of marine mammals, including the endangered Cook Inlet beluga whales, which would occur if Exxon conducts geophysical exploration

WILD 4

for natural gas in Cook Inlet. The takings have been authorized by NMFS (February 2016 draft EA for incidental harassment takings, http://www.nmfs.noaa.gov/pr/permits/incidental/energy/cook_inlet_ihas_draft_batched_ea_2016.pdf) and are being fought by the US Marine Mammal Commission (http://www.mmc.gov/wp-content/uploads/ExxonMobil-LNG-Cook-Inlet-IHA.pdf) . The DEIS cannot combine the analysis of the Donlin Gold pipeline with Exxon's drilling impacts; the impacts from the Donlin pipeline, new natural gas drilling in addition to current drilling and potential impacts from a Chuitna coal mine port would all be analyzed separately for impacts without acknowledging the cumulative effects that would in fact be experienced by marine mammals. This is the classic history of degrading and permanently altering ecosystems while leaving no one particular company with responsibility.

CLA 32

*Mineral exploration*

In Table 4.2-1 (DEIS p 4-5), Nixon Fork is listed as a historical mine. It is a current mine that is in temporary closure (http://dnr.alaska.gov/mlw/mining/largemine/nixonfork/).

Additional projects that should be added to the list include: Vinasale, Cristo, Copper Joe, and Terra Gold (http://www.groundtruthtrekking.org/mines/).

CLA 3

**Reasonably foreseeable impacts not considered**

*Bethel port*

The expansion of the Bethel port is not only reasonably foreseeable, it is necessary to the implementation of the project. This should be included in the cumulative impacts.

CLA 4

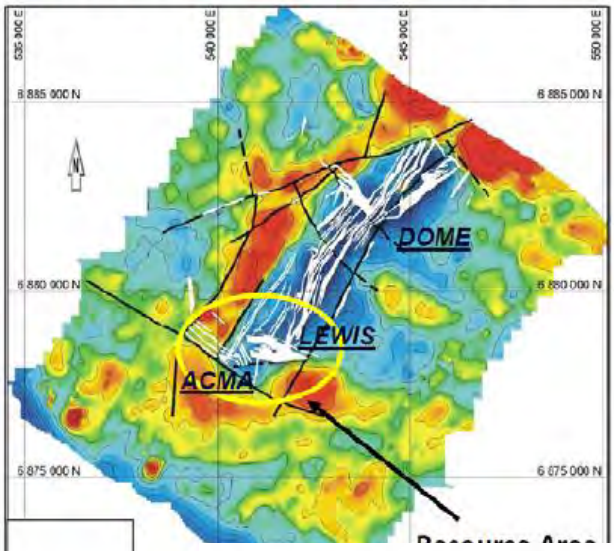
*Donlin mine expansion*

Given the geophysical imagery and statements to investors, there is every reason to believe that if the mine is constructed, it will be expanded.

> *Yes, it's a big deposit but it's still got a lot of room to grow. You know looking at this illustration we've only extensively explored less than half of the gold bearing system. When the time is right, we'll resume exploration and have the potential to significantly add to our reserves and resources.* (NovaGold CEO Greg Lang, Transcript of Q1 2016 earnings call, April 5, 2016 http://seekingalpha.com/article/3963317-novagold-resources-ng-ceo-greg-lang-q1-2016-results-earnings-call-transcript?part=single)

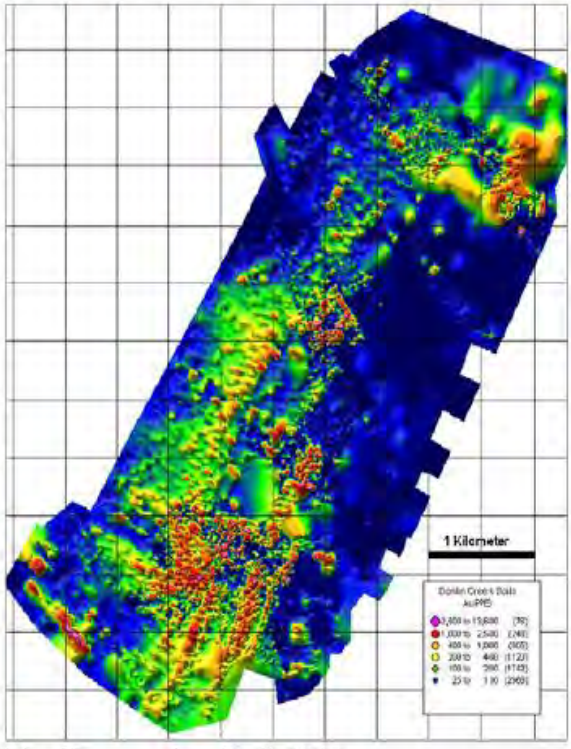
And as shown in a 2012 geophysical image (2012 NovaGold NI 43-101 Technical Report on Second Updated Feasibility Study):

**Figure 9-1: Regional Magnetic Image Showing Magnetic Low Intensity Zone**




Note: Figure courte

**Figure 9-2: Gold-in-Soils Compilation Plan**




Note: Figure courtesy Donlin Gold

CLA 4

CLA 4

While it is understandable that the permitting system allows an initial project to be permitted, then expanded, with impacts assessed at the time of application for expansion, nonetheless, this process could underestimate cumulative impacts – for example spill risks relative to the years that fuel, chemicals, and materials would need to be barged or the length of time a pipeline will need to operate. If these are quantitatively assessed (pipeline miles over x number of years, river miles over x number of years), risks over the life of the full expanded mine will "start" at a higher risk level. If the mine expands, all aspects that are "continuing aspects" from the original project should be assessed for the full life span, not for the additional expected life span.

Impacts to resources

GEO 5

**Paleontological**

There does not seem to be evidence to support a conclusion of "minor" cumulative impacts to paleontological resources for Alternative 2 but "moderate" impact due to Alternative 4. How would Alternative 4 have "large scale changes in resource character and availability" that would not be present in Alternative 2? There also does not appear to be a reason for concluding that Alternative 3A would have "minor to moderate" cumulative effects.

HYD 12

**Surface water hydrology**

An ice road is suggested from Crooked Creek to the mine site to construct the BTC road, if Alternative 4 is chosen. This would require water withdrawals. Was that considered when analyzing impacts to surface water in the Surface Water Hydrology (DEIS 3.5.3.5, 3.5.3.8), Surface Water Quality (DEIS Section 3.7.3.5, 3.7.3.8), Cumulative Impacts (DEIS Section 4.3.1.5.3) sections?

AIQ 6

**Water quality**

The statement that

> *"The additive, incremental cumulative impacts attributable to Alternative 2 would range from minor to moderate in the mine site vicinity"*

is based on modeling that indicates the large amounts of gaseous mercury emissions from the processing plant (larger than the amount currently released by the entire state of Alaska) will move out of the area without depositing. The modeling should be reviewed by an independent expert in atmospheric chemistry of mercury. Additionally, there are concerns about the methods used to conclude that mercury methylation rates are low, and certainly there is no evidence to conclude that they would be low for Alternative 2 (DEIS p 4-31) but higher for Alternative 5A (DEIS p 4-32).

WAQ 28

There also does not appear to be any reason to presume the pit lake would have higher concentrations of metals under Alternative 5A than Alternative 2 (DEIS p 4-32), given that we are told the DSTF operating

WAQ 28

pond will have similar chemistry to the TSF pond – and after the initial TSF or DSTF draindown, the major contributor to pit lake water is the Waste Rock Facility regardless of the alternative chosen. There is no justification for Alternative 5A to have "moderate to major" cumulative impacts on water quality rather than the "minor to moderate" cumulative impact rating of Alternative 2.

**Fish, wildlife, and subsistence**

SUB 10

If Alternative 4 is chosen, the BTC road will become a permanent feature and provide new access to fish and wildlife. This area is more abundant in subsistence resources than the area that would be crossed by the Alternative 2 road, which would also become a permanent feature. This indicates that the impacts to fish, wildlife, and subsistence will be felt over a wider geographical area on a permanent time scale, and therefore the cumulative impact would be at least moderate.

SUB 19

Also, this sentence

"*The reasonably foreseeable future actions relevant to impacts to visual resources include…" (*DEIS p 4-51)

needs to be replaced with

"*The reasonably foreseeable future actions relevant to impacts to* ***subsistence*** *resources include…"*

**Socioeconomics and Environmental Justice**

SER 23

It is interesting that the cumulative impact of the Donlin mine is not expected to be large:

*The contribution of Alternative 2 to cumulative effects on socioeconomics is considered moderate, and little additional impact is anticipated from reasonably foreseeable future actions* (DEIS p 4-48)

and how ALL alternatives have potential adverse environmental justice impacts, including the no-mine alternative (Alternative 1) and the proposed mine alternative (Alternative 2) (DEIS p 4-49).

This emphasizes the need for the region to look hard at how to moderate the "bust" impacts when the mine closes, and also should be food for thought for communities and regional leaders to consider how to leverage a possible "one time" income influx into some long-term, steadier economic opportunities.

## Mitigation and Alternatives Dismissed

Mitigations considered

**Design features (Table 5.2-1)**

**A27.** *Recyclable materials, including equipment and metals, will be handled in accordance with the Donlin Waste management plan. Materials will be recycled to the extent practicable.*

- Villages along the river corridor may struggle with moving recyclables out. Donlin should consider working with communities to recycle and take advantage of the increased scale of materials.
- Donlin currently proposes to landfill much of their equipment (generators, etc.) on site at closure. They should work with communities to make equipment and parts available at closure, and remaining material should be shipped off site for recycling or disposal.

**A28.** *Monitoring activities would be conducted to include water quality, biological, vegetation, and mass stability.*

- Biological monitoring should include fish tissue, feathers, and hair to detect any changes in contaminant concentrations.
- Mass stability monitoring should occur at the waste rock facility and the tailings dam in order to detect potential movement.

**M22.** *At the completion of contouring of the WRF and TSF, a layer of unconsolidated material from the North and South overburden stockpiles will be spread over the surface that will be overlain with an additional layer of growth media (topsoil and overburden). This material will be tested to ensure it is non-PAG.*

MIT 3

- The TSF should have an impermeable cover, not a permeable "engineered" soil cover. An impermeable cover would increase the likelihood that the seepage recovery pump and pipeline system conveying seepage to the pit lake could be decommissioned.
- Material must not leach contaminants, such as arsenic, in addition to being non-PAG.

**M24.** *The project design includes maintenance of sufficient freeboard at the mine pit lake…*

- The freeboard is a mitigation feature for hydrologic and water quality upset, but poses a risk to wildlife. Fencing should be considered to keep wildlife from falling into the pit.

**T3.** *The barge operations system was designed to avoid the need for river dredging.*

- It is difficult to see how this is true, considering the shallow areas that will need to be traversed and the intent to barge during the entire open water season (110 days).

**T6, T9.** *Donlin would implement barge guidelines for operating at certain river flow rates…*
*The project design includes a communication program in communities to keep local communities informed of the schedules and current status of barge traffic as well as minimize displacement of subsistence fishing by barges.*

- Barge guidelines should also include speed limits and periods of barging suspension to protect smelt and important subsistence fish and fishermen.

MIT 3

T8. *The project design includes special flasks and metric ton containers for mercury transport.*

- Air transport of the "special flask and metric ton containers" would eliminate risk to subsistence aquatic resources.

**Mitigation considered by the Corps (Table 5.5-1)**

Table 5.5-1, Mitigation considered by the Corps, contains many good proposals. All that are feasible and effective should be required. Possible additional thought should be applied to:

- Mit 7 – ponds and/or stream connections at borrow sites. Consider potential for pike to move into borrow ponds and displace other fish that had previously used the area.

MIT 4

- Mit 9 – Managing impacts on paleontological resources. Would it be feasible to have a cultural anthropologist on staff during construction?
- Mit 10 – potential for instability at the WRF due to ice rich soils. This is a serious concern and could require a great deal more excavation to bedrock and/or mitigation such as the installation of key trenches. If a much larger area needs to be excavated, how will this impact the costs and timeline of the mine? Will there be impacts on the routing of the rock drains to the pit lake?
- Mit 14 -- sediment barriers. Straw bales should not be used in erosion control due to the potential to harbor invasive species.

Those that are effective and feasible with practicability/cost considerations that should certainly move forward include:

- Mit 6 – seismic stability analysis using a higher level seismic event

MIT 4

- Mit 16, Mit 18 – vegetative mats or root masses to facilitate revegetation. This is listed as "practicable in limited situations where salvaged material can be stored nearby and re used in a timely manner". Conceptually it would seem that this measure could easily be employed, except in winter.

**Monitoring and Adaptive Management considered by the Corps (Table 5.7-1)**

MON 11

There are many good ideas in this table, and nearly all appear to be Effective and Feasible. Those with cost considerations appear to be minor costs. In general, Adaptive Management actions or concepts should have specific triggers that put them into place. Triggers should be quantitative (time period,

contaminant concentration, etc.) and clearly stated. If trigger points are reached, they need to be documented and any actions taken need to be documented, along with follow up monitoring.

- Mon1. Options to reduce potential breach between Crooked Creek floodplain and the pit. Potentially options could also work to reduce the risk of wildlife falling into the pit, and be considered closure mitigation for wildlife impacts.

- Mon16. Bank erosion mitigation. Consider willow cuttings as an erosion control method that would also provide habitat.

- Mon 20 – Monitor and evaluate the relationship between vessel speeds and wave heights. Studies of the impacts of the Yukon Queen II between Dawson City, Yukon and Eagle, AK showed that it *did* cause fish stranding due to wakes, and impacts were primarily related to speed and distance from shore. Speeds were higher (22 – 37 mph) than those anticipated by Donlin's tugs (3.5-10 mph), but the relationship at Donlin should be monitored nonetheless. (Yukon Environmental and Socio-Economic Assessment Board. 2008. Technical review of potential impacts of Yukon Queen II operations on Salmon. 50p.)[7]

MON 11

- Mon26 – Socioeconomic monitoring. A goal of having at least 50% of the employees from the Y-K region has been stated. This, or another figure, should be a quantifiable trigger. If the level of residents employed drops below the trigger, specific measures should be put in place. These may include – additional training opportunities, cultural respect training for all employees, counseling, health/money/time management workshops, elder – youth mentoring, establishment of local day cares, and so forth. Additionally, a trigger of having a certain percent of local residents in upper management and high-paying positions should be established. Outmigration (and the impacts on the Y-K economy) should be part of socio-economic monitoring. There may also be "spin offs" where employees leave to establish their own businesses (in or out of region), and this may be a long-term positive outcome.

Mitigations Not Considered

**Protection of water quality**

MIT 33

*Raincoats*

The use of raincoats is becoming common in the mining industry and should be considered for covering the South Overburden Stockpile or other areas expected to produce poor water, to reduce seepage.

*Reducing SRS pump failure risks*

PAA 9

Could Alternative 5A Option 1 (unlined Dry Stack) have an overdrain incorporated that could be pumped, reducing the number of years that an SRS pumping system would be required? It is currently estimated to

[7] No electronic link is available for the document, but it is attached along with this letter.

need 200 years until the rate of draindown of bad water entrained in tailings is slow enough that dilution
PAA 9 with groundwater will allow it to meet water quality criteria. The expected time for the wet slurry lined TSF or the dry stack lined TSF (assuming the same leakage rate in liners) is about 50 years.

*Mercury disposal*

There are risks inherent in processing mercury-containing ore. There are worker health risks that can be mitigated (but not entirely eliminated) by placing mercury gas monitors in areas where mercury emissions are collected in the plant. There are spill risks that can be mitigated (but not entirely eliminated) by designing a good storage and containment system including secondary containment and spill response equipment.

MIT 28 There is one risk that can be entirely eliminated – the risk of a mercury spill on the Kuskokwim River. Although the risk can be reduced, it cannot be eliminated if the material is barged out – and the results of a spill would be tremendous and permanent for subsistence. This risk CAN be entirely eliminated. One option would be to set up a secure storage area in a location that is not near a subsistence river – possibly near Anchorage or Fairbanks – and fly the material to that location. Mercury disposal containers (flasks, drums) could be flown out regularly on crew change flights, or annually on a dedicated flight. Potentially a permanent RCRA site could be set up – possibly near or on JBER or Eielson AFB – for permanent storage, similar to the way Barrick set up their own RCRA site in Nevada near their mercury-bearing gold mines. A second option could be to encase the material on site, possibly underground in a secure encasement, but this should be done in coordination with DEC and with DEC personnel on site.

**Revegetation**

*Increasing soil availability*

To increase the availability of soil for reclamation, composting could be instituted adjacent to the
MIT 16 cafeteria (in a fenced or enclosed area to prevent it from becoming an attractant). Similarly, sewage sludge and wood waste can be turned into viable soil for reclamation. Using food waste and human waste in this manner would also reduce the costs of disposal.

*Willow staking*

Stream crossing, barge landing, and other areas that are disturbed could stake willows as one way to reduce erosion and simultaneously provide habitat http://plants.alaska.gov/pdf/RevTraininNome.pdf) . This currently does not appear to be proposed as an erosion control measure:

MIT 20

> *"Indirect effects could result from erosion of the exposed soil and sedimentation. Drainage and erosion control measures, both temporary and permanent, would be implemented at the mine site, transportation facilities, and along the pipeline and at facilities such as camps, storage yards, material sites, and airstrips. Donlin would develop Erosion and Sediment Control Plans (ESCP) and Storm Water Pollution Prevention Plans (SWPPP) prior to construction. These plans would outline erosion control Best Management Practices (BMPs) to minimize soil erosion after soil*

MIT 20

*disturbance, such as the use of silt fences, bale check dams, swales, and trench and ditch reinforcement with geotextile fabric or rock gabions and sediment traps"* (DEIS p 3.10-42).

Alternatives Dismissed

**PAG backfill**

The suggestion to place some PAG material in the WRF, rather than in the pit at closure, should be reconsidered. It is expected to generate poor water, some of which will not show up for decades:

PAA 14

*However, piping of the combined WRF seepage to the pit lake may need to continue indefinitely because PAG 5 rock in the WRF is predicted to have the potential to generate ARD only after several decades* (Appendix H, Section 4.1)

This poses an unnecessary risk, which could be easily mitigated by stockpiling the PAG 5 material, preferably in a lined area and with a raincoat cover to reduce seepage during mine life, prior to backfill.

## Conclusions

The DEIS in its current form is insufficient to compare all alternatives adequately, nor does it fully consider alternatives and mitigation that could be implemented.

Thank you for the opportunity to comment on the mining permit. Please feel free to contact us with questions or for further information.

Regards,

Kendra Zamzow, PhD

Dave Chambers

WAQ 25

## Attachment – Water Quality Tables

**Table 1. Water quality at stages of water treatment.** Indicates the heavy reliance on the reverse osmosis (RO) system to meet discharge water quality objectives. From Hatch July 2015.

| | units | Effluent objective | Ferric Sulfate Influent | Expected HRC effluent | Expected Greensand effluent | Meets WQS? | Expected RO effluent | Expected in RO Brine |
|---|---|---|---|---|---|---|---|---|
| Aluminum | ug/L | 87 | 1,309 | 200 | still 200 | No | 6 | 6 |
| Ammonia | mg/L | 2.16 | 2.74 | still 2.7 | still 2.7 | No | 0.6 | 0.6 |
| Antimony | ug/L | 6 | 149 | 40 | still 40 | No | 4 | 4 |
| Arsenic | ug/L | 10 | 2,228 | 200 | 50 | No | 4 | 4 |
| Barium | mg/L | met | 1 | | | | 0.02 | |
| Cadmium | ug/L | 0.25 | 0.59 | still 0.59 | still 0.59 | No | 0.036 | 0.035 |
| Calcium | mg/L | met | 135 | | | | | <540 |
| Chloride | mg/L | met | 3.9 | | | | 0.12 | <15.6 |
| Chromium | ug/L | met | 5 | | | | 0.5 | |
| Cobalt | ug/L | met | 11 | | | | 0.3 | |
| Copper | ug/L | met (8.9) | 7 | | | | | |
| Fluoride | mg/L | met | 0.45 | | | | | |
| Iron | ug/L | 1000 | 5,400 | <1,000 | met at HRC | Yes | 5 | |
| Lead | ug/L | 3.2 | 12.8 | still 12.8 | still 12.8 | No | 0.4 | 0.4 |
| Lithium | ug/L | met | 34 | | | | | |
| Magnesium | mg/L | met | 122 | | | | | <490 |
| Manganese | ug/L | 50 | 1,100 | 550 | 50 | Yes | 2 | 2 |
| Mercury | ug/L | 0.012 | 0.75 | still 0.75 | still 0.75 | No | 0.011 | 0.011 |
| Molybdenum | ug/L | 10 | 52 | 50 | still 50 | No | | 5 |
| Nickel | ug/L | met (52) | 51 | | | | | |
| pH | | met | 8.3 | | | | | |
| Potassium | mg/L | met | 14.9 | | | | | |
| Selenium | ug/L | 5 | 38 | still 38 | still 38 | No | 4 | 4 |
| Sodium | mg/L | met | 147 | | | | | |
| Strontium | ug/L | met | 1,480 | | | | | |
| Sulphate | mg/L | 250 | 620 | still 620 | still 620 | No | 22 | 22 |
| TDS | mg/L | 500 | 1,166 | still 1,166 | still 1,166 | No | 38 | 38 |
| Thallium | ug/L | met | 0.70 | | | | | |
| TSS | mg/L | 20 | 30 | still 30 | still 30 | No | | |
| Vanadium | ug/L | met | 18.80 | | | | | |
| WAD CN | ug/L | 5.2 | 17 | still 17 | still 17 | No | 4.5 | 4.5 |
| Zinc | ug/L | met (119) | 83 | | | | 3 | |

WAQ 10 **Table 2**. **Calculations indicating WTP is undersized.** Maximum flows to the water treatment plant (WTP) upon which the AWT design was based are from the Hatch July 2015 report. Flow volumes if high conductivity material is encountered (high K) are from the BGC June 2015 report. Calculation of capacity needed at the WTP are my own.

| | Maximum Flows to WTP (m3/h) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Well flow (BGC base case)** | **SRS flow** | **Upper CWD flow** | **TSF flow** | **Total** | **Well flows (high K) (BGC June 2015)** | **Calculated WTP capacity needed for high K (m3/h)** |
| -2 | 334 | 161 | 250 | 0 | 745 | 866 | 1,277 |
| -1 | 329 | 161 | 250 | 12 | 752 | 808 | 1,231 |
| 1 | 269 | 161 | 250 | 50 | 730 | 725 | 1,186 |
| 2 | 316 | 161 | 250 | 50 | 777 | 836 | 1,297 |
| 3 | 412 | 235 | 250 | 50 | 947 | 1,174 | 1,709 |
| 4 | 355 | 235 | 250 | 50 | 890 | 1,099 | 1,634 |
| 5 | 343 | 235 | 250 | 71 | 899 | 1,086 | 1,642 |
| 6 | 323 | 235 | 250 | 71 | 879 | 1,064 | 1,620 |
| 7 | 315 | 235 | 250 | 71 | 871 | 1,056 | 1,612 |
| 8 | 392 | 235 | 250 | 71 | 948 | 1,245 | 1,801 |
| 9 | 369 | 235 | 250 | 71 | 925 | 1,193 | 1,749 |
| 10 | 364 | 200 | 250 | 71 | 885 | 1,192 | 1,713 |
| 11 | 360 | 200 | 250 | 71 | 881 | 1,183 | 1,704 |
| 12 | 540 | 200 | 250 | 71 | 1,061 | 1,583 | 2,104 |
| 13 | 467 | 200 | 250 | 71 | 988 | 1,382 | 1,903 |
| 14 | 419 | 200 | 250 | 71 | 940 | 1,338 | 1,859 |
| 15 | 396 | 169 | 250 | 71 | 886 | 1,321 | 1,811 |
| 16 | 419 | 169 | 250 | 71 | 909 | 1,356 | 1,846 |
| 17 | 397 | 169 | 250 | 71 | 887 | 1,339 | 1,829 |
| 18 | 400 | 169 | 250 | 71 | 890 | 1,349 | 1,839 |
| 19 | 394 | 169 | 250 | 71 | 884 | 1,347 | 1,837 |
| 20 | 212 | 153 | 250 | 71 | 686 | 673 | 1,147 |
| 21 | 239 | 153 | 250 | 71 | 713 | 776 | 1,250 |
| 22 | 253 | 153 | 250 | 71 | 727 | 863 | 1,337 |
| 23 | 261 | 153 | 250 | 71 | 735 | 893 | 1,367 |
| 24 | 265 | 153 | 250 | 71 | 739 | 902 | 1,376 |
| 25 | 28 | 134 | 250 | 71 | 483 | 118 | 573 |

WAQ 10 **Table 3: Groundwater dewatering rates.** Shown under base case, high conductivity, and low conductivity scenarios. From the BGC June 2015 report that informed Hatch July 2015 report

| | Base Case (m3/h) | | | High K (m3/h) | | | Low K (m3/h) | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Pit Perimeter | In-Pit | Total | Pit Perimeter | In-Pit | Total | Pit Perimeter | In-Pit | Total |
| -2 | 334 | 0 | 334 | 866 | 0 | 866 | 136 | 0 | 136 |
| -1 | 311 | 18 | 329 | 780 | 28 | 808 | 148 | 10 | 158 |
| 1 | 256 | 13 | 269 | 706 | 19 | 725 | 120 | 7 | 127 |
| 2 | 208 | 108 | 316 | 525 | 311 | 836 | 101 | 52 | 153 |
| 3 | 336 | 76 | 412 | 909 | 265 | 1174 | 158 | 32 | 190 |
| 4 | 288 | 67 | 355 | 849 | 250 | 1099 | 128 | 27 | 155 |
| 5 | 260 | 83 | 343 | 786 | 300 | 1086 | 112 | 36 | 148 |
| 6 | 246 | 77 | 323 | 771 | 293 | 1064 | 101 | 30 | 131 |
| 7 | 240 | 75 | 315 | 764 | 292 | 1056 | 96 | 28 | 124 |
| 8 | 223 | 169 | 392 | 642 | 603 | 1245 | 91 | 58 | 149 |
| 9 | 228 | 141 | 369 | 636 | 557 | 1193 | 94 | 46 | 140 |
| 10 | 212 | 152 | 364 | 609 | 583 | 1192 | 87 | 52 | 139 |
| 11 | 218 | 142 | 360 | 614 | 569 | 1183 | 93 | 46 | 139 |
| 12 | 197 | 343 | 540 | 484 | 1099 | 1583 | 85 | 118 | 203 |
| 13 | 201 | 266 | 467 | 452 | 930 | 1382 | 101 | 94 | 195 |
| 14 | 181 | 238 | 419 | 434 | 904 | 1338 | 90 | 83 | 173 |
| 15 | 171 | 225 | 396 | 428 | 893 | 1321 | 85 | 77 | 162 |
| 16 | 214 | 205 | 419 | 497 | 859 | 1356 | 111 | 63 | 174 |
| 17 | 196 | 201 | 397 | 483 | 856 | 1339 | 100 | 59 | 159 |
| 18 | 187 | 213 | 400 | 473 | 876 | 1349 | 94 | 65 | 159 |
| 19 | 181 | 213 | 394 | 465 | 882 | 1347 | 90 | 63 | 153 |
| 20 | 184 | 28 | 212 | 574 | 99 | 673 | 87 | 12 | 99 |
| 21 | 195 | 44 | 239 | 627 | 149 | 776 | 86 | 21 | 107 |
| 22 | 205 | 48 | 253 | 673 | 190 | 863 | 84 | 16 | 100 |
| 23 | 211 | 50 | 261 | 696 | 197 | 893 | 84 | 15 | 99 |
| 24 | 216 | 49 | 265 | 710 | 192 | 902 | 84 | 14 | 98 |
| 25 | 13 | 15 | 28 | 49 | 69 | 118 | 2 | 2 | 4 |

**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

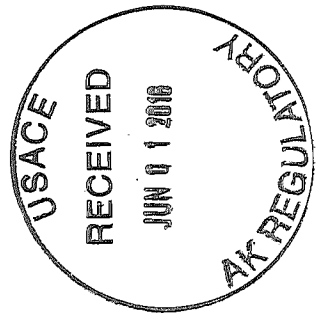
Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline.

Being an original shareholder from both; The Calista Corporation and The Kuskokwim Corporation, with strong family ties in both Crooked Creek AK & Georgetown AK. My main concern would that the Donlin Gold Project not put the subsistence way of life in jeopardy, as long as I can have some assurance, I believe we all can benefit and still preserve our traditional way of life. Thanks for your time and consideration.

Sincerely
John Edison Jr.

SUB 1

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898



| | |
|---|---|
| **From:** | Rachel Klein |
| **To:** | donlingoldeis, POA |
| **Cc:** | Maver Carey; Andrea Gusty |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, April 26, 2016 10:03:29 AM |
| **Attachments:** | Lorraine Egnaty Comment.pdf |

---

**Hi Don,**
**Please find the attached formal comment on the Donlin Gold DEIS from TKC Board Member, Lorraine Egnaty.**

**Thank-you,**

**Rachel Klein**
**Alaska Consult Services, LLC**
907-229-0383

Dear Mr. Kuhle

Hello, my name is Lorraine Egnaty. I am a Board Member for the Kuskokwim Corporation and also a Shareholder. I have mostly lived a subsistance lifestyle in the Upper Kuskokwim valley. I understand the Struggles of getting wood wood for our house, Packing water from the river, for cooking and cleaning. Hunting and fishing is necesary to Keep our familys fed. fuel for this way of living is very exspensive, which includes chainsaws, four-wheelers, out board motors and Snowmachine ~~are getting very expensive~~. Today I am living in Wasilla, Alaska with my family and have been since 2006. Education for my children was the main priority for my children.

SER 5

~~I represent the Shareholders in~~ the STATE OF ALASKA is going through an economic downturn and many Jobs around the STATE are being cut. Donlin Gold may help our Shareholders with Jobs to Support their familys living in the villages. I also Under Stand Donlin Gold will Support organizations that offer Job Skills and training for our Shareholders. Enviromental Studies

have bren a big part of the project since the exploratio which bagun in the mid 1990's and I believe that Donlin Gold is very committed to be a responsible Enviromental Developed project. To Reduce the Barge Traffic to the mine a 14 inch buried Natural gas pipeline has been recomended as the primary Source of fuel for the Project

I also understand that Donlin Gold will be the first Gold mine that use an Industry recomended Synthetic liner in it's tailings Dam. I am very much in Support of this project moving forward because I believe with the very expensive fuel and food costs going up every year our Shareholders will be able to provide for there famil with Jobs this mine will provide. Income is so Desperatly needed in the Villages especially when many State Programs are being cut in Bush Alaska.

Sincerely, Lorraine Egnaty

SER 5

Seppi, Bruce <bseppi@blm.gov>

# Donlin mine

**Carl Ekamrak** <cjkmrk@gmail.com> Sat, Feb 13, 2016 at 7:14 PM
To: "bseppi@blm.gov" <bseppi@blm.gov>

WAQ 18 I do not want donlin creek to be developed because in some years it rains nonstop all summer and then keeps on raining into the winter. When that happens the dangerous chemicals will overflow from the holding pit that they are planning to to build. That will be devastating to the fish and wildlife in and around the kuskokwim river.

PHL 1 We have been seeing the affect of the current Nyak and red devil mines. The people of Tuluksak have been dying of cancer and they have observed fish fries floating on the Tuluksak river. No matter how much they cry for help, no one has been able to make the mine accountable, not even the courts.

Sent from my iPhone

**From:** Jereme.Eklund@ch2m.com
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Thursday, April 21, 2016 9:11:27 AM

April 21, 2016

To whom it may concern,

NSB 1 I would like to express my support for the mining project at the Donlin Gold mine. Please allow the Donlin project to move forward, as mining is an important part of our Alaskan community.

Best regards,

Jereme Eklund
3515 Thompson Ave
Anchorage, AK 99508

**From:** Susan Ellis
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donnie Gold mine
**Date:** Thursday, May 26, 2016 6:22:49 AM

---

Please add Sue and Mike Ellis, of Fairbanks, Alaska, to your list of people opposing the Donlin Gold mine and associated pipeline. I am a former Iditarod musher and am especially opposed to the pipeline proposal affecting the National Historic Iditarod Trail. Short term resource extraction at this scale is too dangerous over too long a time period to accept the risks. Say NO to Donlin Gold and protect our natural resources that are needed far more than more gold going to China.
-Mike Ellis.

IDIT 8

| | |
|---|---|
| **From:** | Enos, Nick |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Donlin Gold Draft EIS comment |
| **Date:** | Tuesday, May 31, 2016 7:26:15 AM |
| **Attachments:** | image003.png<br>Donlin_Gold_DEIS_Comment_Letter_REnos_053116.pdf |

Dear Mr. Gordon,

Please consider the attached written comments on the Donlin Gold Project Draft Environmental Impact Statement (EIS). Please consider my comments in preparation of the Final EIS.

Thank you for this opportunity to provide comment, and improve the accuracy of the Final EIS.

Best Regards,

**Robert (Nick) Enos, CPG**
Senior Environmental Project Manager

(541) 385-4772 ■ (800) 865-9847 (fax)
963 SW Simpson Ave, Suite 200
Bend, Oregon 97702

Consider the environment before printing.

Robert Enos
2361 NW Lemhi Pass Dr
Bend, OR 97703

May 31, 2016

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
CEPOAK-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

Dear Mr. Gordon:

I appreciate this opportunity to submit written comments on the Donlin Gold Project Draft Environmental Impact Statement (EIS). The Notice of Availability for the Draft EIS was published in the Federal Register on November 27, 2015, and was recently amended to extend the comment period to May 31, 2016. Please consider my comments below in preparation of the Final EIS. I have tried to limit my comments to those that would be considered substantive, and as such hope that the U.S. Army Corps of Engineers (Corps) will adequately address them in the Final EIS.

In the interest of disclosure, please note that I was previously employed by the applicant, Donlin Gold. I served as the Project Environmental Coordinator from 2005-2007, Environmental Manager from 2007-2012, and Permitting Manager from 2012-2015. I also previously served as Exploration Geologist for the landowner, Calista Corporation from 1997-2004. I am no longer employed by, nor do I serve in any capacity on behalf of, either Donlin Gold or Calista. I believe that I have an extensive understanding of the project, and the relevant issues, so the comments below are mine alone.

SER 1 **<u>No Action Alternative</u>:** ***The EIS must disclose the significant negative socioeconomic impacts of "Alternative 1 – No Action".*** The Draft EIS does not adequately address, and in some cases downplays, the negative direct, indirect, and cumulative impacts to employment, income, infrastructure, services, and human health of the No Action Alternative, as compared to Alternative 2. The Draft EIS finds that socioeconomic

impacts of Alternative 1 "would be minor", and that impacts to the larger state economy "would be negligible". That finding is not accurate, does not reflect current socioeconomic trends, and fails to fully disclose the negative socioeconomic impacts that would result from no development.

SER 1 The Draft EIS states that the No Action Alternative represents "a baseline for comparison of effects". But that "baseline" does not adequately recognize current trends. Guidance on establishing a baseline is well documented in the Council on Environmental Quality's *Considering Cumulative Effects under the National Environmental Policy Act* (1997), as well as the US Environmental Protection Agency's *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (1999). As described in those documents, the description of baseline conditions should include "how they are likely to change in the future without the proposed action". Contrary to this guidance, the Draft EIS treats the current socioeconomic baseline as a static condition, thereby downplaying the negative future impacts of No Action.

SER 1 Residents of the Yukon-Kuskokwim region currently experience poverty and unemployment rates among the highest in the United States. As described in Section 3.18 of the Draft EIS, these rates are trending worse, not better. Also as noted in the same section of the Draft EIS, "(m)any people are leaving these small communities for economic opportunities in urban areas." As a result of these socioeconomic trends, the No Action Alternative would adversely impact the Yukon-Kuskokwim region, as well as the State, by halting economic development, and contributing to worsening socioeconomic conditions. Therefore, the Final EIS should properly disclose the significant adverse impacts of no development, and the summary socioeconomic impact level of "Alternative 1 - No Action Alternative" should be revised from "Minor" to "Major".

NEP 3 **No Action Alternative:** ***The EIS must disclose that "Alternative 1 – No Action" does not meet the Purpose and Need.*** The Purpose and Need, as described in the DEIS recognizes the unique land status of the mineral resource at Donlin. This project

represents an opportunity to realize the congressional intent of the Alaska Native Claims Settlement Act (ANCSA), by allowing Calista Corporation and The Kuskokwim Corporation (TKC) to develop their lands for the economic benefit of their shareholders.

The proposed mine is located on lands owned by Calista Corporation and TKC, the regional and village ANCSA corporations owning the respective mineral and surface estates. In enacting ANCSA, Congress specifically identified the need to "provide for the real economic and social needs of Natives … with maximum participation by Natives in decisions affecting their rights and property." As the Ninth Circuit Court of Appeals has recognized, "Congress intended…that those Native corporations that did select land for its economic potential would be able to develop that land and to realize that potential." The No Action alternative would extinguish Calista and TKC's ability to maximize economic benefits for their shareholders, from those lands which were conveyed to them under ANCSA. The Final EIS should disclose this and state that "Alternative 1 – No Action" does not meet the Purpose and Need.

SER 5

**Alternative 2 – Donlin Gold's Proposed Action:** ***The socioeconomic impact levels underestimate the beneficial impacts of "Alternative 2".*** The Draft EIS summarizes the socioeconomic impacts for Alternative 2 as "moderate and beneficial". While the Draft EIS acknowledges that "increased employment opportunities would benefit low-income and minority populations in particular", and that a lack of "economic opportunities appears to be a predominant cause of out-migration …", it does not appear to accurately weigh those factors in arriving at a moderate impact level.

In over 18 years of traveling among the communities of the Kuskokwim River region, I've had the opportunity first-hand to witness the positive impact that employment and business opportunities have had during Donlin Gold's exploration phase. Of the approximately 200 locally-hired employees during the peak of exploration activity, the majority stayed as residents in their home communities. Although some individuals chose to relocate, I observed that most did not. They continued to be active members of their communities, and with a source of good income, they could afford to continue to

support and enjoy subsistence activities with their families. Although obliquely referenced in the Draft EIS, this important information about the socioeconomic benefits of steady employment does not seem to be factored into the final impact level. Therefore, the Final EIS should accurately summarize the socioeconomic impact level from "Alternative 2 – Donlin Gold's Proposed Action" as being "major and beneficial".

In summary, the Corps should incorporate the following changes in the Final EIS:

1. Disclose the significant adverse impacts of no development, and revise the summary socioeconomic impact level for "Alternative 1 - No Action Alternative" from "Minor" to "Major".
2. Disclose that "Alternative 1 – No Action" does not meet the Purpose and Need.
3. Revise the socioeconomic impact level from "Alternative 2 – Donlin Gold's Proposed Action" to "major and beneficial".

I appreciate the opportunity to provide these comments, and hope that the Corps finds them constructive. I have been fortunate to have worked and traveled among the communities of the Kuskokwim River region for nearly two decades. In that time I have observed the clearly positive impact that employment and opportunity has had on the local communities and residents. Development of Donlin Gold truly has the potential to positively transform the region with opportunity, economic growth, and hope, for decades to come. Please ensure that the Final EIS fully and accurately characterizes that impact.

Sincerely,

Robert (Nick) Enos

BLM
SUBSISTENCE CONCERNS RE: DONLIN GOLD EIS

I'm Chariton Epchook, Chairman of Kwethluk Incorporated and I'm currently pushing for Alternative Number 1 "No Action" for the following reasons.

FISH 5 The traffic going up and down the Kuskokwim will cause further erosion of Corporate, Private, State and Federal lands which may also cause the salmon not to want to go up to spawn where they usually spawn other than altering the natural course of the river.

SUB 15 Most of the villages on the Kuskokwim are in areas that are considered to be in a flood plain zone. If there is a flood within the Donlin area, the villages around and below the Yukon and Kuskokwim rivers will be contaminated which will also affect our water source (Groundwater), migratory birds, all fish and aquatic organisms ~~will all be contaminated~~ and there goes our customary and traditional lifestyle. We will have caused all living things to become extinct including ourselves, leaving nothing for our younger generations.

BLM
SUBSISTENCE CONCERNS RE: DONLIN GOLD EIS

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COMMENT FORM

# Donlin Gold Mine EIS

## ANILCA 810 Subsistence Hearing

**Give form to BLM or mail to:**
BLM Anchorage Field Office
Attn: ANILCA 810 Subsistence Hearing
4700 BLM Road
Anchorage, AK 99507

**You may also fax this form to 907-267-1267 or email to bseppi@blm.gov**

**OPTIONAL: Your name and contact information**

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Tanya Epchook
PO Box 271
Kwethluk, AK 99621

**Your comments regarding subsistence impacts from the proposed Donlin Gold Mine:**

SUB 1

As many risks as there are for potential disasters with the proposed retrieval and cleaning of the material you are seeking, I cannot support the methods presented in the draft E.I.S. My name is Tanya Epchook and I am from Kwethluk and in my yupik language I am a Kuigalugmiut - which translates to 'people of the river'. I may not have all the education needed to support my comments, but what I do have is history. According to our history our people haven't fought as hard as I believe they should have but the Red Devil Mine is something we all know about, and with all the risks involved, I'm afraid all our natural resources for our subsistence way of life will be irrelevant to my grandchildren (and they don't even exist yet). Its not that I dont support the income that the mine will provide, I oppose the methods used to

SUB 1

(Continue on reverse if needed)

retrieve the Natural resource. As a person of the river, I'm asking you to find another means to achieve your goal.

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Thursday, February 25, 2016 6:53:13 AM

---

-----Original Message-----
From: Bryce Erickson [mailto:BErickson@orionmarinegroup.com]
Sent: Tuesday, February 16, 2016 11:07 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

I am in full support of developing the Donlin Gold Project. It has been in the making for many years, with millions of dollars in environmental studies showing that it can be developed responsibly. That is great news for the people of the region. I was Project Engineer for Green Construction with the contract at Red Dog Mine to finish the last couple miles of road, build the 3 dams, prepare foundations for the mill and the sleeping quarters, and perform some pre-mine development of the deposit. It was and continues to be one of the most rewarding projects for me, as it not only provided hundreds of jobs during construction in the late eighties when employment opportunities were scarce, but it continues to employ a remarkable number of people from that region and others in the State, and will for years to come. When we were training the locals during construction, we had no idea that the mine would be such a success this long.

SER 12

I wish for the same results of the Donlin Gold Project and the region's people. We are headed to tougher times in the State and this is a real bright spot. Of course, the mine will benefit the entire state. There will be equipment and supplies purchased, training required, continual environmental studies, and other contracting opportunities. Employees and vendors will be spending money in other parts of the state as they travel, vacation, etc.

This project will certainly be a tremendous boost for the state and I fully support it.

Bryce Erickson

Vice President

Orion Marine Group, Inc.

740 Bonanza Ave.

Anchorage, AK 99518

Phone 907 561 9811

Fax 907 561-9844

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**From:** Craig, Bill
**To:** Bellion, Tara; Evans, Jessica; Smith, Neal
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Wednesday, April 20, 2016 1:06:38 PM

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-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Wednesday, April 20, 2016 10:30 AM
To: Craig, Bill
Subject: FW: Donlin Gold Draft EIS comment

-----Original Message-----
From: Sarah Erkmann [mailto:erkmann@aoga.org]
Sent: Monday, April 18, 2016 4:10 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

To Whom it May Concern:

I support the proposed Donlin Gold Mine project.

I am a lifelong Alaskan, and I know how crucial resource development is to our state. In addition, I know no one does it better than Alaskans when it comes to safely and responsibly developing our abundant natural resources.

Donlin represents such an important economic opportunity for Alaskans. The project could produce gold for almost 28 years, while providing well-compensated jobs in a region where few other opportunities exist.

The State of Alaska Department of Natural Resources enforces stringent regulations overseeing mining activities statewide that effectively protect the environment, wildlife, and human health, so this project can be held to the highest environmental standards. Perhaps most significantly, new mining operations in the area, should they come to fruition, will provide economic benefit to Alaska and local communities, as well as Alaska Native corporations and shareholders.

SER 2

Please allow the Donlin Gold Mine project to keep progressing, and thank you for considering my comments.

Sarah Erkmann

(907)441-1899

**MICHAEL O. ESHLEMAN**

ATTORNEY-AT-LAW–ADMITTED IN OHIO
P.O. BOX 100–KINGS MILLS, OHIO 45034

May 5th, 2016

Mr. Keith Gordon,
Project Manager,
Regulatory Division,
Alaska District Headquarters,
U.S. Army Corps of Engineers
Post Office Box 6898
Joint Base Elmendorf-Richardson,
Alaska 99506-0898

Via fax to 907-753-5567

Re: Comments on POA-1995-120, Donlin gold mine in the Y-K Delta

Dear Mr. Gordon:

I lived in Bethel, Alaska, in 2009-2010. I believe that the thousands of jobs that the Donlin mine would bring to the Y-K Delta are desperately needed as this is a region where there are so few opportunities.

Because of that I was incredulous to read that the Yukon-Kuskokwim Health Corporation, which runs the hospital in Bethel, voted to oppose the Donlin mine because the jobs it creates might lead to citizens of the Y-K Delta moving to Anchorage. I attach a copy of the Y.K.H.C. resolution and the *Anchorage Dispatch News* article about it.

NEP 5 I believe the Army Corps of Engineers should evaluate this project on the environmental merits. It should consider things such as the risk to the environment, the chemicals to be used, the potential for harming fish and wildlife, the plans for restoring the site once the mine closes, etc. I don't believe that the fact that the project will create jobs or that it might lead people to move to or from the Y-K are factors that the Army Corps should consider.

BER 5 With respect to the clean-up after the mine is closed, the Army Corps should insist on the company maintaining a sizeable insurance policy or surety bond from a third-party to ensure that should the company fail to meet its obligations to restore the environment that the cost of the remediation work will not fall to the taxpayers as has so often happened with closed mines.

With warm regards, I am,

Yours very truly,

Michael Eshleman

Alaska Dispatch News

Published on *Alaska Dispatch News* (https://www.adn.com)



| Attachment | Size |
|---|---|
| YKHC board resolution in opposition to Donlin gold mine project [1] | 173.89 KB |

Lisa Demer [2]
April 26, 2016
**Main Image:**
Donlin Gold [3]
**Main Image Caption:**
The Donlin Gold work camp and airstrip

BETHEL – The biggest employer on the Yukon-Kuskokwim Delta has taken a stand against the biggest economic development project there, the proposed Donlin Gold mine. Its reasoning goes beyond worries over salmon, the environment and public health.

The Yukon-Kuskokwim Health Corp. board's conclusions include a counterintuitive twist. The chance for good mining jobs could lead to out-migration of workers and a drain on human capital in villages, the board says. Some Bush residents might parlay their new economic freedom into a move away, to Anchorage or beyond, only returning to the region the weeks in which they are on the job.

The YKHC board approved the resolution 19-0 April 22 to send to the Army Corps of Engineers as part of the official public comment on the Donlin Gold draft environmental impact statement.

The Army Corps on Tuesday announced that it will extend the period for public comment [4] on the EIS to May 31, responding to repeated requests for more time. The window had been set to close Saturday.

If the mine is developed, Donlin says, 3,000 jobs will be created during construction and the number during the 27 years of operation will range from 800 to 1,400.

"While there is speculation about what employees would do, during our exploration phase we had over 300 employees and the vast majority of them who were from the region stayed in the region," Donlin spokesman Kurt Parkan said in an email response to questions.

Still, some families with a Donlin employee moved from villages to urban Alaska -- workers who would have chopped wood, fished and otherwise supported village life. Donlin flew workers from Anchorage as well as from villages to the mine site, and expects to do the same if the mine is built, Parkan said.

That worries regional health leaders.

"The relocation of the families of the mine workers has caused a drain of human resources in small villages in the region and that drain is expected to increase as the workforce of the mine increases," the new YKHC resolution says.

Residents had been asking whether YKHC would take a stand, said board chairman Esai Twitchell, of the tundra village of Kasigluk. The health corporation runs the Bethel hospital and provides services in 50 towns and villages, including Bethel. Its board heard from Donlin Gold one day last week, then discussed the project the next day. Members were unified from the start in their opposition, said Twitchell, who as board chairman doesn't vote.

Most of the concerns relate to the environment and health. The resolution warns of mercury being released from crushed rock and falling into streams and land where it "will contaminate fish, animals and ultimately people." It points to the threat of longtime containments of mercury and cyanide, used in gold production. It mentions the prospect of an environmental disaster despite safety measures.

"My biggest worry ... is the potential effect on our traditional foods, in particular the salmon that use the river to migrate," Twitchell said. The health corporation wants to protect the fish and wildlife for generations, he said.

The Donlin mine site is 10 miles up Crooked Creek from the salmon-rich Kuskokwim River.

The mine would cover about 10,000 acres, but the project also includes a 315-mile natural gas pipeline from Cook Inlet and a tripling of Kuskokwim barge traffic.

Another regional group, the Association of Village Council Presidents, in 2006 passed a resolution supporting development of Donlin, "to the extent that it can be done in an environmentally sound manner" and as long as subsistence was protected.

The region is among the poorest in Alaska, and the association believed that the chance for jobs would improve lives and help address social problems.

Donlin Gold says that the project is rooted in the desire of Native corporations to develop the land to benefit shareholders. Calista Corp., the regional Alaska Native corporation, holds the mineral rights, and The Kuskokwim Corp., a for-profit company for 10 villages, owns the land.

As it is, The Kuskokwim Corp. has seen a drop in the numbers of shareholders living in the region over the past 20 years.

Six big mines already are operating safely in Alaska, Donlin says.

"We are confident we can be the 7th," Parkan wrote. "We all depend on the product of mining, whether it's our cell phones or our boats."

Operation of the Red Dog Mine, a 27-year-old lead and zinc operation near Kotzebue on a site owned by NANA Regional Corp., has led to job benefits, improved education and stability for NANA shareholders, in part through NANA's arrangements with the mine operator, according to a 2015 analysis, published in the Economic Development Journal [5].

"It gives people, even those who don't work at Red Dog, a vision that they can have a good job, and that school matters toward getting that," said Bob Loeffler, a former state mining official who now is a public policy professor at the Institute of Social and Economic Research.

Red Dog counts about 350 Native shareholders as employees, and of those 144 lived in 11 villages in the Northwest Arctic Borough, according to Loeffler's report. But it's unknown how many of the 200-plus workers who lived elsewhere, including in urban Alaska, left after they landed the job, he said.

Both Calista and The Kuskokwim Corp. see immense potential in the mine for their people. The latter already has negotiated a contract to build and run a new Donlin port site at Junguk Creek on the Kuskokwim River, said Maver Carey, president and chief executive of The Kuskokwim Corp.

"Our main concern is for the sustainability of long-term employment opportunities for shareholders to support their families, no matter where they decide to live," Carey said in a written response to questions. "It's not our decision that they stay in the region; it should be the decision of the individuals who are looking out for their individual best interest of their own families."

So far, hundreds of people and groups have submitted comments on the potential mine impacts in writing or through testimony at public meetings, said Keith Gordon, the Corps' Donlin project manager. People also can comment through the end of May on Donlin Gold's applications for key permissions, including a Clean Water Act section 404 permit to fill wetlands and a separate permit dealing with impacts to navigation, Gordon said.

The comments are being reviewed and categorized by an Army Corps contractor, AECOM. The Corps doesn't yet have a sense of how sentiment overall is breaking down, Gordon said.

The environmental review includes socio-economic factors, and the Corps has considered the prospect of out-migration, Gordon said.

"We recognized in the analyses there is the potential that folks might choose to move out, or back in," he said. "Those are personal decisions. Obviously we don't dictate that to anybody."

The resolution from the region's main health care provider will be reviewed carefully, he said. Comments from those with special expertise get extra weight, he said.

**Source URL:** https://www.adn.com/article/20160426/could-good-mining-jobs-actually-hurt-rural-alaska-villages-y-k-health-corp-thinks

**Links:**
[1] https://www.adn.com/sites/default/files/YKHC%20Donlin%20Resolution%204.22.16.pdf
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[4] http://donlingoldeis.com/Comment.aspx
[5] http://www.iser.uaa.alaska.edu/Publications/2015-MiningAndSustainableCommunities.pdf

# YUKON-KUSKOKWIM HEALTH CORPORATION

**"Working Together to Achieve Excellent Health"**

**Resolution No. 16-04-04**

**A Resolution of the Yukon-Kuskokwim Health Corporation Full Board of Directors in Opposition to the Donlin Gold Mine Project**

**WHEREAS:** The Yukon-Kuskokwim Health Corporation is a tribal organization administering self-governance programs, services, functions and activities under the Indian Self-Determination and Education Assistance Act; and

**WHEREAS:** The Mission of the Yukon-Kuskokwim Health Corporation is "Working Together to Achieve Excellent Health"; and

**WHEREAS:** The Yukon-Kuskokwim Health Corporation provides health services to people in an area of Southwest Alaska comparable in size to the State of Oregon; and

**WHEREAS:** Many people living within the service area of the Yukon-Kuskokwim Health Corporation experience poverty and unemployment rates among the highest in the United States, according to the Labor Department's Alaska's Economic Trends October 2013 report; and

**WHEREAS:** The proposed Donlin Gold mine is expected to employ 3,000 persons during construction and up to 1,400 persons during operation with a large multimillion dollar annual payroll; and

**WHEREAS:** The Board of Directors recognize that although the mine will add jobs to the region, many locally hired persons that worked for the mine have relocated from their home village to more metropolitan cities with their earnings and Donlin provides transportation from residence to work for each job rotation; and

**WHEREAS:** The earnings of many present and former employees of the mine have gone to larger cities; and

**WHEREAS:** The relocation of the families of the mine workers has caused a drain of human resources in small villages in the region and that drain is expected to increase as the workforce of the mine increases; and

**WHEREAS:** The majority of people living within the service area of the Yukon-Kuskokwim Health Corporation depend upon the Kuskokwim River for their food supply and in many villages, their water supply as well; and

**WHEREAS:** The proposed Donlin Gold mine is located approximately 150 miles northeast of Bethel, Alaska, about 10 miles from the Kuskokwim River, a large salmon producing river; and

# YUKON-KUSKOKWIM HEALTH CORPORATION

**"Working Together to Achieve Excellent Health"**

**WHEREAS:** The reported method of gold retrieval for this mine will involve blasting and crushing rock. then mixing the pulverized rock with cyanide and other chemicals; and

**WHEREAS:** The rock in the mine area contains mercury which will be released into the air through the mining process and the mercury will fall onto the streams and land and will contaminate fish, animals and ultimately people; and

**WHEREAS:** Studies are being done, but none can predict the effects of mercury, cyanide and other disruptions in the Yukon-Kuskokwim ecosystem in 100 years, when our grandchildren are living here; and

**WHEREAS:** The proposed project is expected to have the following components:

a. A 315 mile, 14 inch natural gas pipeline coming across the Alaska Range:
b. A new Barge Terminal facility in Bethel;
c. A new 5-acre port on the Kuskokwim River near Angyaruaq or Jungjuk Creek;
d. A new 30-mile road from the upriver port to the mine site;
e. A 5,000 foot airstrip
f. A 40,000,000 gallon diesel fuel tank farm:
g. A Tailings pond for waste chemicals;
h. A 2-mile long and 1-mile wide open pit; and
i. A use of 10,000 acres of land;
j. Increased Barge traffic on the River hauling fuel, chemicals (including cyanide), supplies, and equipment on the Kuskokwim River daily during the ice-free months.

**WHEREAS:** There have been examples of environmental disasters resulting from similar type large industrial sized mines that experienced unexpected failures of their safety measures; and

**WHEREAS:** A failure of the safety measures planned for the Donlin Gold Mine could cause catastrophic damage to the ecosystem of the Yukon-Kuskokwim Delta and would obliterate the subsistence way of life for the people served by the Yukon-Kuskokwim Health Corporation; and

**WHEREAS:** Such failure would devastate the fisheries on the Kuskokwim River and its tributaries, thus negatively impacting the health of the people of the region.

**NOW THEREFORE BE IT RESOLVED** that Yukon-Kuskokwim Health Corporation Full Board of Directors hereby opposes the development and operation of the Donlin Creek Gold Mine due to the extreme hazards and excessive risks it would pose to the health and welfare of the people of the Yukon-Kuskokwim Delta Region.

# YUKON-KUSKOKWIM HEALTH CORPORATION

**"Working Together to Achieve Excellent Health"**

## CERTIFICATION

Adopted at a duly convened meeting of the Board of Directors of the Yukon-Kuskokwim Health Corporation at which a quorum was present on April 22, 2016 by a vote of 19 in favor, 0 opposed, 0 abstaining, and 0 absent.

Attested:

Esai Twitchell, Chairman
YKHC Board of Directors

Patrick Tall, Secretary
YKHC Board of Directors

## Smith, Neal

**From:** Dan Esparza <danesparza70@live.com>
**Sent:** Monday, April 25, 2016 12:44 PM
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS Comment

USACE:

I support and am in favor of this development/project for the Region and the State of Alaska. Please find the following items that I would like to have added to the public review process in support of Donlin Gold and the planned development.

**Environmentally Responsible Development**

- Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project. PUB 6
- The Donlin Gold project was designed to reduce the overall footprint of the mine and allow for safe management of water over the mine life and post closure. SVE 1
- The natural gas pipeline proposal is a result of conversations with the region about reducing the amount of diesel barges on the Kuskokwim River. The use of natural gas for power generation, instead of diesel, will also reduce air emissions. PUB 6
- Donlin Gold will be the first large mine in Alaska to use a synthetic liner underneath its entire tailings impoundment. Additionally, dry closure of the tailings storage facility at the end of the mine's life is a "best practice" Donlin Gold is proposing to ensure an environmentally responsible mining project. MIT 9
- The tailings dam will be constructed of engineered rock fill and use a downstream construction method that is the most stable of all tailings dam types, designed for water storage and to withstand earthquakes.
- Donlin Gold will employ state of the art mercury emissions controls. To ensure the mercury emissions are well below air quality standards. AIQ 1
- Donlin Gold will construct an active water treatment plant to ensure that water that is discharged from the site is treated to meet water quality standards. SVE 1

**Job Opportunities and Economic Stimulant**

- Improved transportation and communications infrastructure to support the mine, including port and pipeline facilities, can provide better services and lower cost of energy, goods and services to local residents. GAS 3
- More than $480 million has been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel and other supplies, with most of that expended in the last 10 years SER 12
- The job skills and training received while working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine. SER 13
- Donlin Gold will support organizations that offer job skill training for a prepared workforce.
- 3,000 construction jobs for 4 years and between 600 and 1,200 jobs for the 27.5 estimated life of the mine, will have a significant and positive impact on the economy of the region and the state. SER 5
- In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care. SER 12

**Rights and Goals of Calista and TKC**

- The land and resources belong to the shareholders of TKC and Calista. It is TKC's and Calista's right and duty to support development of their natural resources for the benefit of the people of the region.
- Calista selected the mineral rights at Donlin Gold, and TKC selected the surface estate during the Alaska Natives Claims Settlement Act (ANCSA), so their shareholders would benefit from the development and production of the mine. This economic opportunity for shareholders and descendants is precisely the purpose behind Congress' grant of entitlement of these lands to Calista and TKC. SER 2
- As ANCSA corporations, Calista and TKC have two primary goals: generate profit for the corporation and its shareholders and provide other socio-economic opportunities and benefits to shareholders and their descendants. The Donlin Gold project will assist Calista and TKC in meeting these goals. SER 2
- The ANCSA corporations recognize the importance of subsistence lifestyle and the possibility of achieving unity and managing the land for both modern and traditional uses.

**Benefits to the Region and Alaska Natives**

- Through the ANCSA 7(i) and 7(j) revenue sharing provisions, the Donlin Gold project will provide revenue to all Alaska Native regional and village corporations and their shareholders. SER 2
- The jobs and the economic stimulus provided by Donlin Gold would help sustain communities in the YK region and fund traditional subsistence activities. SER 11
- Rural Alaska is being impacted most by the reduction of state and federal dollars. Alternative 1 (the no project alternative) would have a negative impact on the YK region. SER 1
- New, high-paying jobs will allow more residents to remain in the YK region and finance the purchase of supplies needed to maintain their traditional way of life for generations to come. SER 11
- With a local hire record of up to 90% at their camp during exploration, Donlin Gold has proven their commitment to hiring local residents. SER 15
- By reducing turnover rate from over 300% to 5% during the exploration phase, Donlin Gold has demonstrated their commitment to retaining qualified employees. SER 15
- The proposed natural gas pipeline will have excess capacity should there be an interest in accessing natural gas to address the energy needs of the YKI region. GAS 1
- Donlin Gold's continued presence in the region over the past two decades, and the partnerships developed between the company and Alaska Native Corporations and with local communities, represent tremendous opportunities for shareholders and the broader YK community. SER 24

**Transparent Operations**

- Donlin Gold has a proven record of discussing the project's plans with the people of the region and listening to what they have to say about the region and the proposed project, including meetings and materials in the Yup'ik language. PUB 2
- Donlin Gold is committed to developing a project consistent with the values of the Yup'ik and Athabascan cultures of the region.

Thank you,

**DANIEL ESPARZA**

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''22 CFR Part 125.4 (b) (9) applicable.''

**From:** Daniel S. Esparza
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Monday, April 25, 2016 12:32:15 PM

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To the USACE:

We support, and are in favor of this development/project for the Region and the State of Alaska. Please find the following items that we would like to be added to the public review process in support of Donlin Gold and the planned development.

**Environmentally Responsible Development**

PUB 6 • Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project.

SVE 1 • The Donlin Gold project was designed to reduce the overall footprint of the mine and allow for safe management of water over the mine life and post closure.

PUB 6 • The natural gas pipeline proposal is a result of conversations with the region about reducing the amount of diesel barges on the Kuskokwim River. The use of natural gas for power generation, instead of diesel, will also reduce air emissions.

MIT 9 • Donlin Gold will be the first large mine in Alaska to use a synthetic liner underneath its entire tailings impoundment. Additionally, dry closure of the tailings storage facility at the end of the mine's life is a "best practice" Donlin Gold is proposing to ensure an environmentally responsible mining project.

• The tailings dam will be constructed of engineered rock fill and use a downstream construction method that is the most stable of all tailings dam types, designed for water storage and to withstand earthquakes.

AIQ 1 • Donlin Gold will employ state of the art mercury emissions controls. To ensure the mercury emissions are well below air quality standards.

SVE 1 • Donlin Gold will construct an active water treatment plant to ensure that water that is discharged from the site is treated to meet water quality standards.

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GAS 3 • Improved transportation and communications infrastructure to support the mine, including port and pipeline facilities, can provide better services and lower cost of energy, goods and services to local residents.

SER 12 • More than $480 million has been spent on exploration of the property, engineering and environmental studies, camp support, flight services, fuel and other supplies, with most of that expended in the last 10 years

SER 13 • The job skills and training received while working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine.

• Donlin Gold will support organizations that offer job skill training for a prepared workforce.

SER 5 • 3,000 construction jobs for 4 years and between 600 and 1,200 jobs for the 27.5 estimated life of the mine, will have a significant and positive impact on the economy of the region and the state.

SER 12 • In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care.

**Rights and Goals of Calista and TKC**

SER 2 • The land and resources belong to the shareholders of TKC and Calista. It is TKC's and Calista's right and duty to support development of their natural resources for the benefit of

the people of the region.

SER 2
- Calista selected the mineral rights at Donlin Gold, and TKC selected the surface estate during the Alaska Natives Claims Settlement Act (ANCSA), so their shareholders would benefit from the development and production of the mine. This economic opportunity for shareholders and descendants is precisely the purpose behind Congress' grant of entitlement of these lands to Calista and TKC.

SER 2
- As ANCSA corporations, Calista and TKC have two primary goals: generate profit for the corporation and its shareholders and provide other socio-economic opportunities and benefits to shareholders and their descendants. The Donlin Gold project will assist Calista and TKC in meeting these goals.
- The ANCSA corporations recognize the importance of subsistence lifestyle and the possibility of achieving unity and managing the land for both modern and traditional uses.

**Benefits to the Region and Alaska Natives**

SER 2
- Through the ANCSA 7(i) and 7(j) revenue sharing provisions, the Donlin Gold project will provide revenue to all Alaska Native regional and village corporations and their shareholders.

SER 11
- The jobs and the economic stimulus provided by Donlin Gold would help sustain communities in the YK region and fund traditional subsistence activities.

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- Rural Alaska is being impacted most by the reduction of state and federal dollars. Alternative 1 (the no project alternative) would have a negative impact on the YK region.

SER 11
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SER 15
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SER 15
- By reducing turnover rate from over 300% to 5% during the exploration phase, Donlin Gold has demonstrated their commitment to retaining qualified employees.

GAS 1
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SER 24
- Donlin Gold's continued presence in the region over the past two decades, and the partnerships developed between the company and Alaska Native Corporations and with local communities, represent tremendous opportunities for shareholders and the broader YK community.

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PUB 2
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- Donlin Gold is committed to developing a project consistent with the values of the Yup'ik and Athabascan cultures of the region.

Thank you,

**DANIEL.ESPARZA**
President

**TUNISTA.CONSTRUCTION.LLC**
33400 8th Avenue South, Suite 105 / Federal Way / WA, 98003
C: 253.441.7946 / O: 253.517.9988x101
745 West 4th Avenue, Suite 306 / Anchorage / AK, 99501
O: 907.646.2214x101

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desparza@tclcon.com | www.tclcon.com

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‘‘22 CFR Part 125.4 (b) (9) applicable.’’

| | |
|---|---|
| **From:** | donlingoldeis, POA |
| **To:** | Craig, Bill |
| **Subject:** | FW: Donlin Gold Draft EIS comment |
| **Date:** | Thursday, February 25, 2016 6:50:55 AM |

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-----Original Message-----
From: Chad Estes [mailto:cestes@bdo.com]
Sent: Monday, February 15, 2016 1:37 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

Dear US Army Corps of Engineers-

I am writing the email to express my support for the Donlin Gold project here in Alaska. Below are some points that I believe provide a great deal of support showing why the project should be allowed to move forward.

Environmentally Responsible Development

* Donlin Gold has conducted extensive studies to develop an environmentally and socially responsible gold mine project.

* The Donlin Gold project was designed to reduce the overall footprint of the mine and allow for safe management of water over the mine life and post closure.

* The natural gas pipeline proposal is a result of conversations with the region about reducing the amount of diesel barges on the Kuskokwim River. The use of natural gas for power generation, instead of diesel, will also reduce air emissions.

* Donlin Gold will be the first large mine in Alaska to use a synthetic liner underneath its entire tailings impoundment. Additionally, dry closure of the tailings storage facility at the end of the mine's life is a "best practice" Donlin Gold is proposing to ensure an environmentally responsible mining project.

* The tailings dam will be constructed of engineered rock fill and use a downstream construction method that is the most stable of all tailings dam types, designed for water storage and to withstand earthquakes.

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Job Opportunities and Economic Stimulant

* Improved transportation and communications infrastructure to support the mine, including port and pipeline facilities, can provide better services and lower cost of energy, goods and services to local residents.

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* The job skills and training received while working at the mine will prepare the workforce for future work opportunities, creating a value that extends beyond the life of the mine.

* Donlin Gold will support organizations that offer job skill training for a prepared workforce.

* 3,000 construction jobs for 4 years and between 600 and 1,200 jobs for the 27.5 estimated life of the mine, will have a significant and positive impact on the economy of the region and the state.

* In addition to direct employment and contracting opportunities associated with Donlin Gold, many indirect business opportunities are anticipated in areas such as logistics, transportation, training, education and health care.

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SER 1

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* Rural Alaska is being impacted most by the reduction of state and federal dollars. Alternative 1 (the no project alternative) would have a negative impact on the YK region.

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and materials in the Yup'ik language.

* Donlin Gold is committed to developing a project consistent with the values of the Yup'ik and Athabascan cultures of the region.

Thank you for your time and consideration.

Chad

Chad D. Estes, CPA
Senior Tax Manager
907-770-2283 (Direct) 371-2283 (Internal)
907-278-5779 (Fax)
cestes@bdo.com <mailto:cestes@bdo.com>

BDO
3601 C Street, Suite 600
Anchorage, AK 99503
UNITED STATES
907-278-8878
Blockedwww.bdo.com <Blockedhttp://www.bdo.com>

<Blockedhttps://appsa.bdo.com/images/bdofooterimage.gif>

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USACE
RECEIVED
APR 0 5 2016
AK REGULATORY

March 29, 2016

Keith Gordon , Regulatory Division

Alaska District

CEPOA-RD-Gordon

P.O. Box 6898

JBER, AK 99506-0898

Dear Mr. Gordon:

My name is Johnny Evan. I represent Unit 5 on the Calista Corporation Board. I am a subsistence hunter and fisher from Tuntutuliak, Alaska. I am also retired military after 23 years of service in the Army National Guard.

I support alternative 2 of the Donlin Gold Draft Environmental Impact Statement because I believe it would bring economic stimulus to our impoverished region. If Donlin is permitted, we will get more 7j monies and it will help our village corporations and could subsidize the cost of food and heating fuel, and fuel to use for subsistence purposes. Currently we have 13,000 shareholders – if Donlin starts making money, it will increase the Corporations investment and will be able to issue substantial dividends to our current shareholders, and the to new shareholders which will increase to 45,000. I strongly urge the US Army Corps of Engineers to emphasize these important benefits to our shareholders in the Final EIS and recognize them in making permitting decisions.

SER 2

SER 6

Donlin will also continue and probably add to our scholarship program which in turn will increase the number of youth in our region attending post-secondary education. If our youth know that there are scholarships available, and that there are jobs available after earning a degree, they will be encouraged to continue their education.

SER 11

Now a days, in order to participate in subsistence activities, we need equipment, gas, oil, ammunition – if our youth work a 2 week on and 2 week off schedule, they will be able to work and have money to participate in subsistence activities.

Donlin Gold has been conducting studies for the past 20 years and have carefully created plans to construct and run an environmentally responsible project in our region. I have seen Fort Knox, Pogo, and Golden Sunlight Mines respectively, and they are conducting operations respectfully, as opposed to Red Devil and NYAC. The people from our region that will work at the mine live in our region and will be good stewards of the land and waters.

With Regards,

Johnny Evan, Unit 5 Representative

**From:** Laura Evan
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Wednesday, May 18, 2016 4:03:58 PM

SUB 17

What are your plans to have a clean up when a natural disaster pops up while the cyanide is there before purification in use. That is my concern. Also the rivers connecting to the mine. Is there a clean up response team set if there is a natural diasater? Also the 2 rivers connecting to this mine. I am also concerned about spill to these rivers that connect to the kuskokwim? I know that this mine will provide jobs to “purchase” necessary supplies to go hunt but will it employ all? My big concern will be that this mine will contaminate our whole subsistance lifestyle and if anything diasterous happens, this mine will not help with money to buy supplies so I am for learning the old way of life. Also about the barge site that is planned for bethel. I am not supporting that because it will take up the whole river and disrupt our migration of fish and definitely our subsistance gathering

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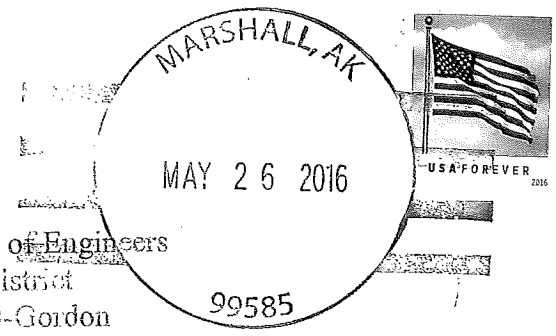
JUN 0 1 2016
AK REGULATORY

Dowlin Gold - Stantec? 5/26/16

SER 6

"As a former employee, I do reckon that Economic development in our Region is very Important. in the area, where in our Small Villages Jobs are so limited, that People rely on Subsistence, As we can see due to Chum Salmon Crash in the late 1980's. Also we are facing Today Small Numbers of King Salmon on the Yukon, that it is True our Subsistence Resources are in the Mercy due to Climate change or Over fishing. In the Past 1700's - 1800's, there onece was this, sort of Starvation Many faced Starvation, I will Restate what My Great Great Grandma Said to My dad. who is a School Teacher today, that Education is Important., that Jobs are our Safety Net. If all Subsistence Resources are depleted, Education is a Safety Net if our Subsistence Resources dont Comply to our Needs. We do Need Professional Economic development in our Small Villages. Such as Dowlin Gold, I do look forward, Such as His Venture Gives Hope to our Young People Today, Education is a Must! Because You cannot Pay Bills with Subsistence.

Marcus Edwin Marshall




U.S Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Thursday, February 25, 2016 6:46:03 AM

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-----Original Message-----
From: Laurie Fagnani [mailto:laurie@msialaska.com]
Sent: Thursday, January 28, 2016 4:42 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

Good afternoon,

I am writing to express my support for the Donlin Gold Project. As the owner of a business that represents dozens of companies employing thousands of Alaskans, I am intensely aware of how important it is for our state to develop new opportunities as oil declines.

The company I founded in my living room in 1995 with one small client has grown over the years and I am now personally responsible for employing 20 Alaskans, all with families. So this is a very personal issue for me and I care deeply about turning our economy around. Donlin's mine is exactly the sort of project we need.

SVE 1 This mine will make intelligent use of our valuable resources and fits exactly with our Constitution's instruction to develop Alaska's resources for the benefit of Alaska's people. A mine of this sort has a proven safety record and can co-exist very well with our other great resource: salmon.

SER 4 As to economic impact, Donlin's mine would employ hundreds of Alaskans and support businesses far and wide that seemingly have nothing to do with mining. I've learned in my 20 years as a company president that, when it comes to business, we are all connected.

The key to running a successful business is a stable, diversified economy. The Donlin Gold Project is exactly what Alaska needs.

Thank you,

Laurie Fagnani

<Blockedhttp://www.msialaska.com/>

Laurie Fagnani
W: 907.569.7070 <tel:9075697070> C: 907.227.3649 <tel:9072273649>
3501 Denali Street, Suite 202
Anchorage, AK 99503
Blockedwww.msialaska.com <Blockedhttp://www.msialaska.com/>

<Blockedhttps://www.facebook.com/msialaska> <Blockedhttps://twitter.com/msialaska>
<Blockedhttps://instagram.com/msicommunications/> <Blockedhttps://vimeo.com/msialaska>
<Blockedhttps://www.youtube.com/channel/UCy1KPTyrJl2EndE8ULJw84g>

MARY

Im Grant Fairbanks and I live part time in Bethel and part time on my homestead on the Holitna River.Our Holitna home is 54 miles southeast of the proposed Donlin mine.

NEP 1

My first and main concern is that there is not ample time for this public review.I request that the timeline be pushed out an additional 6 months and that there be another Bethel meeting in April.This is too rushed for such a large amount of material to be read,studied and for citizens to contact outside experts to review and then ~~discriminate~~ disseminate this to us.

Since 1974 I have been involved with many land , water, moose and salmon issues concerning the Kuskokwim watershed. I have attended many meetings concerning the Red Devil mercury super fund site.

I first heard of the Donlin Creek prospect in the 1980s and have been closely studying it every since.

I myself have elevated levels of mercury in my body and I attribute this to eating lots of Pike during our years living a subsistence life style on the Holitna.
Members of my family have been involved in the placer mining industry and it from this that I learned the big difference between placer and lode gold mining.Placer mining has had a great and positive influence here in the Kuskokwim area.Many mom and pop placer mines have helped the local economy.This new Lode gold mining industry will have an new impact on this area.Using acids and large equipment to open up ground in the Kuskokwim mercury belt has me very concerned.Its not going to be small family mines washing rocks near streams but its large multinational mining companies from Canada and beyond extracting massive

HZM 5

HZM 5

amounts of mercury and arsenic laced rock. This new type of mining promises jobs and economic windfalls to our region but with the caveat of possible pollution to our wind,earth and watersheds including Changes to our local culture and its associated subsistence lifestyle.

TWL 4

This type of mining doesn't produce minerals to make cars and hospital beds but to produce gold for the worlds market. 80% of all the lode gold mined is ultimately shipped to China and India and used for jewelry and bling.

PHL 16

In 2010 I read in a technical paper submitted to the EPA, and a very important sentence caught my eye,"while it is likely beyond the scope of the current propose rule making, the 8 year review should consider regulations that disallow mine permits on grounds of mercury release.That is,given that gold prospects exist both within and beyond high mercury areas,consideration should be given to denying

permits to or limiting the number of,mines in high mercury areas in order to achieve an overall national goal of reduced mercury emissions.

This paper also states that if Donlin were permitted it would be allowed under current EPA regulations to emit as much or more mercury than the State of Alaska's total release from all other sources.This doesn't take in to consideration all the mercury coming from China into our state from the air stream. Donlin itself has the possibility of doubling the states mercury release to the atmosphere.

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One item that continues to hit me over the head, is the idea thats its not always about the proper science or biology but it sometimes about the politics. Countless issues have been studied by the professionals and their honest science only to be waylaid by some unseen political force urged on by some unseen corporate power.I have been witness to this many times on the issues dear to my heart and

it happens all too often.

A Case in point ,Holitna Energy and the Dept of Natural Resources vs the Village of Sleetmute, a case of shallow bed methane proposed for early power to this Donlin project is a case to study. Holitna Energy, was owned by an geologist whom was involved with the early Donlin prospect, he started a company and applied to DNR for a shallow bed methane permit on the lower Holitna River.After many years of meetings and hearings the permit was changed to a natural gas permit due to unfavorable public review .

The State DNR did not allow public review of this new changed permit and the Village of Sleetmute had to hire a lawyer to stop the illegal action by DNR.It cases like this that concern me.

PUB 4

I asked for my own copy of the Donlin EIS in late November in paper form and received it

PUB 4

just before xmas.I picked up a 50 pound box at the postoffice and wondered what my wife had bought that was so damn heavy.To my surprise it was over 7000 pages of EIS.
There is not enough time for me to read this much less figure out what it means before today.I prefer to orally address my concerns so as other can hear some of what I have discovered.This region has become very apathetic when it comes to meeting,hearings and such.The people of this region generally don't have a sphere of reference when it comes to industrial pollution,smokestacks and just general mining problems.I was born in an industrial zone and do have direct knowledge of impacts from these types of projects.I had

PUB 4

hoped that the Corp of Engineers and Donlin would have provided the public with a 3rd party reviewer group to study this preliminary EIS and break it down in to language we could understand and then allow public discussion on these alternatives.This EIS is too technical for

PUB 4

the majority of the people of the region and the time allotted for discussion and study is much too short.

**I ask by a show of hands, who here in this room has had a chance to look at this EIS.... I ask who here would like more time to discuss among ourselves this enormous technical work.**

One of the largest mining companies on this planet,Barrack, owns half of this project and I have studied their mines extensively and they have a questionable track record in terms of being a good steward of this planet.
I know this doesn't have anything to do with this EIS **but doesn't it.** Past practices don't make for trusting neighbors.I know we have Federal and State agencies as our watchmen and all their acts and policies to protect us but shoot happens and it happens everyday.

We read News stories of very recent mining damn failures and what about those hundreds of Alaska mining water quality guidelines that have been exceed and the mines just keep on operating.I would like to see language in this EIS stating that when ever a permit or standard is not followed or exceeded then the permitter shuts the mine down, a cease and desist order issued, until its corrected instead of letting them just paying the fines.We are told that safeguards are in place but shoot happens. State governments and federal government budgets are cut everyday and those smaller budgets still have to monitor the permits and regulations.I just worry that 92 years from now the possibility of harming our fish and watersheds could happen because a subcontractor for a large scale mine with lots of toxic water contained in a pit lake failed to have the right tools to prevent an event or they didn't have the budget.With perpetual projects such as this as times goes on the probability of

BER 9

WAQ 18

WAQ 18 failure increases.

The following are my preliminary statements and observations as to specific alternatives.

**Alternative 1-No Action**

This alternative is my choice as opposed to Alternative-2 Donlins proposed action for the following reason

I support No Action,meaning no permits being issued thus no mine for the following reasons.

Economic uncertainties with the price of gold and Donlins recent restating of their breakeven point.Years ago Donlin stated that $540/oz was their breakeven point but recently in one of their owners quarterly report the price of breakeven was now$900.At todays current gold price of$1100/oz the margin for profit is shrinking and if the price continued to drop this mine might not be able operate at a profit.

SER 22

BER 3 Both partners of the Donlin mine do not have

the money that it takes to build this mine looking at their current stated balance sheets.This has been illustrated by Barracks statement that they are at a wait and see stage as to weather to move this mine to the development stage.They only have indicated to their partner the plan to just get thru permitting. Nova golds recent balance sheet shows that their available cash to go to build for this project and their 50% pay in, is very lacking to the tune of 90%.Granted both these companies might find financing but since they have not illustrated these capabilities then I feel they are not able and or ready to commence this project and we are just turning our wheels.Some of Barracks mines that have a breakeven point of around $1000/oz have recently be suspended from operation. Nova gold has never built a mine and as such their ability to operate a mine is in question in my book.Due to falling gold prices I worry what would happen to all the safeguards if the proposed mine was built and

BER 3

BER 3

the price of gold went below breakeven point.Under the financial assurances concerning bonding Donlin proposes to have a yearly pay in to their bonding indebtedness but what would happen if the mine were built and the pit lake was used and lets say that at year 3 the economic breakeven point were such that the partners suspended mining.There would not be enough funds available to correct a major environmental problem such as a damn breach and toxic water and tailing were to flow down Crooked Creek.

BER 1

On page 1-27 it states that the State of Alaska has not developed regulation or guidance on how to implement the trust fund statutory language.In fact if the Corp finds that the state of Alaska isn't ready or capable to develop,implement or monitor their duties it would be prudent to issue a No ACTION Alternative.Having briefly studied the states responsibility to this proposed mine I feel at this time they are not ready.This is also

BER 1

important considering the states financial problem and the Governors budget reductions.On page 1-27 it states that the state of Alaska is not required to offer a public comment period on the Reclamation and Closure Plan and Dam Certificates and associated financial assurances.I would hope the Federal Government and its agencies would not go forward with this EIS until the State of Alaska was committed to full transparency and public scrutiny. The Corp of Engineers has had many meetings and reviews of their permitting process but the State of Alaska might not allow the citizens to review some of their actions concerning this mine.

I feel that the financial assurances needed for this mine should be in place and reviewed before any permitting be allowed.

MIT 1

I see quite a few mitigating measures spelled out that would be dealt with once construction were started but what hook does the Corp have after permits are issued that would assure these

items were dealt with.
It seems to me that because certain items are not detailed out well enough and that these items will be decided on at a later date but I don't see the framework spelled out.

MIT 1

For example Barging and erosion.I have read the science and modeling for tug prop wash and bank erosion but there is not details of actual barge configuration and observations of the actual boats used and erosion observations.Its stated that mitigation measure will address this when actual barge traffic commences.I can tell you that after traveling on this river for over 10,000 mile and passing Quite a few barges that the formulas used in this EIS doesn't touch the problem.Our small river barges and tugs now used cause a very big wake and you can observe this for over a 1 ½ miles away. .My Observations of wave heights are higher than those stated in this paper. Donlin should have used real barges and in the configuration stated and with both shore observation being done for

BARG 11

BARG 11

the whole length of their proposed operations. Mitigating these after permitting doesn't seem right.In all the meeting I attended time after time this barge and erosion issue was brought up.On page 3.5-103 it is stated that increased barge traffic would not majorly impact bank erosion.I greatly question this statement.

AIQ 6

**I would like to see Mercury deposition modeling and these reviewed by a 3rd party. Before this goes to permitting and we the public need to have time to review this information.This is very very important.**

PHL 2

The state of Alaska hasn't released it Health impact statement for this mine and that should have been included in this EIS before permitting is done.

I have many more reason that I have to support Alternative 1 but these will be stated at a later date.

# Alternative 2-Donlins Plan

Ill list my concerns that were not detailed out where I could see them or items that need more work.Due to limited time to review, these concern might have been addressed.

AIQ 1 I didn't see fugitive gas and dust monitoring detailed out. I would assume that monitoring would be through out the plant and work sites.

AIQ 1 The prevailing winds for a portion of the year will be in the ETA and Crooked Creek area. I would assume that downwind residents should have a baseline reading for mercury and or other problem materials possibly released from the proposed mine. PHL 19 The second largest source of fugitive mercury will be from volatilization off the tailing pond. AIQ 1 Having looked at the dust modeling from the mine I would assume this dust will reach Crooked Creek residents and they need to be aware and tested yearly and as I MIT 28

MIT 28

stated have a baseline on file with the proper agency.

HYD 7

Stream flow....Have the residents been full aware in an informative and direct method as to the possible stream flow and or stream flow reductions modeled out in this report.If I read the predictive modeling correctly there could be stream flow restrictions of 18 to 100% of Crooked creeks water at sometimes.

PUB 4

Granted these modelings were written by scientists and I as a boiler guy might not be understanding full.This is another reason why a 3rd party needs to look at these studies and refine them down to information we can understand and this information needs to be presented to each village that might possibly be impacted.

BIRD 3

In the Ecological risk assessment for the pit lake 3.12.2.11 only 4 birds were identified as receptors and as residents of the immediate .I find that there is a model lacking.Waterfowl observations were noted on the areas small streams but there was little modeling

BIRD 3

concerning having a very large pit lake, now called Lake Calista, that would be possibly unfrozen in the spring and fall during migratory waterfowl season.It was stated that there might be a potential for perceived impact.There should have been references as to a Nevada mine problem where white fronted geese landed on a mine pit lake and the outcome wasn't good due to chemicals and ph levels. I know for a fact that these birds will land any where.This pit lake will be the biggest lake in the immediate area and not frozen and with a possible PH to do damage to these ducks and geese.This needs more research and correlation to other mines that have had this problem.I

BIRD 3

didn't see any details for deterrents to waterfowl from landing and if this is a perpetual lake then this needs to be reflected in the budget.In one place it was stated that the TSF would not be an attractant or exclusive source of water for birds.Apparently whom ever wrote this don't know Mallards like I do.

GEO 10

In the Waste rock facility there was mention of possible soil instability deeper than core drilling went and I would like to know how this will be addressed.There were assumptions about the bedrock that might change the design.

GEO 2

**Earthquakes-Alaska is the most seismically active area of the world.**

In looking at Chapter-3 environmental analysis sec 3.3 concerning geohazards and seismic conditions, figure 3.3.1 regional earthquakes and active faults. I note a spay fault trending south from the Idatarod-Nixon Fault in the direction of the proposed mine.Its noted as black or questionable, a class B fault.This should be looked at and addressed in the hazard assessment.

GEO 2

There is a new data set that President Obama announced recently while in Alaska and this should be studied in terms of access tilting.
There is a lack of information concerning blind

earthquakes in this area.The recent earthquake in Haiti shows this in that there was no surface event as this was a blind rupture.

An example of a splay fault recently here in Alaska that was never mapped was the Susistna Glacier Fault that preceded the Denali fault quake of 7.9.The unknown Susistna Glacier fault preceded the 2002 Denali fault by 7.2 seconds and was at a magnitude of 7.2. This Iditarod-Nixon Fork splay need more study and addressed by Donlin

GEO 2

I must complement this work by the Corp and Donlin as being a multitude times better than the Pebble mine Fault work.They completely missed the boat there.

GEO 2

Having this proposed mine with perpetual water treatment needs the highest safety factor available. The Dry stacking alternative will help this perceived risk.

PAA 23

I have many more reasons for not supporting Donlins Alternative 2 such as pit lake water quality and their perpetual water treatment.No one that I have talked to can support this idea and all the

WAQ 8

WAQ 8

experts that I have talked with just say it wont work. I don't trust the states bonding and financial assurances that should protect this area.I wonder if the Calista Corporation and the Kuskokwim Corporation understand that if Donlin cant meet their responsibilities of reclamation or possible cleanup then the land owners under state law will be responsible.Ive consulted two Alaska lawyers concerning this issue.One stated that the possibility of these mining companies being solvent in 70 years is laughable and mining letters of credit used by government agencies for reclamation are only good if these companies are still in business.A recent operation gold mine that closed upriver of Donlin has a toxic pit lake ready to overflow its banks and only had a 6 million dollar bond.Im sure they went thru an EIS and now possibly the tax payers will foot the bill for the cleanup and remediation.

BER 5

SER 7

Employment- In he economic section they talk about inflow and ex flow of employees. Donlin has promised jobs and other positive benefits.I believe that we will see an out flow of our best , brightest

SER 7

and many future leaders that receive jobs at Donlin. I dint see any tables or statistics concerning this issue.I know in Sleetmute that almost 80% of the Donlin workers have moved to Anchorage .There is talk from the Kotz area concerning the Red Dog mine and this very occurrence.

Alternative 3---LNG Haul Trucks
This will have a possible 32% reduction in diesel fuel barging.This will lessen subsistence fishing impacts due to barge traffic.Shore erosion will be less.
Possible Barge fuel oil spills will be less.

PAA 10

I would like to see the addition of an Alternative where there was an LNG pipeline along side a Diesel pipeline. Thus reducing barge traffic signatifly. This diesel pipeline could have a tank farm at the Kuskokwim crossing and a 3rd party could supple heating and diesel to the whole Kuskokwim river at a very high saving to the public.Im surprised that this wasn't looked at.

PAA 8

Alternative 4-Birch Tree Crossing Port
I support this alternative due to the 39% reduction in distance.There would be a reduction to barge caused salmon impacts,barge erosion to river banks.Less air pollution from tug engine emissions and potential fuel spills.
Since the river is shallower above this point the possible need for river dredging will be less.

PAA 23

Alternative 5a-Dry Stacking of tailings.
This is possibly the most important alternative in this EIS and this should be addressed by outside experts available to the Corp.
This will lessen the risk of damn failure and the potential release of toxic slurry into the Crooked watershed.
I really like the verb-age of the second line in the introduction, where it states," this was developed to avoid the perceived risk of accidental release from the tailings damns.Under this alternative there are 2 options, a lined option and an unlined option. I favor the lined option.Alternative 5 would have the SRS or seepage recovery system decommissioned

in post closure.Option 1 would be after 200 years and option 2 would be after 10-50 years.This would provide the additional advantage of lowering ground water impacts.

FISH 5

Areas that were not addressed or that I could not find in the time allotted.
During construction of the pipeline barge traffic below Devils Elbow could cause salmon habitat and salmon passage restriction due to traffic and shallow waters.This should have been studied and mitigated.

BER 1

My last area of concern is the states role in this project.This EIS doesn't cover their permitting and bonding but if the Federal government knew that the state might not be able to carry out there part of this mine in a proper way then its up to the Corp to detail this out.The EPA had deferred to the States DEC and DNR to permit many Federal water and air regulation.Under reduced states budgets this must be talked about and taken into consideration.My biggest worry is the bonding and post closure financial assurance that the State of Alaska and DNR are tasked with. Donlin has

BER 1

submitted their proposed amounts and with a mine that could potentially have a 27 year profit of 1.5 trillion dollars its seems to me that the Donlin plan only proposes under 300 million.We are talking perpetual water treatment and monitoring for the next many hundreds of years.The Corp of Engineers and their cooperation agencies need to take this into consideration before any alternatives are selected and before permitting.

Im Grant Fairbanks and I live part time in Bethel and part time on my homestead on the Holitna River.Our Holitna home is 54 miles southeast of the proposed Donlin mine. 1

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PUB 4

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BER 9

WAQ 18

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BER 3

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the money that it takes to build this mine looking at their current stated balance sheets.This has been illustrated by Barracks statement that they are at a wait and see stage as to weather to move this mine to the development stage.They only have indicated to their partner the plan to just get thru permitting. Nova golds recent balance sheet shows that their available cash to go to build for this project and their 50% pay in, is very lacking to the tune of 90%.Granted both these companies might find financing but since they have not illustrated these capabilities then I feel they are not able and or ready to commence this project and we are just turning our wheels.Some of Barracks mines that have a breakeven point of around $1000/oz have recently be suspended from operation. Nova gold has never built a mine and as such their ability to operate a mine is in question in my book.Due to falling gold prices I worry what would happen to all the safeguards if the proposed mine was built and

BER 3

the price of gold went below breakeven point.Under the financial assurances concerning bonding Donlin proposes to have a yearly pay in to their bonding indebtedness but what would happen if the mine were built and the pit lake was used and lets say that at year 3 the economic breakeven point were such that the partners suspended mining.There would not be enough funds available to correct a major environmental problem such as a damn breach and toxic water and tailing were to flow down Crooked Creek.

BER 1

On page 1-27 it states that the State of Alaska has not developed regulation or guidance on how to implement the trust fund statutory language.In fact if the Corp finds that the state of Alaska isn't ready or capable to develop,implement or monitor their duties it would be prudent to issue a No ACTION Alternative.Having briefly studied the states responsibility to this proposed mine I feel at this time they are not ready.This is also

BER 1

important considering the states financial problem and the Governors budget reductions.On page 1-27 it states that the state of Alaska is not required to offer a public comment period on the Reclamation and Closure Plan and Dam Certificates and associated financial assurances.I would hope the Federal Government and its agencies would not go forward with this EIS until the State of Alaska was committed to full transparency and public scrutiny. The Corp of Engineers has had many meetings and reviews of their permitting process but the State of Alaska might not allow the citizens to review some of their actions concerning this mine.

I feel that the financial assurances needed for this mine should be in place and reviewed before any permitting be allowed.

MIT 1

I see quite a few mitigating measures spelled out that would be dealt with once construction were started but what hook does the Corp have after permits are issued that would assure these

MIT 1

items were dealt with.
It seems to me that because certain items are not detailed out well enough and that these items will be decided on at a later date but I don't see the framework spelled out.

BARG 11

For example Barging and erosion.I have read the science and modeling for tug prop wash and bank erosion but there is not details of actual barge configuration and observations of the actual boats used and erosion observations.Its stated that mitigation measure will address this when actual barge traffic commences.I can tell you that after traveling on this river for over 10,000 mile and passing Quite a few barges that the formulas used in this EIS doesn't touch the problem.Our small river barges and tugs now used cause a very big wake and you can observe this for over a 1 ½ miles away. .My Observations of wave heights are higher than those stated in this paper. Donlin should have used real barges and in the configuration stated and with both shore observation being done for

BARG 11

the whole length of their proposed operations. Mitigating these after permitting doesn't seem right.In all the meeting I attended time after time this barge and erosion issue was brought up.On page 3.5-103 it is stated that increased barge traffic would not majorly impact bank erosion.I greatly question this statement.

AIQ 6

**I would like to see Mercury deposition modeling and these reviewed by a 3rd party. Before this goes to permitting and we the public need to have time to review this information.This is very very important.**

PHL 2

The state of Alaska hasn't released it Health impact statement for this mine and that should have been included in this EIS before permitting is done.

I have many more reason that I have to support Alternative 1 but these will be stated at a later date.

Alternative 2-Donlins Plan

Ill list my concerns that were not detailed out where I could see them or items that need more work.Due to limited time to review, these concern might have been addressed.

AIQ 1 I didn't see fugitive gas and dust monitoring detailed out. I would assume that monitoring would be through out the plant and work sites.

AIQ 1 The prevailing winds for a portion of the year will be in the ETA and Crooked Creek area.I

PHL 19 would assume that downwind residents should have a baseline reading for mercury and or other problem materials possibly released from the proposed mine.

AIQ 1 The second largest source of fugitive mercury will be from volatilization off the tailing pond.

MIT 28 Having looked at the dust modeling from the mine I would assume this dust will reach Crooked Creek residents and they need to be aware and tested yearly and as I

MIT 28

stated have a baseline on file with the proper agency.

HYD 7

Stream flow....Have the residents been full aware in an informative and direct method as to the possible stream flow and or stream flow reductions modeled out in this report.If I read the predictive modeling correctly there could be stream flow restrictions of 18 to 100% of Crooked creeks water at sometimes.

PUB 4

Granted these modelings were written by scientists and I as a boiler guy might not be understanding full.This is another reason why a 3rd party needs to look at these studies and refine them down to information we can understand and this information needs to be presented to each village that might possibly be impacted.

BIRD 3

In the Ecological risk assessment for the pit lake 3.12.2.11 only 4 birds were identified as receptors and as residents of the immediate .I find that there is a model lacking.Waterfowl observations were noted on the areas small streams but there was little modeling

BIRD 3

concerning having a very large pit lake, now called Lake Calista, that would be possibly unfrozen in the spring and fall during migratory waterfowl season.It was stated that there might be a potential for perceived impact.There should have been references as to a Nevada mine problem where white fronted geese landed on a mine pit lake and the outcome wasn't good due to chemicals and ph levels. I know for a fact that these birds will land any where.This pit lake will be the biggest lake in the immediate area and not frozen and with a possible PH to do damage to these ducks and geese.This needs more research and correlation to other mines that have had this problem.I

BIRD 3

didn't see any details for deterrents to waterfowl from landing and if this is a perpetual lake then this needs to be reflected in the budget.In one place it was stated that the TSF would not be an attractant or exclusive source of water for birds.Apparently whom ever wrote this don't know Mallards like I do.

GEO 10

In the Waste rock facility there was mention of possible soil instability deeper than core drilling went and I would like to know how this will be addressed.There were assumptions about the bedrock that might change the design.

GEO 2

**Earthquakes-Alaska is the most seismically active area of the world.**

In looking at Chapter-3 environmental analysis sec 3.3 concerning geohazards and seismic conditions, figure 3.3.1 regional earthquakes and active faults. I note a spay fault trending south from the Idatarod-Nixon Fault in the direction of the proposed mine.Its noted as black or questionable, a class B fault.This should be looked at and addressed in the hazard assessment.

GEO 2

There is a new data set that President Obama announced recently while in Alaska and this should be studied in terms of access tilting.
There is a lack of information concerning blind

earthquakes in this area.The recent earthquake in Haiti shows this in that there was no surface event as this was a blind rupture.

An example of a splay fault recently here in Alaska that was never mapped was the Susistna Glacier Fault that preceded the Denali fault quake of 7.9.The unknown Susistna Glacier fault preceded the 2002 Denali fault by 7.2 seconds and was at a magnitude of 7.2. This Iditarod-Nixon Fork splay need more study and addressed by Donlin

GEO 2

I must complement this work by the Corp and Donlin as being a multitude times better than the Pebble mine Fault work.They completely missed the boat there.

GEO 2

Having this proposed mine with perpetual water treatment needs the highest safety factor available. The Dry stacking alternative will help this perceived risk.

PAA 23

I have many more reasons for not supporting Donlins Alternative 2 such as pit lake water quality and their perpetual water treatment.No one that I have talked to can support this idea and all the

WAQ 8

WAQ 8

experts that I have talked with just say it wont work.I don't trust the states bonding and financial assurances that should protect this area.I wonder if the Calista Corporation and the Kuskokwim Corporation understand that if Donlin cant meet their responsibilities of reclamation or possible cleanup then the land owners under state law will be responsible.Ive consulted two Alaska lawyers concerning this issue.One stated that the possibility of these mining companies being solvent in 70 years is laughable and mining letters of credit used by government agencies for reclamation are only good if these companies are still in business.A recent operation gold mine that closed upriver of Donlin has a toxic pit lake ready to overflow its banks and only had a 6 million dollar bond.Im sure they went thru an EIS and now possibly the tax payers will foot the bill for the cleanup and remediation.

BER 5

SER 7

Employment- In he economic section they talk about inflow and ex flow of employees. Donlin has promised jobs and other positive benefits.I believe that we will see an out flow of our best , brightest

SER 7

and many future leaders that receive jobs at Donlin. I dint see any tables or statistics concerning this issue.I know in Sleetmute that almost 80% of the Donlin workers have moved to Anchorage .There is talk from the Kotz area concerning the Red Dog mine and this very occurrence.

Alternative 3---LNG Haul Trucks
This will have a possible 32% reduction in diesel fuel barging.This will lessen subsistence fishing impacts due to barge traffic.Shore erosion will be less.
Possible Barge fuel oil spills will be less.

PAA 10

I would like to see the addition of an Alternative where there was an LNG pipeline along side a Diesel pipeline. Thus reducing barge traffic signatifly. This diesel pipeline could have a tank farm at the Kuskokwim crossing and a 3rd party could supple heating and diesel to the whole Kuskokwim river at a very high saving to the public.Im surprised that this wasn't looked at.

PAA 8

Alternative 4-Birch Tree Crossing Port
I support this alternative due to the 39% reduction in distance.There would be a reduction to barge caused salmon impacts,barge erosion to river banks.Less air pollution from tug engine emissions and potential fuel spills.
Since the river is shallower above this point the possible need for river dredging will be less.

PAA 23

Alternative 5a-Dry Stacking of tailings.
This is possibly the most important alternative in this EIS and this should be addressed by outside experts available to the Corp.
This will lessen the risk of damn failure and the potential release of toxic slurry into the Crooked watershed.
I really like the verb-age of the second line in the introduction, where it states," this was developed to avoid the perceived risk of accidental release from the tailings damns.Under this alternative there are 2 options, a lined option and an unlined option. I favor the lined option.Alternative 5 would have the SRS or seepage recovery system decommissioned

in post closure.Option 1 would be after 200 years and option 2 would be after 10-50 years.This would provide the additional advantage of lowering ground water impacts.

Areas that were not addressed or that I could not find in the time allotted.
During construction of the pipeline barge traffic below Devils Elbow could cause salmon habitat and salmon passage restriction due to traffic and shallow waters.This should have been studied and mitigated.

FISH 5

1) My last area of concern is the states role in this project.This EIS doesn't cover their permitting and bonding but if the Federal government knew that the state might not be able to carry out there part of this mine in a proper way then its up to the Corp to detail this out.The EPA had deferred to the States DEC and DNR to permit many Federal water and air regulation.Under reduced states budgets this must be talked about and taken into consideration.My biggest worry is the bonding and post closure financial assurance that the

BER 1

BER 1

State of Alaska and DNR are tasked with. Donlin has submitted their proposed amounts and with a mine that could potentially have a 27 year profit of 1.5 trillion dollars its seems to me that the Donlin plan only proposes under 300 million.We are talking perpetual water treatment and monitoring for the next many hundreds of years.The Corp of Engineers and their cooperation agencies need to take this into consideration before any alternatives are selected and before permitting.

AIQ 6

Areas in EIS that are in need of better modeling and outlines for insuring it will be considered.
1.Need wind modeling for mercury volitization in village area.ie Crooked Creek

MIT 28

2.Baseline testing of surrounding residents and workers for mercury,yearly testing and published results.Crooked Creek residents need this.

Grant Fairbanks
BOX 370
Bethel, ak.
99559

DATA 1

# LONG TERM RISKS OF TAILINGS DAM FAILURE

David M Chambers[1], Bretwood Higman[2]

October, 2011

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## Abstract

*"Tailings storage facilities typically represent the most significant environmental liability associated with mining operations." (MMSD, 2002, p. 2)*

Large tailings dams built to contain mining waste, among the largest dams and structures in the world, must stand in perpetuity. A catastrophic release of a large amount of tailings could lead to long term environmental damage with huge cleanup costs. Tailings dams have failed at a rate that is significantly higher than the failure rate for water supply reservoir dams. The causes for the higher incidence of tailings dam failures between tailings and water supply reservoir dams are probably shaped by two factors: (1) the ability to use construction types for tailings dams that are more susceptible to failure; and, (2) the fact that tailings dams are most often constructed in sequential 'lifts' over several years that make quality control more challenging relative to water supply dams that are constructed all at once.

We know that our technology and science have limits, and that there are significant economic incentives to make present day decisions about risk less, rather than more, conservative about the magnitude of these risks. In looking at the long term risk from tailings impoundments to other resources, policy makers should view the risks from a conservative probabilistic perspective rather than relying on assumptions about specific hazards that are likely flawed.

## Long Term Tailings Dam Stability

Tailings impoundments have been around for about a century.[3] The construction and care of a tailings dam is a relatively new phenomenon to society and to mining, which historically disposed of its waste in the most convenient way. Tailings dams are also fundamentally different from water supply dams in several respects.

> *"Conventional dams generally do not need to be designed to last forever, as they have a finite life. Tailings dams have a closure phase as well as an operational phase. They have to be designed and constructed to last "forever", and require some degree of surveillance and maintenance long after the mining operation has shut down, and generation of cash flow and profit has ceased." (MMSD, 2002, p. 8)*

> *"Conventional dams are viewed as an asset. As a result, their construction, operation, and maintenance receives a high standard of care and attention from owners, who often retain in-house dam engineering expertise. Contrast this to tailings dams, which have until recently been viewed by their owners as an unprofitable, money-draining part of the mining operation. The significance of this aspect is that with such attitudes a mining operation would be naturally less inclined to expend effort in the management of its tailings facility than the owner of a conventional dam." (MMSD, 2002, p. 8)*

Tailings dams differ from water supply reservoir dams in two significant ways – dam design life, and dam construction design.

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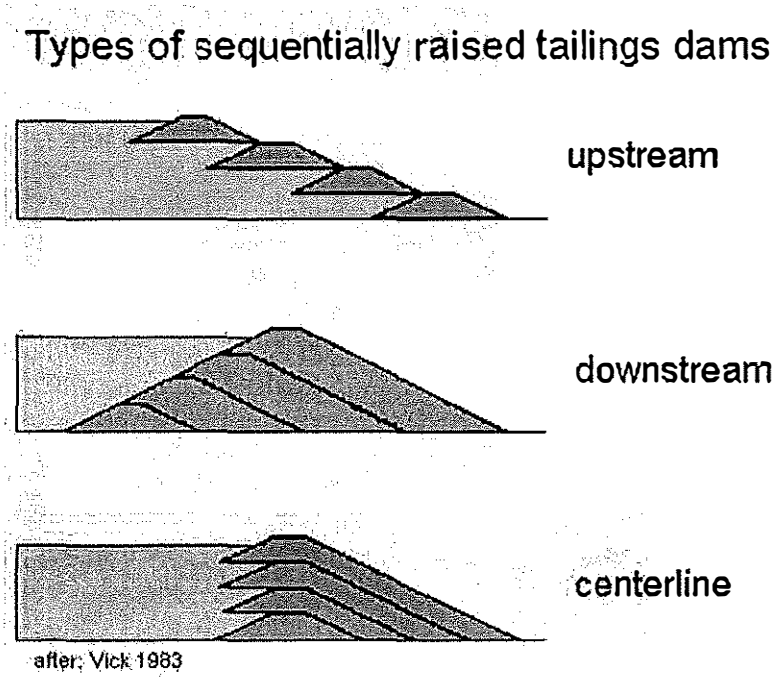
[1] Center for Science in Public Participation, 224 North Church Avenue, Bozeman, MT 59715, Ph. 406-585-9854, email: dchambers@csp2.org

[2] Ground Truth Trekking, PO Box 164, Seldovia, AK 99663, Ph: (907) 399 5530, email: hig314@gmail.com

[3] See MMSD, 2002, for a short summary of the history of modern mining.

First, unlike a dam built for impounding water, which can ultimately be drained if the structural integrity becomes questionable, a tailings dam must be built to stand in perpetuity. This consideration should impose additional design requirements, especially with regard to the seismic and hydrologic events the dam might experience. These issues will be addressed in more detail in this paper.

Second, while water supply dams are all of the downstream-type construction, the construction of tailings dam can be either (1) downstream; (2) centerline; (3) upstream; or, (4) a combination of any of the previous methods.




Downstream construction is the safest type of construction from a seismic standpoint, but is also the most expensive option.

> *"In general, dams built by the downstream or centreline method are much safer than those built by the upstream method, particularly when subject to earthquake shaking." (ICOLD, 2001, p. 24)*
>
> *"Dams built by the upstream method are particularly susceptible to damage by earthquake shaking. There is a general suggestion that this method of construction should not be used in areas where there is risk of earthquake." (ICOLD, 2001, p. 47)*

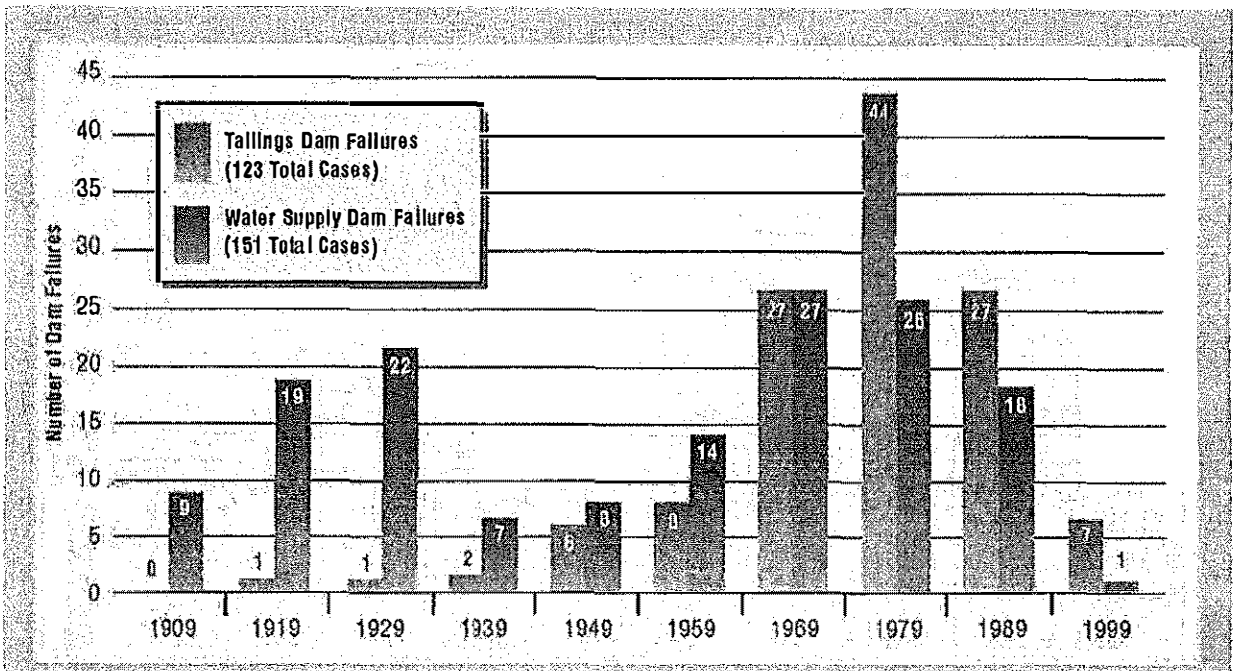
Upstream construction is the least secure because it relies on the stability of the tailings themselves as a foundation for dam construction (Davies, M.P., 2002, p. 35). Tailings are generally placed behind the dam in a slurry from the mill, and can remain saturated for long periods. Saturated, unconsolidated material is very susceptible to liquefaction under seismic loading.

But upstream dam construction, often using the coarse fraction of the tailings, is the cheapest option, and is still routinely employed in tailings dam construction today.

Centerline construction is a hybrid of downstream-type dam construction, and from a seismic stability standpoint the risk is lies between that of centerline and upstream types.

## Tailings Dam Failure Incidents

Even with an obvious requirement for long term stability, since 1970 the number of tailings dam failures has significantly exceeded the failures for dams used for water supply. See the figure below.




**HOW SAFE ARE TAILINGS DAMS?**

While it appears that the mining industry has the knowledge to design dams safely, can it be said that all dams are built to the same standards, with state-of-the art technology and management? Some are better than others, and failures have occurred. Several recent studies have been conducted to compile data on tailings dam failures, isolate the causes of these failures and identify trends (USCOLD, 1994; UNEP, 1996). No single legislative body, however, records tailings dam statistics. Furthermore, the data do not allow comparisons between the number of tailings dam failures and the total number of tailings dams built in any given area or time period.

However, comparisons have been made between tailings dam failures and incidents at hydroelectric and water-retaining structures (ICOLD 1995b). Although the database is incomplete, some convincing trends have emerged. The above chart shows a plot of the total number of failures reported for all countries in 10-year increments for both tailing dams and water supply dams. Before the 1940s, there were very few reported failures of tailings dams, either because many of the existing dams were not documented, or because the total number of failures was small. From the 1940s to the 1970s, the number of failures for both tailings dams and water supply dams increased substantially. The rise in the number of failures in the 1950s to 1960s may have been due to the increasing size and weight of earthmoving equipment. This trend peaks in the late 1960s for water supply dams, and in the 1970s for tailings dams. The overall behaviour of the two structure types is, in general terms, very similar.

***Tailings Dam and Water Supply Dam Failures (UNEP, 1998)***

There are more than 3500 tailings dams located around the world (Davies, M.P. and T.E. Martin, 2000). There are between 25,420 and 48,000 large dams worldwide[4] (World Commission on Large Dams, 2000, Annex V Dams, Water and Energy – A Statistical Profile, Table V.5 Summary of regional statistics on large dams). Tailings dam failures have occurred more frequently than water supply dam failures (Davies, M.P., 2002, p. 32). This is probably due to two factors: (1) the ability to use construction types

[4] Data from 1998. The potential variation in the total number is due in large part to the unreliability in data from China, the country with the largest number of dams in world.

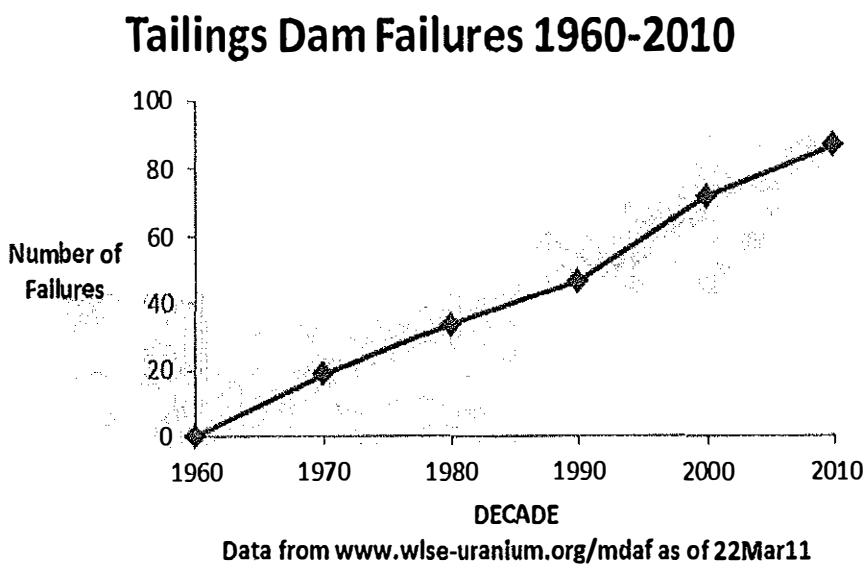
for tailings dams that are more susceptible to failure; and, (2) the fact that tailings dams are most often constructed in sequential 'lifts' over several years that make quality control more challenging relative to water supply dams that are constructed all at once.

Because of the alarmingly high number of tailings dam failures, the International Commission on Large Dams (ICOLD) convened several studies to investigate tailings dam failures.

> *"Satellite imagery has led us to the realisation that tailings impoundments are probably the largest man-made structures on earth. Their safety, for the protection of life, the environment and property, is an essential need in today's mining operations. These factors, and the relatively poor safety record revealed by the numbers of failures in tailings dams, have led to an increasing awareness of the need for enhanced safety provisions in the design and operation of tailings dams. The mining industry has a less than perfect record when tailings dam failures are reviewed." (ICOLD, 2001, p. 15)*

> *"Unfortunately the number of major incidents continues at an average of more than one a year. During the last 6 years the rate has been two per year." (ICOLD, 2001, p. 8)*

In the 10 years since the ICOLD 2001 report the failure rate of tailings dams has remained at roughly one failure every 8 months (i.e. three failures every two years).[5] Over a 10,000 year lifespan (a conservative estimate for how long these structures will need to maintain integrity) this implies a significant and disproportionate chance of failure for a tailings dam. One explanation might be that we are still experiencing the effects of old technology and practices, but it has been 15 years since the International Commission on Large Dams initiated a major effort to investigate tailings dams and change construction and operational practices, and the rate of tailings dam failures has remained relatively constant.




These dam failures are not limited to old technology or to countries with scant regulation. Previous research pointed out that most tailings dam failures occur at operating mines, and that 39% of the tailings dam failures worldwide occur in the United States, significantly more than in any other country (Rico, et. al., 2008a, p. 848).

[5] Data from http://www.wise-uranium.org/mdaf.html "Chronology of major tailings dam failures" as of March 22, 2011

## Why Tailings Dams Fail

Some of the long-term failure mechanisms for tailings dams include cumulative damage (e.g. internal dam erosion and multiple earthquake events), geologic hazards (landslides, etc.), static load induced liquefaction,[6] and changing weather patterns.

In ICOLD, 2001, (Figure 9) the three leading causes for tailings dam incidents[7] are 'overtopping', 'slope stability', and 'earthquakes'.[8] Designing for both overtopping and earthquakes requires a prediction of the largest hydrologic or earthquake "event" the tailings dam will see during its lifetime, and in each of these instances the required lifetime is almost always perpetuity. Better data, better prediction methods, and following conservative guidelines for assuming the worst-probable event are needed to remedy these problems.

Getting better data is a significant issue for both hydrologic event and earthquake prediction. The time periods we are concerned with are many millennia, but in the best case data collection is limited to decades.

Assumptions must be made as to magnitude of hydrologic and seismic "maximum" events. There is a well understood tendency to make assumptions that favor short-term economic situations, and to assume that present teclmology can and will minimize the long-term risks associated with the design, operation, and long-term closure of tailings facilities.[9] The statistics of tailings dam failures strongly suggest that these issues have still yet to be adequately addressed.

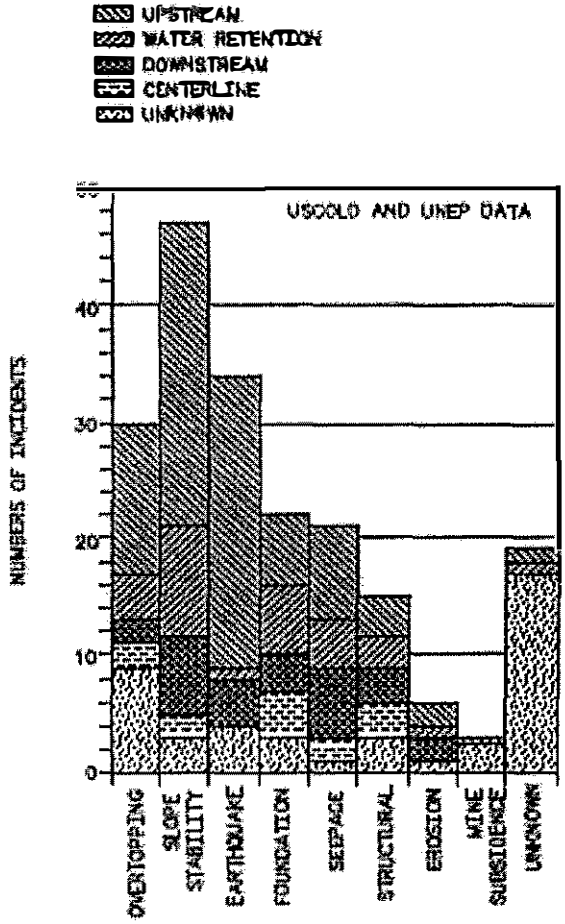



Figure 9. Tailings dam incident cause comparison with dam type.

Dam incidents in the 'slope stability', 'foundation', and 'structural' categories can be largely attributed to engineering design or construction failures. Better design and construction practices, and adopting larger margins of safety in the designs, are needed to tackle these problems.

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[6] Static liquefaction refers to the loss of strength in saturated material due to the buildup of pore water pressures unrelated to "dynamic" forces (most typically earthquakes).

[7] A "dam incident" is an unexpected event that occurs to a tailings dam that poses a threat to dam safety or the enviromnent and requires rapid response to avoid a likely dam failure. (ICOLD, 2006, p. 63) Note: The dam incidents in Figure 9, ICOLD, 2001, include "dam failures" – an event resulting in the escape of tailings and/or water from the tailings dam.

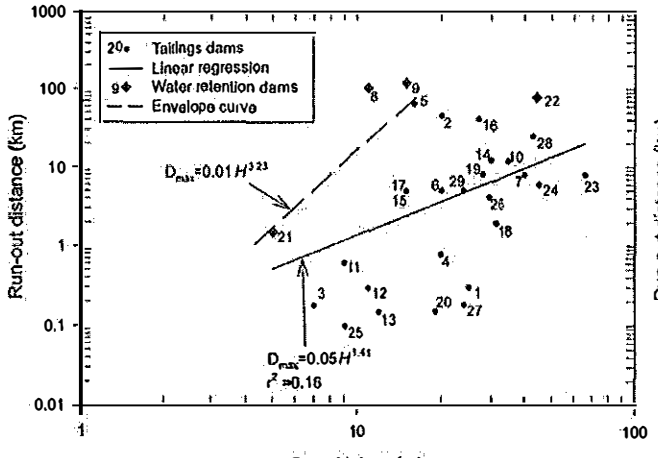
[8] "This figure (Fig.9) also indicates that the leading causes for incidents are slope instability, earthquake and overtopping: particularly so for dams constructed by the upstream method." (ICOLD, 2001, p. 20)

[9] One leading tailings dam design expert has noted: *"As time goes on, the largest event to have been experienced can always be exceeded but can never be made smaller." (European Commission, 2001, "Stability Aspects of Long-Term closure for Sulfide Tailings", Steven G. Vick)*

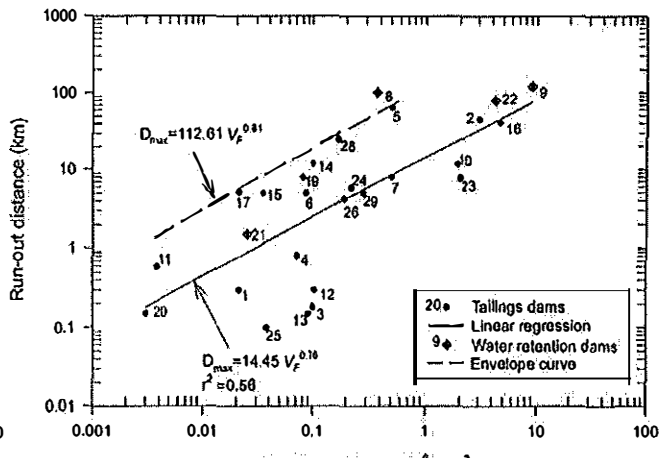
*"In the early 1970's, most of the tailings dam structural technical issues (e.g. static and earthquake induced liquefaction of tailings, seepage phenomena and foundation stability) were fairly well understood and handled in designs. Probably the only significant geotechnical issue not recognised by most designers was the static load induced liquefaction (e.g. the reason for many previously "unexplained" sudden failures). However, issues related to geochemical stability were not as well recognised, and tailings impoundments were rarely designed and operated with reclamation and closure in mind." (MMSD, 2002, p. 4)*

## When Tailings Dams Fail

Findings from research associated with tailings dam failures show estimates can be made both for the volume of tailings that could be released from a tailings dam, and the distance downstream/downgradient from the failure the waste could be expected to move.[10]




*Rico, 2008b, p. 81*




*Rico, 2008b, p. 82*

The researchers that developed these graphs noted that:

*"... key hydrological parameters associated with dam failures (e.g., outflow volume, peak discharge, mine waste run-out distance) can be estimated from pre-failure physical characteristics of the dam (dam height, reservoir volume, etc.), based on reported historic dam failures." (Rico, 2008b, p. 80)*[11]

*"The reports on tailings dam failures are incomplete and heavily biased. There is no (complete) worldwide database of all historical failures. ... The majority of tailings dam incidents remain unreported, especially in developing countries. ... To date, 250 cases of tailings dam failures in the world have been compiled." (Rico, 2008b, p.80)*

In spite of a basic understanding of the mechanisms that cause tailings dam failures, and a convincing collection of empirical data on the impact of these failures, we have continued to see tailings dams fail at a relatively constant rate over the last five decades.

*"Failures of tailings dams continue to occur despite the available improved technology for the design, construction and operation. The consequences of these failures have been heavy economic losses, environmental degradation and, in many cases, human loss." (ICOLD, 2001, p. 53)*

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[10] This research was initiated largely in response to the tailings dam failure at Los Frailes, near Seville. Spain, in 1998

[11] It is somewhat unsettling to realize that there is more than enough data on actual tailings dam failures to establish the empirical relationships presented in these graphs.

## Regulatory Framework

The design standards for most tailings dams are determined by state dam safety agencies. Although there are hazard classification and earthquake analysis guidelines for dams published by the Federal Emergency Management Agency (FEMA), these guidelines are oriented toward water reservoirs, and do not specifically address tailings dams.[12]

Closely following the FEMA recommendations are guidelines for coal tailings dams, but these guidelines do not address the much larger and potentially more damaging metal-mine tailings dams.[13] There are no definitive federal regulations governing the construction and operation of metal-mine tailings dams, and only minimal federal involvement in the design of metal-mine tailings dams, usually only when there is a lack of state oversight.[14]

The standards that do exist often lack specificity, and implementation of the standards depend in large part on the professional judgment and experience of company consultants and government regulators. While this builds regulatory and site-specific flexibility into permits for tailings dams, it also means that critical specifications are often left for company consultants to define, and regulators to approve.

## Hydrology-Related Risk

> *"Lack of control of the hydrological regime is one of the most common causes of failure. Of the cases reported here, the majority of failures were due to overtopping, slope instability, seepage and erosion; all caused by a lack of control of the water balance within the impoundments." (ICOLD, 2001, p. 31)*

The water storage capacity of a tailings dam and the water release capacity, via a spillway, is governed by the choice of the maximum hydrologic event (storm and/or snow melt) that the facility will experience over its life. Guidance for determination of the design flood event to be used for mine closure has been evolving, and is still in flux. In 1995, the International Commission on Large Dams suggested that the Probable Maximum Flood be used as the design standard, but left the possibility of utilizing a lesser event open to consideration.

> *"As in the case for the operating dam, hydrological criteria for safety of the dam after closure must be carefully considered. The Probable Maximum Flood should be considered for this evaluation although the 100-year design flood is often accepted for this purpose." (ICOLD, 1995c, p. 81)*

Six years later the International Commission on Large Dams took a stronger stand, recommending that the Probable Maximum Flood, not a lesser event, be used as the design event for mine closure.

> *"All impoundments and their retaining dams need to be able to accommodate extreme hydrologic events, up to the Probable Maximum Flood." (ICOLD, 2001, p. 31)*

Yet even today the design hydrologic event for dam construction may not be the Probable Maximum Flood, but a lesser event. The choice of a lesser event makes dam construction less expensive, and is often justified by evaluating the risk of potential impacts of dam failure. The risks evaluated are most often focused on the potential for loss of human life and damage to existing infrastructure. Long-term environmental impacts and cleanup costs are not emphasized, and often not considered.

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[12] Federal Emergency Management Agency (FEMA), 2005, Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams, FEMA 65, U.S. Department of Homeland Security, FEMA, Washington, DC.; and, Federal Emergency Management Agency (FEMA), 2004, Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams, FEMA 333, Interagency Committee on Dam Safety (ICODS), Washington, DC

[13] Mine Safety and Health Administration (MSHA), 2009, Engineering and Design Manual, Coal Refuse Disposal Facilities, prepared by D'Appolonia Engineering, May 2009

[14] For example the Army Corps of Engineers, the US Forest Service, or Bureau of Land Management might be involved in tailings dam design if there is no state oversight of dam design for a mining project that requires a federal permit.

Meteorological events led to most of the tailings dam failures, with seismic events triggering the second most failures (Rico, et. al., 2008a, p. 846). Upstream-type dam construction was involved with more of these incidents than any other type (Rico, et. al., 2008a, p. 849).

## Seismic Safety Standards for Tailings Dams

There is a risk that a large earthquake might cause catastrophic failure of a tailings dam, with the release of a large amount of tailings, and could lead to long term environmental damage with huge cleanup costs. The probability of such a catastrophic failure is low, but the consequences should it occur are very high. Cleanup costs are usually borne by the public, and if the tailings are not cleaned up, then the long term environmental and social costs would also be borne by the public.

When planning a dam, the design seismic event is often described with two terms, the Operating Basis Earthquake and the Maximum Design Earthquake. The Operating Basis Earthquake (OBE) represents the ground motions or fault movements from an earthquake considered to have a reasonable probability of occurring during the functional life-time of the project (Alaska Department of Natural Resources, 2005, p. 6-6). The Maximum Design Earthquake (MDE) represents the ground motions or fault movements from the most severe earthquake considered at the site, relative to the acceptable consequences of damage in terms of life and property (Alaska Department of Natural Resources, 2005, p. 6-6, 6-7). Since a tailings dam must stand in perpetuity, the Operating Basis Earthquake should be equivalent to the Maximum Design Earthquake.

The estimated largest earthquake that could occur at any given location is called the Maximum Credible Earthquake. The Maximum Credible Earthquake (MCE) is defined as the greatest earthquake that reasonably could be generated by a specific seismic source, based on seismological and geologic evidence and interpretations (Alaska Department of Natural Resources, 2005, p. 6-6). The Maximum Credible Earthquake is often associated with a recurrence interval of 10,000 years.[15]

Existing regulatory guidelines for the choice of the location of the Maximum Design Earthquake or Maximum Credible Earthquake, which do not specifically consider metal-mine tailings dams, leave the final location of these seismic events for project-related experts to determine. For most projects engineering experts from consulting firms, hired by mining companies, use deterministic or probabilistic methods to select the location and size of the Maximum Credible Earthquake and/or Maximum Design Earthquake. This is a complex process, and regulators are typically involved only at an approval level, not in the detailed analysis.

Engineering consultants are not experts on determining the amount of risk that is appropriate in determining public policy. Public policy determinations on risk are typically reflected in regulatory requirements, but for the determination of the size of the Maximum Credible Earthquake and/or Maximum Design Earthquake for a tailings dam there is a great deal of regulatory flexibility, often exercised by one regulator.

### *Choice of the "Design Event" – How Large and How Far Away?*

For tailings dams the Maximum Design Earthquake is a key variable, since the facility (dam) must provide perpetual containment for the waste. The choice of the MDE should reflect the largest event that the dam would be expected to experience during its functional lifetime, and survive the shaking produced by this event. Because tailings dams are structures that must impound waste with chemical properties and/or physical properties that pose long term risk to the public and the environment, assumptions related to critical design parameters for these structures should be the most conservative in order to protect public interests and public safety.

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[15] Large Dams the First Structures Designed Systematically Against Earthquakes, Martin Wieland, ICOLD, The 14th World Conference on Earthquake Engineering, Beijing, China, October 12-17, 2008

The Maximum Design Earthquake is a predicted maximum earthquake described in terms of size and distance from the dam. The MDE is typically used in computer models to evaluate how a dam will respond to earthquakes. The science used to determine the MDE, while sophisticated, has limits. The physical properties of seismic events have only been recorded since the early 1900's (Introduction to Seismology, Peter Shearer, Cambridge University Press). On most faults, no earthquake has happened within that time frame, so paleoseismology techniques must be used to estimate earthquake size in the more distant past. In many areas, the faults are not mapped or analyzed, further reducing the confidence in these determinations. There is still a great deal of uncertainty over the potential size, and more importantly the location, of future seismic events.

The choice of the Maximum Design Earthquake for a tailings dam becomes important not only from the perspective of determining the largest seismic event that dam can withstand and still hold back the material it is impounding, but also because there is a direct correlation between the size of the MDE and the cost of constructing the dam – the larger the MDE, the greater the cost of the dam. Tailings dam construction costs generally run from tens to hundreds of millions of dollars. Tailings dam construction cost is one of several significant factors in determining the cost of mining, and the competiveness of the mine in the international markets.[16]

***Estimating Earthquake Size and Location***

***Probabilistic Method:*** In order to estimate the earthquake potential of a given region, geologists use data from historic earthquakes, combined with studies of known faults. For well-studied faults, there are both historic measurements, and prehistoric earthquake estimates gleaned from paleosismic studies. A probability distribution over time is created based on the recurrence interval (how frequently an earthquake occurs) and the distribution of earthquake sizes on that fault. To account for the potential of earthquakes on unknown faults, this distribution is combined with information from smaller, historic earthquakes across the region. Seismic instruments can measure earthquakes down to a very small size, and record many earthquakes for which no fault is known. Statistical methods can be used to take the occurrence and size of these small earthquakes and estimate a probability distribution that includes larger earthquakes as well. In order to choose a Maximum Design Earthquake, a time frame and a probability are specified. For example, you might decide to design for the largest earthquake with at least a 2% chance of occurrence, over the next 1,000 years.

***Deterministic (Fault Length) Method:*** Another method for determining earthquake potential is to estimate the maximum energy that could be released for a given fault. Earthquake energy in a given event is closely related to the length of rupture. Therefore, a rupture across the entire length of a fault will produce the maximum possible energy on that fault. This can be calculated if the fault length is known. The advantage of this method is that it gives a true maximum, rather than a probability, for a known fault, eliminating the uncertainties in estimating recurrence interval and earthquake size prior to instrumental measurement. The disadvantage of this method is that it does not account for unknown faults, or faults of unknown length.

If the deterministic (fault length) method is used to estimate the maximum earthquake size, location can be described simply as the closest point on the measured fault. In the probabilistic method a statistical analysis is done to determine the largest earthquake that might occur in a given geographic area.

> *"Strictly speaking, the MCE is a deterministic event, and is the largest reasonably conceivable earthquake that appears possible along a recognized fault or within a geographically defined tectonic province, under the presently known or presumed tectonic framework. But in practice, due to the problems involved in estimating of the corresponding ground motion, the MCE is usually defined*

[16] Other significant cost factors for a mine include the construction of the mine and mill facilities, power generation, and operating costs (labor, materials, fuel, etc.).

*statistically with a typical return period of 10,000 years for countries of low to moderate seismicity." (Wieland, M, ICOLD, 2008, p.7)*

However, probabilistic methods can be viewed as inclusive of all deterministic events with a finite probability of occurrence (McGuire, c1999, p. 1).

*"Deterministic and probabilistic seismic hazard analyses should be complementary. The strength of one over the other depends on the earthquake mitigation decisions to be made, on the seismic environment, and on the scope of the project. In general, more complex decisions and subtler, detailed seismic environments strongly suggest the probabilistic analysis, whereas simpler decisions and well-understood seismicity and tectonics point toward deterministic representations." (McGuire, c1999, p. 6)*

***The "Design Earthquake" – How Large and How Far Away?***

The choice of the Maximum Credible Earthquake as the Maximum Design Earthquake for a tailings dam is an appropriately conservative choice for the design seismic event. For most structures, including the design of buildings and other structures that are designed with finite lifetimes, the choice of a Maximum Design Earthquake is often one with a recurrence interval significantly less than that of the Maximum Credible Earthquake, since these structures will not be used indefinitely.

Tailings dams, however, require a very conservative choice of design event. Once these structures are built, it is not economically or environmentally viable to move the waste that is impounded behind the dam. The dam must hold this waste safely in perpetuity. We don't know how long 'perpetuity' means, but 10,000 years (e.g. the approximate time since the last ice age) is a minimum approximation.

*"According to the current ICOLD guidelines, large dams have to be able to withstand the effects of the so-called maximum credible earthquake (MCE). This is the strongest ground motion that could occur at a dam site. In practice, the MCE is considered to have a return period of several thousand years (typically 10'000 years in countries of moderate to low seismicity)." (Wieland, ICOLD, 2001)*

The unintended release of the waste behind a tailings dam imposes real costs on society. There is a direct economic cost associated with cleaning up the waste that would escape from a failed impoundment, which can run into the hundreds of millions of dollars.[17] If there is no cleanup the long term environmental costs will be borne by local communities, both natural and human, and could be even larger than the direct cleanup costs.

Tailings dams, which must impound the waste behind the dam in perpetuity, should use the Maximum Credible Earthquake as the Maximum Design Earthquake. However, because cost is a significant factor in the economic viability of mining projects, the Maximum Credible Earthquake is considered, but often not required as the Maximum Design Earthquake for tailings dams in many regulatory jurisdictions.[18]

Although much progress has been made on designing large dams to withstand seismic events, there is still much progress to be made.

*"Dams are not inherently safe against earthquakes. In regions of low to moderate seismicity where strong earthquakes occur very rarely, it is sometimes believed (i) that too much emphasis is put on the seismic hazard and earthquake safety of dams, and (ii) that dams designed for a seismic coefficient of 0.1 are sufficiently safe against earthquakes as none of them has failed up to now. Such arguments are not correct.*

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[17] For example the Los Frailes dam break (near Seville, Spain), April 1998. As of August 2002 the cleanup cost was 276 million Euros (El País/El Mundo, August 3, 2002)

[18] For example, the State of Alaska does not require the use of the Maximum Credible Earthquake for tailings dam design. (Alaska Department of Natural Resources, 2005, Table 6-2. Operating- and Safety-Level Seismic Hazard Risk)

*For the earthquake safety evaluation the same criteria (dam must withstand the MCE ground motion) as for the hydrological safety (PMF must be released safely) have to be considered." (Wieland, M, ICOLD, 2008, p.7)*

Once the size of the design seismic event has been determined, it must be given a location. The further away the tailings dam is from the location of the earthquake, the less energy the tailings dam will need to withstand in order to maintain its structural integrity. The closer the location of the earthquake to the tailings dam, the higher the cost of building the dam, because the closer the earthquake the more energy the dam will have to withstand.

Seismologists know that there are many active faults that have not been mapped or have been mapped inaccurately, that some faults believed to be inactive may actually be active, and that there are many inactive faults that may become active again.[19] Because of these considerations, probabilistic methods are the more conservative way to determine the magnitude of a Maximum Credible Earthquake for dam analysis.

For tailings dams the most conservative choice for the location of the Maximum Design Earthquake would be what is sometimes referred to as a 'floating earthquake' on an undiscovered fault that passes very near the site of the dam. This is a way of recognizing that we do not know the present, future, and even the past locations of significant faulting, and associated earthquakes (National Research Council, 1985, pp. 67-68). The conservative choice for a Maximum Design Earthquake would be a Maximum Credible Earthquake that ruptures the ground surface on which the dam is built.

**Post Closure Monitoring and Maintenance**

Even when the reclamation process has been completed for a tailings facility, there is still need for ongoing monitoring and maintenance.

*"Experience regarding the long term behavior of tailings storage facilities (TSFs) is limited. Most are still in the phase of after care. Our knowledge is constantly increasing, but the closed and remediated tailings dams today (2006) are less than one or two decades old i.e. most experience of the long term stability of tailings dams after closure is still limited. In this case the long term is defined as 1000 years, or more." (ICOLD, 2006, p. 39)*

The International Commission on Large Dams/United Nations Environmental Program publications describe some of the factors driving the need for long term monitoring and maintenance. These include dam stability, which requires monitoring for (ICOLD, 1996b, p. 21):

- seepage discharges through the dam, foundation, or abutments;
- phreatic surface[20] in the tailings pond and dam;
- pore pressures in the dam;
- horizontal and vertical movements in the dam

In addition to these conventional risks to dams, the need to confine tailings behind the constructed dam impose additional long-term monitoring concerns, including progressive processes that degrade dam stability over time, including (ICOLD, 2006, p. 44):

- weathering of materials
- water and wind erosion
- ice and frost forces
- intrusion by vegetation and animals

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[19] Faults, and the corresponding earthquakes, are most often very deep structures. The major source of the energy associated with an earthquake is usually located a significant distance below the earth's surface.

[20] The phreatic surface is the surface of the water-saturated part of the ground, i.e. the groundwater level.

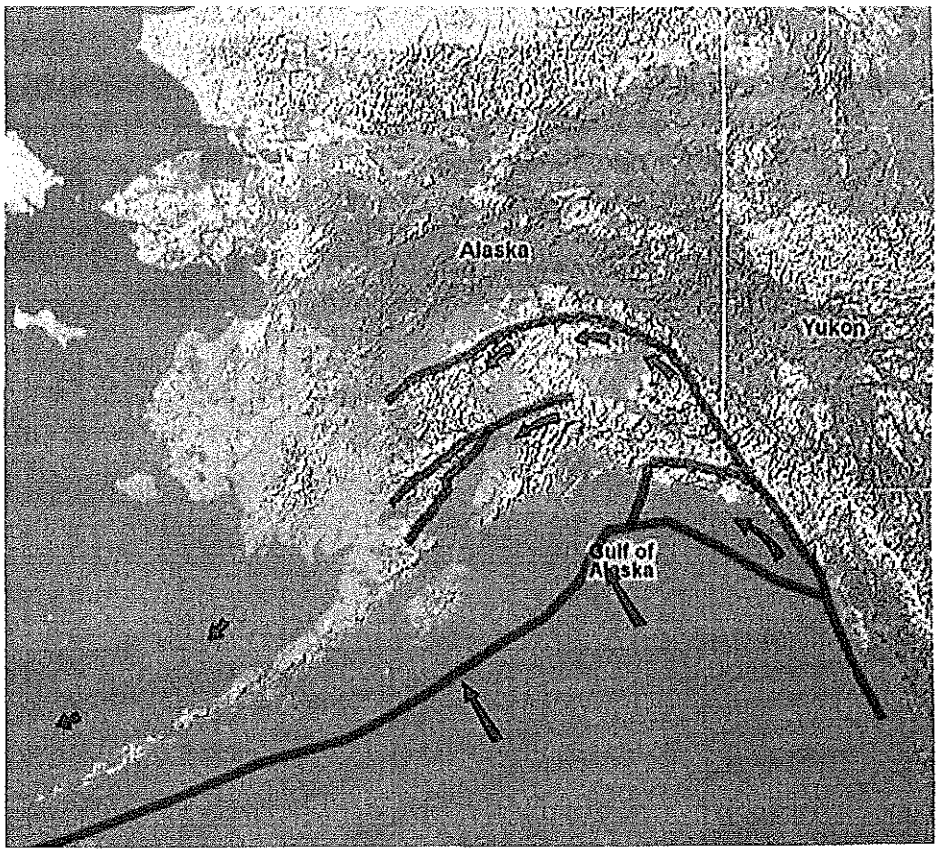
To meet these and any additional needs financial provision for not only perpetual monitoring, but also for any repairs that may be required to correct any deficiencies detected as a result of the monitoring activities, monies must be provided as a part of the financial surety for the mine.

The uncertainty in estimating the long-term monitoring and maintenance costs, and especially in providing adequate monies for repairs that may be required, is obvious.

**Case Study: Seismic Risk in the Area of the Pebble Mine**

The tectonic deformation of southern Alaska is driven by collision of the Pacific Plate with the North American Plate. Faults in the area around Lake Iliamna, along with most of Western Alaska, have not been studied in detail. Lake Iliamna straddles the west edge of the band of earthquakes and volcanoes that comprises the Pacific 'Ring of Fire'. It's the sort of place where active faults are likely, but little fieldwork has been done and few instruments have been deployed to measure plate motion or earthquakes.

There is good evidence that most of southcentral Alaska, called the 'Southern Alaska Block' (Haeussler, 2008) is a section of the earth's crust that is moving westward relative to the rest of North America. The Denali Fault, in the Alaska range, is the main fault that this block moves along, but there are other faults, including the Castle Mountain Fault just north of Anchorage, that allow it to deform and move westward. Additionally, there is evidence that the crust beneath the Bering Sea (called the 'Bering Block', Mackey et al., 1997), is rotating clockwise relative to North America and eastern Russia. And the Pacific Plate, which extends all the way from the Gulf of Alaska down into the South Pacific, is sliding northwards, beneath continental crust that forms Alaska.




The tectonic deformation of southern Alaska is driven by collision of the Pacific Plate with the North American Plate. This map shows some of the prominent known faults that bound different fragments of crust in southern Alaska. Arrows depict how the pieces are moving relative to North America (longer arrows mean faster motion).

At the Pebble prospect, to the east is the Southern Alaska Block, to the northwest is the Bering Block, and to the south is the Pacific Plate. It is unclear whether the Lake Ilianma region is part of the Bering Block or Southern Alaska Block. It may even be that the Bering Block and Southern Alaska Block have no distinct boundary between them (Redfield et al., 2007).

Also, there are known faults in the area that were once active, and which may or may not currently be active. The Lake Clark Fault, an extension of the Castle Mountain Fault, extends southwest from Lake Clark Pass down through Lake Clark (Haeussler et al. 2004). The Bruin Bay Fault branches from the Castle Mountain and Lake Clark faults near Tyonek, and runs south along the Cook Inlet coast into Katmai National Park.

Given the lack of instruments and geological fieldwork in the area it is very possible that subtle evidence of activity on these faults and others has simply been missed.

There are several potential sources of earthquakes that might affect Pebble. The source for the largest potential earthquake comes from the subduction zone along the Aleutian Trench south of the coast in the Gulf of Alaska. This was the source of the famous 1964 magnitude 9.2 Alaska earthquake.

There are also a series of fault systems that parallel the Aleutian Trench on the Alaska mainland north of the subduction zone. One of these faults is the Denali Fault zone. A magnitude 7.9 earthquake occurred along the Denali Fault in 2002. Another of these parallel faults is the Lake Clark Fault. This is the fault that comes closest to Pebble.

A final seismic threat is what is generally termed as a "floating' earthquake, that is, one that is not associated with a known fault. It is generally assumed that this floating earthquake would occur very near to the site being evaluated, but could also be of a lesser magnitude than an earthquake associated with a known fault system. Any actual earthquake will occur on a fault, but the "floating" earthquake is a statistical construct used to estimate the risk of an earthquake on an unknown fault.

The energy from an earthquake dissipates as it radiates from the source (the source is a planar surface extending into the earth rather than a point). So, the further away a location is from the source of the earthquake, the less energy is available to cause motion at the dam location. The 1964 earthquake ruptured to within approximately 125 miles from the Pebble site, while the 2002 rupture extended to within about 260 miles. The Lake Clark Fault (an extension of the Castle Mountain Fault) is less than 20 miles from Pebble. Therefore, the Lake Clark Fault is much more likely to be the source of the Maximum Credible Earthquake at the Pebble Mine site.

This is especially problematic, because the location of the Lake Clark Fault is not known, and it is possible that it runs directly through the area of proposed development at Pebble (Haeussler et. al., 2004). The Lake Clark Fault is almost certainly less active than the Denali Fault, meaning that it has a longer recurrence interval between earthquakes. However, in the long time span that a tailings dam is required to maintain integrity, it has a significant chance of producing an earthquake of 7.9 or similar magnitude. A difference of only a mile in the location of this fault could have a dramatic impact on the potential ground acceleration at the tailings dam, and hence on the engineering constraints for the dam. The larger the earthquake, the more energy, and the longer the period of shaking that will take place at the dam site.

***Alaska Regulatory Requirements***

Alaska dams fall into one of three classes:

(1) Class I - Probable loss of one or more lives
(2) Class II - No loss of life expected, although a significant danger to public health may exist
(3) Class III - Insignificant danger to public health
(Alaska Department of Natural Resources, 2005, Section 2.4 Hazard Potential Classification, Table 2-1. Hazard Potential Classification Summary, in Appendix B of this paper)

The Alaska dam classification system is designed primarily for water retention dams. Tailings dams are not specifically mentioned in the Alaska regulations, yet tailings dams are the largest dam structures in the state. From a classification standpoint the main difference between a Class I and Class II dam is essentially that people are directly at risk below a Class I dam, but there are no human habitations directly

below a Class II dam. However, from a performance standpoint the most significant difference in dam safety requirements between a Class I and Class II dam is the size of the earthquake the dam is required to withstand (see Alaska Department of Natural Resources, 2005, Section 6.3.2 Design Earthquake Levels, Table 6-2. Operating- and Safety-Level Seismic Hazard Risk, in Appendix B of this paper).[21] Class II dams must withstand seismic events with return periods of 1,000 – 2,500 years, and Class I dams 2,500 years to the Maximum Credible Earthquake (Alaska Department of Natural Resources, 2005, Table 6-2). Note that it is not mandatory to use the Maximum Credible Earthquake as the Maximum Design Earthquake for a Class I dam.

***Choice of MCE & MDE at Pebble***

As discussed in Knight-Piesold, 2006, under Alaska dam classification regulations a tailings dam would be classified as a Class II dam (Knight Piesold Ltd., 2006, Section 3.2.3 Design Earthquakes).

The most recent information about seismic considerations for tailings dams (Tailings Storage Facility - TSF,) at the Pebble site comes from the Preliminary Assessment of the Pebble Project, Southwest Alaska, Wardrop-Northern Dynasty Mines, February 17, 2011, p. 52:

> *"Recognizing the seismic characteristics of Alaska, particular attention has been paid to understanding seismic risk factors in the TSF design. The embankment design parameters conform to Alaska Dam Safety regulations, under which they would be classified as Class II structures. Extensive research has been conducted into historical seismic events, in Alaska generally and in southwest Alaska in particular, to support an assessment of the probability and magnitude of seismic events that might affect Pebble.*
>
> *Analysis of public domain literature was undertaken to determine the location of likely sources for seismic events near Pebble, with the most likely candidate identified as the Lake Clark Fault. The location of this fault has been identified as part of a geophysical survey of the region. Using these data, as well as public domain information, the energy that might be released if a major earthquake were to occur along the Lake Clark Fault has been determined.*
>
> *The parameters used in this analysis are extremely conservative. For instance, while there is no evidence of movement along the Lake Clark Fault since the last glaciers receded some 10,000 years ago, TSF seismic design criteria assume that it is an active fault. Further, sections of the Lake Clark Fault nearest the Pebble Project are actually splays of the main fault and thus unlikely to release the same energy as if the entire fault was to move. Nonetheless, TSF seismic design criteria have conservatively assumed that the Lake Clark Fault is both active and capable of a seismic event equivalent to slippage along the entire fault."*

This 2011 summary appears to reflect earlier work done by Knight-Piesold Ltd., for Northern Dynasty in 2006. In the sections on seismic risk from the Knight-Piesold Ltd., 2006, Report.[22]

> *"Consistent with current design philosophy for geotechnical structures such as dams, two levels of design earthquake have been considered: the Operating Basis Earthquake (OBE) for normal operations; and the Maximum Design Earthquake (MDE) for extreme conditions (ICOLD, 1995a).*

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[21] This points to a fundamental flaw in the Alaska Dam Classification Seismic Stability Regulations, where large tailings dams could be regulated as Class II dams with significantly less seismic safety requirements than Class I, even though they are the largest dams in Alaska, and have an infinite lifetime. The author has discussed this situation with officials in the Alaska Department of Natural Resources, and while sympathetic they point to the difficulty in changing regulations, and the flexibility of the State to require some dams to be Class I. However, some large Alaska tailings dams have been classified as Class II in the past (Red Dog, although it is voluntarily being upgraded to Class I), and the possibility for this happen again still unnecessarily exits.

[22] See Appendix A of this paper for these sections in their entirety.

*Values of maximum ground acceleration and design earthquake magnitude have been determined for both the OBE and MDE.*

*Appropriate OBE and MDE events for the facilities are determined based on a hazard classification of the facility, with consideration of the consequences of failure. The hazard classification was carried out using the criteria provided by the document "Guidelines for Cooperation with the Alaska Dam Safety Program" (2005). Classification of the facilities is carried out by considering the potential consequences of failure, including loss of life, economic loss and environmental damage. The hazard classification has been assessed as at least Class II (Significant). The OBE and MDE are selected based on the dam hazard classification and an appropriate earthquake return period, as defined by the "Guidelines for Cooperation with the Alaska Dam Safety Program" (2005).*

*For a Class II hazard classification, the OBE is selected from a range of return periods from 70 to 200 years, depending on the operating life of the facility, the frequency of regional earthquakes and the difficulty of quickly assessing the site for repairs. The impoundment would be expected to remain functional during and after the OBE and any resulting damage should be easily repairable in a limited period of time.*

*The MDE is typically selected from a range of return periods from 1,000 to 2,500 years for a Class II hazard classification. However, the MDE for the Pebble TSF has been conservatively based on a Class I hazard classification making it equivalent to the Maximum Credible Earthquake (MCE), which has a bedrock acceleration of 0.30 g corresponding to a magnitude M7.8 earthquake, occurring along the nearby Castle Mountain Fault system." (Knight Piesold Ltd. 2006, Section 2.5 Seismicity and Embankment Stability)*

Although the Pebble NDM consultants have decided to base their calculations on the "Maximum Credible Earthquake", their use of the deterministic method for the MDE/MCE does not appear to meet ICOLD standards for locating the MDE/MCE. The Pebble NDM consultants assume the Lake Clark Fault is 18 miles from the minesite, and using this deterministic location ignores the risks from unknown or poorly-mapped faults, and could also lead to underestimating the amount of energy that could impact a tailings dam at the Pebble minesite.[23]

Although Knight-Piesold considers that Maximum Design Earthquake for the Pebble dam design to be the Maximum Credible Earthquake, an examination of Table 3.1 of the report reveals that the calculations for maximum horizontal acceleration are based on a 1-in-5000 year earthquake, not the 1-in-10,000 year event recommended by the International Commission on Large Dams (Knight Piesold Ltd., 2006, Section 3.2.2 Seismic Hazard Analyses, Table 3.1, in Appendix A of this paper). The choice for the magnitude of the Maximum Credible Earthquake for Pebble is not the same, and not as conservative, as that recommend by International Commission on Large Dams.

Because a return period of 5000 years has been chosen instead of the 10,000 years recommended by ICOLD, it is unlikely that the horizontal acceleration of the 1 in 3,000 – 5,000 year event (0.3 g – Knight Piesold Ltd., 2006, Section 3.2.2 Seismic Hazard Analyses, Table 3.1, in Appendix A of this paper) is as large as that of the horizontal acceleration for a 1 in 10,000 year event would be.

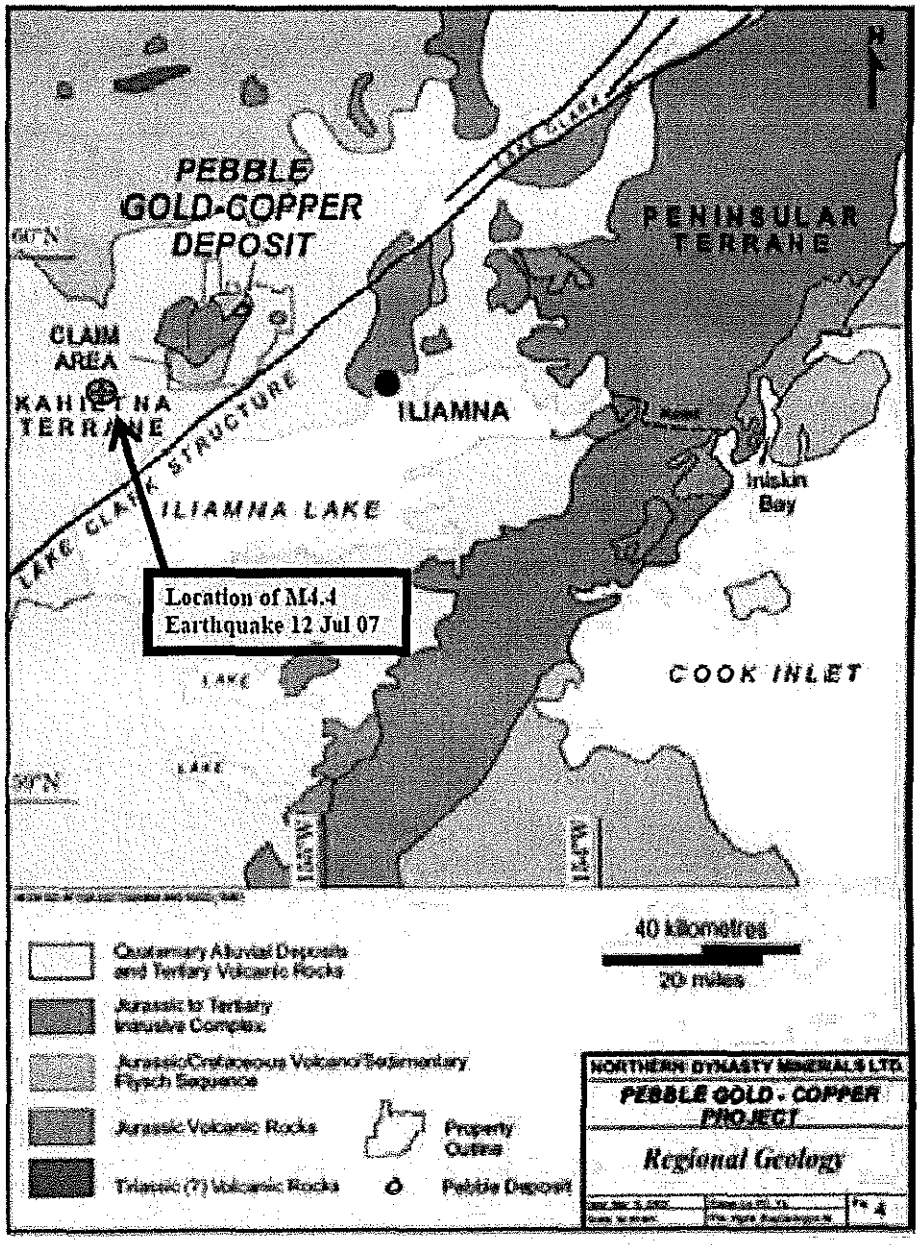
Using a seismic event with a return period of 5000 years implies that the dam will experience an earthquake of this magnitude sometime during the 5000 year period. Over 10,000 years the dam could experience an earthquake of this size twice. Using an earthquake with a return period of 10,000 years would probably mean that the dam would have to be designed to withstand more energy and longer

[23] Table 3.2, Section 3.2.2 Seismic Hazard Analyses, Knight Piesold Ltd., 2006, in Appendix A of this paper, shows the deterministic locations and associated magnitudes of the Maximum Design Earthquakes analyzed for Pebble in 2006. A probabilistic floating earthquake is not included in this analysis.

shaking. This means more expense in building the dam, but it would make the dam less likely to partially or fully fail over the long term.

Another factor affecting the size of the Maximum Design Earthquake is the location of the Maximum Credible Earthquake. Knight-Piesold has not chosen to locate its Maximum Credible Earthquake as a floating earthquake near the dam site, but picked a location for the Maximum Credible Earthquake deterministically 18 miles away (Knight Piesold Ltd., 2006, Section 3.2.2 Seismic Hazard Analyses, Table 3.2, in Appendix A of this paper). As mentioned, fault locations in this area are imprecise. The potential for an earthquake occurring in a different place than expected is the major downfall of this deterministic method of risk estimation, particularly in places, like the Pebble area, where faults have been poorly mapped.

It is very possible that an active fault could be located closer to the mine-site than assumed by Knight-Piesold. Knight-Piesold has made statements assuring that they have done "extensive research" into seismic potential in the area, but the lack of fieldwork or peer reviewed research on these faults suggests this research may not be adequate. The choice of the location for the Maximum Design Earthquake, on the Lake Clark Fault 18 miles from the mine-site may be inaccurate, which could lead to a dramatic underestimation the peak ground acceleration that could impact a tailings dam at the Pebble mine-site (Knight Piesold Ltd., 2006, Section 3.2.2 Seismic Hazard Analyses, Table 3.2, in Appendix A of this paper).




**This earthquake had a magnitude of 4.4 and a depth of 6.2 km. (Alaska Earthquake Information Center)**

In fact, there was a small earthquake on July 12, 2007, located approximately 20 miles from the Pebble location. This earthquake had a preliminary magnitude of 4.4 and was located at a depth of about 6.2 km (approximately 4 miles) (Alaska Earthquake Information Center, Information Release, as of 2May11, www.aeic.alaska.edu). This earthquake was not located on a known fault, but it is potentially in line with

one of the splays of the Lake Clark Fault. This type of earthquake suggests either the extension of a known fault or an unmapped fault, either of which may pass closer to the Pebble site than the current estimate.

Picking the Maximum Design Earthquake using a deterministic method when the location of the fault is uncertain is insufficiently conservative to protect public safety over the life of the tailings dam. Lacking more accurate mapping, a probabilistic method that locates a 'floating earthquake' very near the facility should be used.

**Conclusions**

As a society we still don't fully understand the long term implications of storing billions of tons of potentially harmful waste in large impoundments. We have been building large tailings dams for about a century, but these structures must maintain their integrity in perpetuity, so we have only a relatively short history of their performance.

What we do know is that the technology for designing and identifying the long term threats to these structures has been advancing steadily during this same time. These advances to the technology have usually been prompted by dam failures that have identified the need for further analysis, as well as the need for more conservative assumptions for design specifications and in the magnitude of natural events like floods and earthquakes that pose long term risks for these structures.

When we consider the recorded life of these structures (a century at most) to the length of time that they must function (millennia) the number of failures we have experienced in the first century of their operation is not comforting. The International Commission on Large Dams (ICOLD) summarized some of the underlying causes for these failures in 2001 Bulletin (Tailings Dams, Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences, Bulletin 121, International Commission on Large Dams, 2001):

> *"Causes (for dam failure) in many cases could be attributed to lack of attention to detail. The slow construction of tailings dams can span many staff changes, and sometimes changes of ownership. Original design heights are often exceeded and the properties of the tailings can change. Lack of water balance can lead to "overtopping": so called because that is observed, but may be due to rising phreatic levels causing local failures that produce crest settlements." (ICOLD, 2001, p. 53)*
>
> *"... the technical knowledge exists to allow tailings dams to be built and operated at low risk, but that accidents occur frequently because of lapses in the consistent application of expertise over the full life of a facility and because of lack of attention to detail." (ICOLD, 2001, p. 55)*
>
> *"By highlighting the continuing frequency with which (dam failures) are occurring and the severe consequences of many of the cases, this Bulletin provides prima facie evidence that commensurate attention is not yet being paid by all concerned to safe tailings management." (ICOLD, 2001, p. 55)*
>
> *"... the mining industry operates with a continual imperative to cut costs due to the relentless reduction in real prices for minerals which has been experienced over the long term, plus the low margins and low return on capital which are the norm. The result has been a shedding of manpower to the point where companies may no longer have sufficient expertise in the range of engineering and operational skills which apply to the management of tailings." (ICOLD, 2001, p. 56)*

The Pebble case study provides interesting insight into preliminary design choices for the technical, environmental, and economic factors that drive decisions today and may affect future generations that will inherit the responsibility and liability for managing these structures. Policy guidance from an organization with responsibilities to guide the safe construction and management of large dams (ICOLD) tell us that we should be making 'conservative' engineering decisions when designing tailings dams. But we can also see that the recommended design specifications for the tailings dams at Pebble (and at other

mines) are not based on the most conservative assumptions about the source and proximity of the largest seismic event that might be experienced at the dam site.

While these decisions may be rationalized in terms of defining 'reasonable' risk, we must also acknowledge that lessening the assumptions about the amount of risk associated with the design of the tailings dam may be motivated by lessening the present day economic cost to the builders the dam.

One well published author, in discussing mine waste disposal, has noted:

> *"... a well intentioned corporation employing apparently well-qualified consultants is not adequate insurance against serious incidents" (Morgenstern, N.R., 1998)*

By making 'reasonable' rather than 'conservative' assumptions we may be increasing the long term risk to the society which will inherit the dam and the responsibility for managing the waste, and any future costs associated with the escape of impounded waste due to an unanticipated event.

> *"The likelihood of extreme events is proportionally large in the long-term phase." (ICOLD, 1996a, p. 35)*

The potential for an 'unanticipated' event should drive our initial design assumptions to be more conservative, but there is ever present economic pressure to limit the extent of these conservative assumptions.

As present day events (the Gulf oil spill, which the oil industry repeatedly said couldn't happen) demonstrate that we don't fully understand the nature of industrial hazards. And, as the Honshu earthquake (which released 8 times as much energy as the maximum earthquake estimated by seismic risk experts ) and accompanying tsunami that crippled the Fukushima nuclear reactors have shown, we don't even understand some of the critical issues we should be addressing about these hazards.

In looking at the long term risk from tailings impoundments to other resources – the economic and environmental risks to future generations, or the long term risk to a renewable fishery in Bristol Bay – policy makers should view the risks from a conservative probabilistic perspective rather than relying on assumptions about specific hazards that are likely flawed. We know that our technology and science has limits, and that there are significant economic incentives to make present day decisions about risk less, rather than more, conservative about the magnitude of these risks.[24]

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[24] One professional in this field has described this situation thusly:

*"I have concluded from all these failures that the only way is extreme conservatism, no reliance on the opinions of others—however reputable—and full site characterization and detailed analyses. For even now I am involved in the design of a tailings facility in a part of the world where the design earthquake is 8.5. That is big and could send everything down the valley and the experts say there is no problem and I think they are deluded.*

*I have written that I believe those who focus on single causes of failure are deluded. There is no single reason for failure of a mine geowaste facility. All failures that I have known are the result of a string of minor incidents. If but one of this string of incidents had been dealt with, no failure would have occurred. This is pretty much standard accident theory these days, although it seems not to have entered the otherwise bright minds of those who write on the failure of mine geowaste facilities. Pity them, and pity the profession for remaining so ignorant and failure oriented through failing to keep up with modern ideas and theories.*

*So the failure of mine geowaste facilities will keep on happening. It is inevitable. The professionals are blind and behind times. The operators are greedy and careless. Nobody reads the guidelines. The peer reviewers are old and sleepy. The pressures to profit are intense."* (Slimes Dam - aka Tailings Storage Facility - Failure and what it meant to my mining mindset, April 19, 2011 by Jack Caldwell, http://ithinkmining.com)

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# APPENDIX A

# KNIGHT PIESOLD PEBBLE PROJECT SEISMICITY REPORT EXCERPTS

***Northern Dynasty Mines Inc. Pebble Project, Tailings Impoundment A Initial Application Report (Ref. No. VA101-176/16-13), Knight Piesold Ltd., September 5, 2006***

## 3.2 SEISMICITY

### 3.2.1 Regional Seismicity

Alaska is the most seismically active state in the United States and in 1964 experienced the second largest earthquake ever recorded worldwide. Both crustal earthquakes in the continental North American Plate and subduction earthquakes affect the Alaska region. Historically, the level of seismic activity is highest along the south coast, where earthquakes are generated by the Pacific Plate subducting under the North American plate. This seismic source region, known as the Alaska-Aleutian megathrust, has been responsible for several of the largest earthquakes recorded, including the 1964 Prince William Sound magnitude 9.2 (M9.2) earthquake. There is potential for a future large subduction earthquake (M9.2+) along the southern coast of Alaska, and this seismic source zone is located approximately 125 miles from the project site.

Several major active faults in Alaska have generated large crustal earthquakes within the last century. A magnitude 7.9 earthquake occurred along part of the Denali fault in 2002, approximately 44 miles south of Fairbanks. The western portion of the Denali Fault trends in a northeast-southwest direction, approximately 125 miles north of the project site. Approximately 19 miles northeast of the project site is the western end of the northeast-southwest trending Castle Mountain Fault, which terminates approximately at the northwest end of Lake Clark. A magnitude 7.0 earthquake associated with this fault occurred in 1933. The Denali and Castle Mountain faults are capable of generating large earthquakes with magnitudes in the range of M7.5 to M8.0.

### 3.2.2 Seismic Hazard Analyses

The seismic hazard for the Pebble project has been examined using both probabilistic and deterministic methods of analysis.

Maximum bedrock accelerations have been determined based on the published USGS probabilistic seismic hazard model for Alaska. This was developed by the USGS to produce their latest seismic hazard maps for Alaska. Maximum horizontal acceleration values have been determined for return periods ranging from 100 years to 5000 years. The results have been summarized in Table 3.1, in terms of earthquake return period, probability of exceedance and maximum acceleration. The calculated probabilities of exceedance assume a design operating life of 20 years. For a return period of 475 years the corresponding maximum acceleration is 0.14g, implying a moderate seismic hazard.

TABLE 3.1

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Tailings Impoundment A - Initial Application Report
PRELIMINARY SUMMARY OF PROBABILISTIC SEISMIC RISK

M:\1\01\00176\16\A\Report\Report 13_dam application - Site A\Rev 0\Tables\[Table 3.1 and 3.2 - Design Scope.xls]Table 3.1

Print: Sep 8, 06
Rev: Aug 16, 06

| Return Period (Years) | Probability of Exceedance[1] (%) | Maximum Acceleration[2] A (g) |
|---|---|---|
| 108 | 16.9 | 0.08 |
| 224 | 8.5 | 0.10 |
| 475 | 4.1 | 0.14 |
| 975 | 2.0 | 0.18 |
| 2475 | 0.8 | 0.24 |
| 4975 | 0.4 | 0.30 |

Notes:
1) Probability of Exceedance calculated for a design life of 20 years.

$$q = 1 - \exp(-L/T)$$

where, q = probability of exceedance
L = design life in years
T = return period in years

2) Maximum Accelerations are for values on bedrock/firm ground.

A deterministic analysis has been carried out by considering known seismic sources and fault systems in the region and applying a maximum earthquake magnitude to each potential source. The resulting deterministic acceleration at the study site for each source is considered to be the maximum credible acceleration that can occur, on the basis of available geologic and tectonic information. The maximum accelerations were calculated using the mean plus one standard deviation values with appropriate ground motion attenuation relationships. The ground motion attenuation relationships used are applicable to western North American earthquakes, and are consistent with those used by the USGS. As indicated by the review of regional seismicity summarized above, the three most prominent seismic sources in the region of southwestern Alaska are the Denali Fault, Castle Mountain Fault and the Alaska-Aleutian megathrust. The results of the deterministic analysis are presented in Table 3.2, including the potential maximum magnitude for each of these seismic sources, the estimated minimum epicentral distance and the calculated maximum acceleration at the project site. Based on these results a Maximum Credible Earthquake (MCE) of M7.8 causing a maximum bedrock acceleration of 0.3g has been selected for the Pebble project site.

TABLE 3.2

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Tailings Impoundment G - Initial Application Report
PRELIMINARY SUMMARY OF DETERMINISTIC SEISMIC HAZARD ANALYSIS

Print: Sep 8, 06
M:\01\00176\16\A\Report\Report 12_dam application - Site G\Rev 0 Tables\[Table 3.1 and 3.2 - Design Scope.xls]Table 3.2 Rev: Aug 16, 06

| A Earthquake Source | Maximum Magnitude (Mw) | Epicentral Distance (miles) | Maximum Acceleration[1] (g) |
|---|---|---|---|
| Castle Moutain Fault | 7.8 | 18 | 0.30 |
| Denali Fault - Central | 8.0 | 125 | 0.08 |
| Mega-Thrust Subduction Event | 9.2 | 125 | 0.17 |

Notes:
1) Maximum Accelerations are for values on bedrock/firm ground.

### 3.2.3 Design Earthquakes

Consistent with current design philosophy for geotechnical structures such as dams, two levels of design earthquake have been considered: the Operating Basis Earthquake (OBE) for normal operations; and the Maximum Design Earthquake (MDE) for extreme conditions (ICOLD, 1995a).

Appropriate OBE and MDE events for the facilities are determined based on a hazard classification of the facility, with consideration of the consequences of failure. The hazard classification was carried out using the criteria provided by the document "Guidelines for Cooperation with the Alaska Dam Safety Program" (2005). Classification of the facilities is carried out by considering the potential consequences of failure, including loss of life, economic loss and environmental damage. The hazard classification has been assessed as at least Class II (Significant). The OBE and MDE are selected based on the dam hazard classification and an appropriate earthquake return period, as defined by the "Guidelines for Cooperation with the Alaska Dam Safety Program" (2005).

For a Class II hazard classification, the OBE is selected from a range of return periods from 70 to 200 years, depending on the operating life of the facility, the frequency of regional earthquakes and the difficulty of quickly assessing the site for repairs. The impoundment would be expected to remain functional during and after the OBE and any resulting damage should be easily repairable in a limited period of time.

The MDE is typically selected from a range of return periods from 1,000 to 2,500 years for a Class II hazard classification. However, the MDE for the Pebble tailings storage facilities embankments have been conservatively based on a Class I hazard classification making it equivalent to the MCE, which has a bedrock acceleration of 0.30 g corresponding to a magnitude M7.8 earthquake,

occurring along the nearby Castle Mountain Fault system. [25] The MCE is considered to be the seismic event with the highest possible maximum ground acceleration at the project site. A M9.2+ megathrust earthquake does not impose the highest maximum ground acceleration at the Pebble site (predicted maximum acceleration of 0.17 g), but the event is also considered in seismic design analyses due to the very long duration of ground shaking associated with earthquakes of this magnitude.

The tailings storage facility embankments will be designed to meet or exceed the Alaska Dam Safety requirements to ensure the embankment will remain stable without release of tailings or process water for all loading cases, including the MDE and the M9.2+ megathrust event.

## 5.2 DESIGN OBJECTIVES

The principal objectives of the design and operation of the tailings storage facility are to provide secure containment for tailings solids, potentially reactive waste rock and impounded process water. The design and operation of the tailings storage impoundment is integrated with the overall water management objectives for the entire mine development in that surface runoff from disturbed areas within the mine site is controlled, collected, and contained. An additional requirement is to allow effective reclamation of the tailings impoundment and associated disturbed areas at closure to meet end use land objectives.

Preliminary studies have been conducted to develop feasible options that satisfy these fundamental objectives at this stage of design, but additional investigation and design work will be necessary as contemplated in the Alaska Dam Safety Program. The preliminary Design Basis for the impoundment is included in Table 5.1.

**TABLE 5.1**

**NORTHERN DYNASTY MINES INC.**
**PEBBLE PROJECT**
**Tailings Impoundment A – Initial Application Report**
**PRELIMINARY DESIGN BASIS**

M:\1\01\00178\16\A\Report\Report 13_dam application - Site A\Rev 0\Tables\Table 5.1 - Design — Rev'd: August 16, 2008

| ITEM | DESIGN CRITERIA |
|---|---|
| | KP Design Basis<br>• Operating Basis Earthquake (OBE) ≥ 1/200 year<br>  o Magnitude = M7.5<br>• Maximum Design Earthquake (MDE) = 1/2500 year<br>  o Magnitude = M7.8<br>  o MDE corresponds to the Maximum Credible Earthquake (MCE)<br>  • Maximum firm ground acceleration = 0.3g |
| **Stability Analyses** | |
| Stability Analyses | • Upstream and downstream stability analyses will be completed using the limit equilibrium computer modeling program SLOPE/W.<br>• The embankments will be designed to meet of exceed the minimum acceptable factors of safety (based on the U.S. Army Corps of Engineers) for the following cases:<br>  o End of embankment construction<br>  o Long term (full tailings pond)<br>  o Seismic (pseudo-static)<br>  o Post-Liquefaction |

[25] *Author's note: This statement does not agree with the information provided in Table 5.1, but does agree with Table 3.1*

# APPENDIX B

# ALASKA DAM CLASSIFICATION
# SEISMIC STABILITY REGULATIONS

***Guidelines for Cooperation with the Alaska Dam Safety Program, Prepared by Dam Safety and Construction Unit, Water Resources Section, Division of Mining, Land and Water, Alaska Department of Natural Resources, June 30, 2005, Sections 6.2, 6.3, 6.4***

## 2.4 Hazard Potential Classification

The hazard potential classification is the main parameter for determining the level of attention that a dam requires throughout the life of the project, from conception to removal. The hazard potential classification represents the basis for the scope of the design and construction effort, and dictates the requirements for certain inspections and emergency planning. The ADSP uses three classifications for dams based on the potential impacts of failure or improper operation of a dam:

- Class I (high)
- Class II (significant)
- Class III (low)

The hazard potential classifications are explained in detail in 11 AAC 93.157 and are summarized in Table 2-1.

Dams are classified based on theoretical estimates of the potential impact to human life and property if the dam were to fail in a manner that is typical for the type of dam under review, or if improper operation of the dam could result in adverse impacts. The actual or perceived quality of design and construction and the condition of the dam are irrelevant for the classification, but may influence other requirements such as the frequency of monitoring, the scope of PSIs, and the content of O&M manuals and EAPs.

To determine the hazard potential classification consistently and equitably for projects, Dam Safety developed the Hazard Potential Classification and Jurisdictional Review Form in Appendix A, as previously mentioned. This form should be completed by a qualified engineer based on the existing or proposed configuration of the dam, and submitted to Dam Safety for review and concurrence.

**Table 2-1. Hazard Potential Classification Summary**

| Hazard Class | Effect on Human Life | Effect on Property |
|---|---|---|
| I (High) | Probable loss of one or more lives | Irrelevant for classification, but may include the same losses indicated in Class II or III |
| II (Significant) | No loss of life expected, although a significant danger to public health may exist | Probable loss of or significant damage to homes, occupied structures, commercial or high-value property, major highways, primary roads, railroads, or public utilities, or other significant property losses or damage not limited to the owner of the barrier<br>Probable loss of or significant damage to waters identified under 11 AAC 195.010(a) as important for spawning, rearing, or migration of anadromous fish |
| III (Low) | Insignificant danger to public health | Limited impact to rural or undeveloped land, rural or secondary roads, and structures<br>Loss or damage of property limited to the owner of the barrier |

The form presented in Appendix A is designed as a "tickler" to remind the engineer of important aspects that should be considered in the review. In addition, the form is designed to be progressive. Three levels of review are available:

**Preliminary** – An initial, conservative assignment based on a visual inspection of the dam, the reservoir, the downstream reach, and other limited, readily available information such as aerial photography and topographic maps

**Qualitative** – A limited engineering evaluation that may involve crude hydrological estimates, simplistic peak discharge calculations for a dam failure or mis-operation, open-channel flow calculations, elevation or cross-section surveys, and simplistic data used with conservative assumptions
that includes failure mode evaluation, computerized dam-break and hydraulic-routing models, detailed hydrological estimates, and good-quality input data

**Potential Future Development and Hazard Potential Classification**

*A hazard potential classification determines the standard for the design, construction, and operation of the dam during the life of the project. If additional downstream development is likely, the dam should be designed and constructed to standards for the higher classification, although the dam may be classified and managed for existing conditions until the future development occurs.*

The higher levels of analyses and detail carry more credibility in the assignment of the classification. For example, a preliminary assignment of a Class II (significant) hazard potential could be overruled if a qualitative or quantitative review demonstrates that the potential for adverse impacts is actually low. In another example, if new development occurs below an existing Class III (low) hazard dam, a qualitative analysis may be used to upgrade the dam to a Class I (high) hazard, whereas a quantitative analysis may demonstrate that a Class II (significant) hazard is the appropriate classification. Additional information about dam failure analysis is presented in Section 9.3.

The ADSP hazard potential classifications were modified in the current regulations to be consistent with guidance contained in the following source:

> *Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams*, published by the Federal Emergency Management Agency (1998b)

Admittedly, much of the terminology used in 11 AAC 93.157 is not specific; for example, "probable" is not currently defined. Dam Safety will consider arguments presented by dam owners for hazard potential classifications that are in dispute, including risk assessments that quantitatively assign probabilities to certain outcomes. Nevertheless, those arguments should be cooperatively developed, technically sound, and justifiable. Additional information about risk assessments is presented in Section 12.3. The following references may also be helpful in assigning the hazard potential classification:

> *Evaluation Procedures for Hydrologic Safety of Dams*, published by the American Society of Civil Engineers (1988)
>
> "Dam Break Inundation Analysis and Downstream Hazard Classification," Technical Note 1, in *Dam Safety Guidelines*, published by the Washington State Department of Ecology (WSDOE) (1992)

.....

## 6.2 Stability

Stability must be demonstrated for all types and hazard potential classification dams under a variety of loading conditions. Many acceptable empirical and numerical methods are available for evaluation of the stability of dams. The scope of the stability analysis should be defined in the design scope memorandum, including methods of analysis and verification and references for proposed safety factors, or objectives of deformation analyses or finite element analyses.

The general guidance shown in Table 6-1 should be considered when defining the scope of the stability analysis in the design scope proposal. (See Section 5.1.7.)

The stability analysis requirements for hazard potential classification dams are summarized below.

**Class I (high) hazard potential dams –** Detailed stability analysis is required. All computer stability analyses must be verified with manual calculations or other approved methods.

**Class II (significant) hazard potential dams –** Detailed stability analysis is required. Graphical or empirical evaluations may be used to verify computer results.

**Class III (low) hazard potential dams –** Published empirical or graphical methods may be adequate for small embankment dams less than 25 feet in height. Embankment dams greater than 25 feet in height should be evaluated in the same manner as Class II dams. Other types of dams, such as concrete, steel, or timber frame dams, may require a combination of methods.

For any given analysis, all input data and results must be clearly documented, including assumptions, sources of information, references, and computer outputs.

**Table 6-1. General Guidance for a Stability Analysis**

| Hazard Potential | Dam Type | Computer Analysis | Graphical or Empirical Analysis | Manual Analysis | Finite Element Analysis |
|---|---|---|---|---|---|
| Class I | All | P | | V | S |
| Class II | All | P | V | | S |
| Class III | Earth and rock fill, <25 feet tall | O, S | P | O | |
| Class III | Earth and rock fill, 25 feet or taller | P | V | | |
| Class III | All others | S | O | O | S |

P = Primary method of analysis

S = May be required under special circumstances

V = Verification of primary method

O = Optional method of analysis

## 6.3 Seismicity

Evaluation and design of all new dams, or major modifications of existing dams should consider the effects of seismicity on the stability and performance of the facility, including appurtenant structures, reservoir, and associated equipment. A study to assess the seismicity is required for all dams. Depending on the complexity of the project, this study may require an interdisciplinary team that includes seismic, geologic, geotechnical, and structural engineering specialists.

### 6.3.1 Minimum Scope

The scope and detail of each seismic study will depend on the dam hazard potential classification and location, the regional seismic environment, and the site-specific geologic and topographic conditions. However, each study should address the following four key elements:

Define the seismic environment such as regional earthquake sources, historical activity, and recurrence rates, and characterize the levels of potential ground motions such as duration, frequency, amplitude and predominant period of ground vibrations, and peak ground accelerations, as needed for design and monitoring during operation

Evaluate the potential for fault movements rupturing the surface at or near the dam, liquefaction, lateral ground spreading and cracking, and overtopping caused by seiches or waves induced by slope failures around the reservoir

Analyze the dynamic response of the dam to inertial forces and potential reductions or loss of strength and stiffness in the foundation and dam materials as a function of the design ground motions

Analyze the facility to verify that each element, including embankments, foundations, appurtenances, and reservoir, will adequately resist translational (sliding wedge or block), rotational or flow-type slides, or excessive settlements and deformations during the design earthquakes

### 6.3.2 Design Earthquake Levels

Two levels of design earthquake must be established:

**Operating basis earthquake** (OBE) represents the ground motions or fault movements from an earthquake considered to have a reasonable probability of occurring during the functional life-time of the project. All critical elements of the project (such as dam, appurtenant structures, reservoir rim, and equipment) should be designed to remain functional during the OBE, and any resulting damage should be easily repairable in a limited time. The OBE can be defined based on probabilistic evaluations, with the level of risk (probability that the magnitude of ground motion will be exceeded during a particular length of time) being determined relative to the hazard potential classification and location of the dam.

**Maximum design earthquake** (MDE) represents the ground motions or fault movements from the most severe earthquake considered at the site, relative to the acceptable consequences of damage in terms of life and property. All critical elements of the dam and appurtenant structures for which the collapse or failure could result or precipitate an uncontrolled

**Maximum Credible Earthquake**

*The terminology used for describing various design earthquakes and seismic hazards is inconsistent in the various references. The maximum credible earthquake (MCE) is defined herein as the greatest earthquake that reasonably could be generated by a specific seismic source, based on seismological and geologic evidence and interpretations. The MDE and OBE are defined in the text. Other terminology may be acceptable, but specific references and definitions must be included.*

release of the reservoir must be designed to resist the MDE. In addition, the dam and appurtenances must be designed to resist the effects of the MDE on the reservoir and reservoir rim. The MDE may be defined based on either deterministic or probabilistic evaluations, or both.

Table 6-2 provides a range of probabilistic return periods (risk) considered appropriate for defining the OBE and MDE, as a function of the hazard potential classification of the dam. Within the context of these ranges, the OBE return period for a given project should be selected in direct correlation with the frequency of regional earthquakes, the useful life span of the facility, and the difficultly of quickly accessing the site for repairs. The return period selected for the MDE should be selected in direct correlation with the magnitude of the maximum credible earthquake (MCE) for the known or suspected regional sources; the dam type, size, and geometry; and the reservoir capacity. Further guidelines for selecting the ground motions associated with these two levels of seismic hazard are provided in Dobry et al. (1999) and USCOLD (1999).

**Table 6-2. Operating- and Safety-Level Seismic Hazard Risk!**

| Dam Hazard Classification | Return Period, Years | |
|---|---|---|
| | Operating Basis Earthquake | Maximum Design Earthquake |
| I | 150 to >250 | 2,500 to MCE |
| II | 70 to 200 | 1,000 to 2,500 |
| III | 50 to 150 | 500 to 1,000 |

### 6.3.3 Seismic Study Phases

Seismic studies for new dam design should be conducted in two phases, which are described below.

**Seismic report phase** – This phase should occur early in the planning of the project and be included with the Preliminary Design Package submittals described in Subsection 5.2.5. The seismic report will include preliminary evaluations as needed to establish an understanding of the potential influence of the OBE and MDE on the type, geometry, and size of the dam and reservoir. Given the preliminary nature of this phase, evaluations can generally be based on published information and simplified methods. After the risks have been established, preliminary values for the OBE and MDE parameters can be estimated based on regional geologic mapping (for example, USGS publications and Plafker and Berg, 1994) and seismological studies (for example, Wesson et al., 1999; and USGS National Seismic Hazard Mapping Project – Interactive Deaggregation, 2003). Evaluations of the potential for liquefaction should be presented based on the local geology, historical record, and simplified methods with the use of standard penetration test values from the geotechnical evaluation (for example, Seed et al., 2001; and Youd and Idriss, 1997). Evaluations of the response and stability of the dam should be presented by using limit-equilibrium or linear-elastic analysis and generic response spectra found in applicable design codes or standards (see methods in Kramer, 1996).

The seismic report phase should also refine the scope and detail of the evaluations to be performed during the subsequent design evaluations of the facility conducted in the second phase of the seismic evaluation of the dam. If the associated risks are high because of the location of the dam and its hazard potential classification, more sophisticated analyses may be required (USCOLD, 1999); for example, with deterministic and probabilistic evaluations or acceleration time histories.

**Seismic design phase** – This phase should occur during the detailed design of the project and be included in the engineering design report submitted as part of the Detailed Design Package and described in Subsection 5.3.1. The seismic design phase of the seismic study will include formal evaluations of each critical element of the dam as needed to assure that the facility meets the performance requirements under the OBE and MDE. The effort and sophistication of the work conducted during this phase of the seismic study will depend on the hazard potential classification of the dam, and the magnitude of the OBE and MDE. For example, the dynamic and stability evaluations for all Class I and II dams located in a highly seismic region (with peak ground accelerations greater than about 30% to 40% of gravity or peak shear strains greater than about t2%) should utilize advanced one- and two-dimensional site response analysis techniques (for example, Lee & Finn, 1978; and Idriss et al., 1973) to more accurately model the nonlinear behavior of soil subject to earthquake loading. On the other hand, the dynamic stability evaluations for Class III dams or Class II dams located in regions with low seismicity (with peak ground accelerations less than about 5% to 10% of gravity) can utilize the same simplified methods followed in the seismic report phase, and no additional detailed evaluation may be required. However, the simplified methods presented in the seismic report should be reviewed with respect to the final design of the dam, and should be revised if necessary. Evaluations of Class I and II dams located in regions of moderate seismicity can utilize techniques between these ranges, such as equivalent-linear, one-dimensional, site response analysis (for example, Idriss and Sun, 1992).

## 6.4 Seepage

Seepage must be considered for all hazard potential classification dams; however, the scope of the analysis depends on a number of factors, including the size and type of dam and the foundation and construction materials. The following are conditions and suggested levels of evaluation based on the hazard potential classification of the dam.

**All hazard potential class dams**

The material properties, including permeability, must be estimated for both the foundation and construction materials.

Filters must be included in all embankment dams between core materials and drains. Soil filter criteria must be demonstrated based on actual gradation tests. References to filter criteria standards must be included.

Appropriate seepage cutoff or reduction measures must be included to limit gradients and prevent piping and erosion.

All dams must include the appropriate drainage features to control seepage pressures and gradients, including uplift.

Phreatic surfaces must not daylight on the downstream face of embankment dams.

Appropriate measures to control seepage along penetrations through the dam or at contact planes between different materials, such as the interface between concrete and soil fill, must be included.

**Class III (low) hazard potential dams**

Empirical evaluations combined with engineering controls may be used to address seepage.

Published values for material properties may be used in lieu of laboratory testing to a limited extent; however, sufficient index testing must be completed to accurately classify all materials to be used in construction.

**Class II (significant) hazard potential dams**

Foundation conditions must be thoroughly evaluated in the geotechnical program, including rock coring and packer testing, as appropriate.

Laboratory testing must be used to determine permeability and index properties of the core, filter, and drainage materials. Published permeability values may be used for coarse- grained drainage materials. In situ soil and rock, excavated material to be reused, and borrow sources must be tested.

Appropriate foundation preparations, such as cleaning, slush grouting, pressure grouting, and dental concrete, must be included in the construction specifications.

A numerical analysis may be required for certain Class II dams for which seepage control is a primary performance parameter.

**Class I (high) hazard potential dams**

All Class II conditions apply.

Geotextile filters may not be used as primary filters in critical components of Class I dams.

A numerical analysis must be completed.

**Seepage Monitoring**

*All dams should be monitored for seepage. Increases in seepage rates or turbidity can be key indicators of a developing failure situation. Seepage monitoring requirements should be specified by the engineer and included in the operations and maintenance manual discussed in Chapter 8. Seepage monitoring software is available from the Federal Emergency Management Agency's National Safety Program. Contact Gene*

DATA 1

# Factual and Foreseeable Reliability of Tailings Dams and Nuclear Reactors: a Societal Acceptability Perspective.

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Franco Oboni
*Oboni Riskope Associates Inc, Vancouver, British Columbia, Canada*

Cesar oboni
*Oboni Riskope Associates Inc, Vancouver, British Columbia, Canada*

ABSTRACT: This paper compares the "historic" rate of failure (major accidents only) of tailings dams and nuclear reactors world-wide to well known, previously published acceptability criteria and codes. It then attempts a comparison of these two very different industries (nuclear vs. mining) from a quantitative risk evaluation point of view showing unexpected results. The paper then shows that the mining industry as a whole has considerably progressed in reducing the rate of dam failures from the 1970 to date. Three questions are asked: 1) Is it sufficient? 2) Is it sufficient from the perspective of present and future societal acceptability? 3) Do common practice risk assessments offer enough depth of analysis with respect to modern requirements? To answer these questions, the authors suggest a simplified model for long-term risk evolution of tailings dams with particular emphasis on post-production – closure – long-term dam life. The paper shows how a generic modern "excellent quality" dam probability of failure can be estimated, as well as how the initial probability of failure will evolve during the dam life as care and monitoring are released (in view of closure), and during the closure phase until, for example, the first Maximum Design Earthquake. The paper is written in non-scientific language to broaden the audience beyond the engineering community.

## 1 INTRODUCTION

This paper compares the "historic" rate of major accidents (failure) of tailings dams and nuclear reactors world-wide to previously published acceptability criteria and defines the long-term evolution of the risks (major accidents) generated through the life of a tailings dam (TD), with particular focus on the post-production phases/closure. In contrast to hydro dams that would typically be breached at the end of their production life, the closure phase is the longest phase for TD. A TD's life can be summarized as follows (M.B. Szymanski, M.P. Davies, 2004): Production (tailings disposal); Transition (preparation for the closure phase which may include flushing out contamination); Long-term treatment (dam operation continues in the sense of regulated water levels); Closure (dam is no longer operated in the sense of regulated water levels), likely more than 1,000 years. For the purpose of this paper, we will summarize the phases as follows: Production as the phase with the highest monitoring and care, Transition and Long-term treatment as phases during which monitoring and care are gradually reduced, and Closure as the phase during which the dam is "abandoned". Major hazard hits may occur during any of these phases.

A TD's probabilities of failure and those generated by major nuclear reactors' accidents to date are empirically estimated, and both are compared to societal and technical acceptability thresholds to understand if present and foreseeable performances are aligned with expectations. Risk is often modeled as the expected value of an undesirable outcome by combining the probabilities of various possible events and an evaluation of the corresponding harm into a single consequence value. Accordingly, in this paper, the risk is defined as the product of the probab-

ility of failure by the related consequences expressed in casualties, leaving aside all other environmental and physical direct or indirect consequences, for the sake of simplification.

- As a first step the paper examines real life failure data (Fig. 1) for the world-wide and US TDs portfolio in an attempt to define a "base value" of the rate of failure $p_f$ (annual probability of major accident), then an "excellent" TD rate of failure $p_f$.
- The second step encompasses the definition of a simplified model for the evolution of the probability of failure $p_f$ of a TD over time, including the long-term post-production "era". In today's world, civilian/industrial facilities are generally designed to last for 50-100 years save, for example, spent nuclear fuel disposal sites. Some former mining sites (uranium tailings, arsenic disposals, etc.) are calling for "perpetual care", very much like nuclear fuel disposal. Perpetual care design means ensuring somehow survival for repeated major hazards hits, etc., certainly for more than the "classic 1,000 years". For example, the need to account larger exposure periods for TDs has been recognized in the New Zealand Dam Safety Guidelines (NZSOLD, 2000).
- Third, we compare risks generated under various conditions to different published acceptability thresholds and discuss the implications.

The simplified models used through this paper for TDs focus on major events and use approximations: they are geared toward defining an order of magnitude of the long-term risk evolution of a generic dam undergoing variation of the standard of care, during and after the mine closure, and when hit by a major hazard. This discussion could be expanded to cover various Maximum Design Hazards but it should not be relied upon for specific assessments; only a third party, i.e. not performed by the design team, quantitative risk assessment should guide specific sites' decisions to avoid biases and prejudices (F. Oboni, C. Oboni, S. Zabolotniuk, 2013).

A generic well-designed, built and monitored "excellent" dam is used as Base Case Study (BCS), where "excellence" is defined by compliance with modern TDs codes for critical, high consequences dams (ANCOLD, 2011). The BCS $p_f$ is estimated using the "SLM" (F. Silva, T.W. Lambe, W.A. Marr, 2008) semi-empirical relationship with the classic Factor of Safety (FoS) (Fig. 2). The first step is to define the "Category" (I to IV) of the structure under examination by examining sequentially Design, Construction and Operations aspects of the slopes.

Within the frame of a specific and detailed analysis for a site specific quantitative risk assessment, probabilistic slope stability methods should be used to define the probability of failure of a particular dam.

## 2 HISTORIC FAILURES RATES

### *2.1 Tailings Dams and Hydro Dams*

USCOLD (1994), UNEP (1996, 1998) studies have shown that Slope Instability is the highest cause for TDs failures (Fig. 1), followed by earthquake, overtopping and "unknown" (ICOLD, 2001). Following Davies & Martin (M. P. Davies, T.E. Martin, 2000; N. Lemphers, 2010) there were more than 3,500 TDs (of various kinds and construction type, with at least 50% of the upstream design) around the world. (For the US (See *1 in the Literature) we consider the total number of TDs at 984). In absence of more accurate data, and more particularly, on the evolution of this number, we will consider in this paper a portfolio of 3,500 dams globally and 1,000 dams for the US alone. Portfolios are assumed constant over the years but, as we will see later, even if that assumption was wrong by one order of magnitude, which is very difficult to believe, there would be no significant alterations in the conclusions of this paper.

From UNEP (1998) world data we read that there were 44 TDs failures in the decade around 1979 and 7 in the decade around 1999. From US sources, 984 TDs 984 (See *2 in Literature),

the chronology of major failures (from 1960) gives a total of 28, with 7 failures in the decade around 1979 and 8 failures in the decade around 1999).

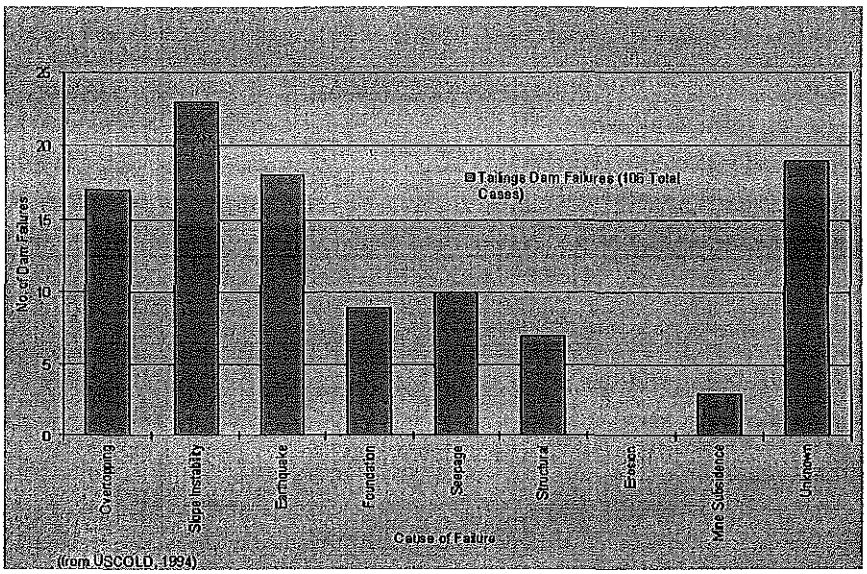


*Fig. 1 Causes of Failure of Tailings Dams, Number of Occurrences over a Total of 106 Recorded by USCOLD, UNEP up to 1994.*

| Where | When (decade) | $p_f$ | Approx $p_f$ | Verbiage for $p_f$ |
|---|---|---|---|---|
| World-wide | Around '79 | 44/(3,500*10) | $10^{-3}$ | One in one thousand |
| World-wide | Around '99 | 7/35,000 | $2*10^{-4}$ | Two in ten thousands |
| US | Around '79 & Around '99 | 7 or 8/(1,000*10) | 7 or $8*10^{-4}$ | Seven or eight in ten thousands |

### *2.1.1 Annual Probability of Failure vs. Factor of Safety*

As slope instability is the greatest source of TDs failures (Fig. 1), for the sake of simplification, this paper looks only at this particular failure mode. The proposed methodology could, however, easily be expanded to cover other failure modes.

The SLM methodology examines sequentially the following *aspects* of the Design (D1 Investigation, D2 Testing, D3 Analyses and documentation ) and Construction "CO" as well as Operations and Monitoring "OM" of embankments and slopes to determine the Category for a structure. Each aspect is described by various detailed specifications. The less stringent the specifications, the lesser the quality of the considered structure; thus, SLM defines four Categories ranging from I (Best) to IV (Poor). Experience shows that structures with high failure consequences are generally designed, built, and operated in such a way that they fall in Category I. Of course, if a structure has received little or no engineering it will fall in Category IV. Accordingly SLM's Category I has OM described as "complete performance program including comparison between predicted and measured; no malfunctions; continuous maintenance" whereas a Category IV will have "occasional inspection, no field measures". We will assume in this paper that Category I OM applies to Production Phase (undergoing full monitoring), and Category IV OM to Closure Phase with "abandonment" (no monitoring).

Figure 2 shows the FoS-$p_f$ relationship for the four categories. If we go back to the rate of failure $p_f$ empirical estimates (Section 2.1) for TDs = $10^{-3}$ to $2*10^{-4}$ (we will not mention the US value as it lies within that range) and assume that the average original FoS was in the area of

1.3 (ANCOLD, 2011), we would come to the conclusion that TDs are generally Category I or slightly inferior structures.

The statement above is in good agreement with the common understanding and empirical knowledge that TDs are generally of "lesser quality" than hydro dams. Indeed, if we consider the hydro dam failures in the decades around 1989 and 1999 and evaluate $p_f$ as we did for TDs, based on an "average number of dams" of 30,000, we get $p_f=3*10^{-6}$ to $10^{-5}$, values which are compatible, considering usual FoS, with a Category I (three failures in a million to one failure in one hundred thousand dams per year). By using the SLM methodology, we can estimate the $p_f$ of an "excellent" TD at $10^{-5}$ to $10^{-6}$ as "excellence" would mean "top of the class" Class I structure, well engineered, undergoing serious QA/QC, with a minimal FoS of 1.4-1.5. Should inspections become occasional, measurements/monitoring not be performed, the probability will raise to $6*10^{-5}$. Interestingly, many different industries around the world consider values below $10^{-6}$ to $10^{-5}$ (below one in one hundred thousand to one in a million) as the boundary of what is humanly credible (meaning that below that range of probability any lay person or expert would imagine that an accident is "incredible").

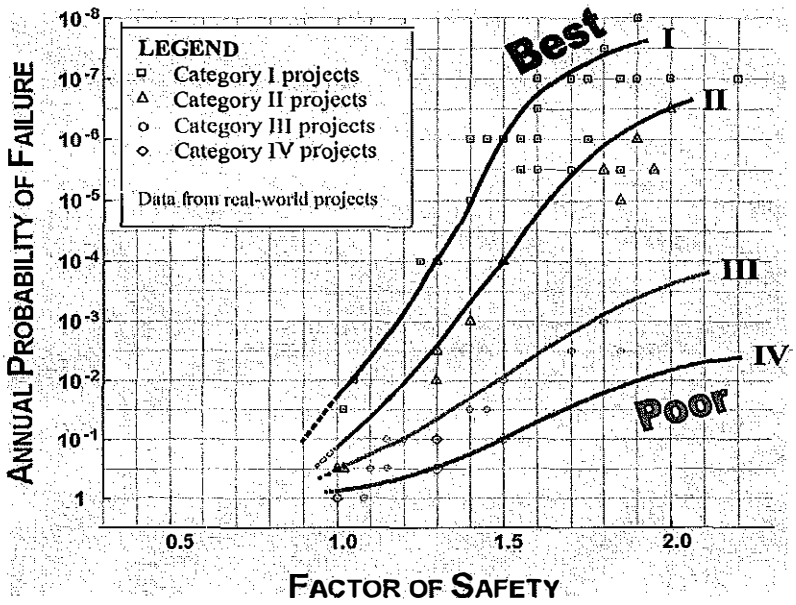


*Fig. 2 Annual Probability of Failure vs. Factor of Safety following Silva, Lambe, Marr (SLM) (F. Silva, T.W. Lambe, W.A. Marr, 2008) methodology.*

In case of partial fulfillment of a Category's qualifications, the original SLM paper suggests to interpolate values (on Fig. 2) after defining weights for the specifications/Categories. Thus a stepped increase of the probability of failure is suggested if one of the *aspects* is gradually worsened for a dam belonging to a specific Category.

In the case of TDs, it is possible to "simulate" long-term complete abandonment. Thus the $p_f$ could actually reach the value of the lower Category IV (and even higher). For example, if we look at the case of OM standards phased release from Category I (operational life) down to IV (long-term closure), the probability of failure will increase each time the OM standard attains a lower category. Interestingly, for initial FoS in the 1.3 to 1.5 range, the difference between Category I (we are assuming that the dam under examination is initially an "excellent" structure) and II varies respectively between 1.5 and 2 orders of magnitude: for FoS=1.5, $p_{fCatI}=10^{-6}$, with possible increase to $10^{-4}$ and higher if the same structure falls in total neglect.

### *2.1.2 $P_f$ with Seismic Event*

Following ANCOLD (2011) an "excellent" TD should be designed to remain serviceable under Operating Basis Earthquake (OBE), i.e. to undergo limited damage/deformation repairable

without significant service disruptions (this moves the structure from Category I to Category II-III following SLM). Therefore $p_f$ will increase from $10^{-6}$ to $10^{-4}$ or higher under OBE if the initial FoS is still attained (no expected liquefaction, well-drained structure, no change in shear strength).

In case the post-seismic shear strength would be lower than pre-seismic values, then ANCOLD 2011 declares an acceptable minimum Fos=1.1 and therefore the $p_f$ could increase to $1.25*10^{-2}$ or higher. Of course this is again quite simplistic, insofar we are considering "a single earthquake" instead that the whole set of aftershocks on a weakened or damaged structure.

Under Maximum Design Earthquake (MDE) damage will be more extensive and disrupt operations, but the structural integrity of the dam needs to be maintained and uncontrolled release of tailings/water should not occur. MDE for Significant Consequence Dams should be those with an Annual Exceedance Probability (APE)=1/100=$10^{-2}$; APE=1/1000=$10^{-3}$ for High & Extreme Consequences dams (ANCOLD, 2011). Thus we can estimate that after a MDE the dam could fall down to Category III during operations, and most likely Category IV or higher during the very long closure phase, during which the occurrence of at least one MDE is almost certain to occur.

Such low "acceptable" FoS and respective high $p_f$ will lead to deformations and other defects of the dam which will be weaker when the next seismic event occurs, but more importantly an increase of risks. If we use the SLM suggested interpolation technique, if after an OBE the dam does not undergo routine maintenance and has uncorrected malfunctions, the probability of failure will rise significantly. After multiple hits, or if the first hit provokes severe damages equivalent to the cumulated damage of several quakes, we could see a possible post-seismic increase to $p_{fCatIPS}=1.2*10^{-1}$ and higher if the dam has fallen in total neglect.

### *2.2 Major Nuclear Accidents*

As of February 2, 2012, 435 nuclear power plant units with an installed electric net capacity of about 368 GW were in operation in 31 countries and 63 plants with an installed capacity of 61 GW under construction in 15 countries. The cumulative nuclear reactor operating experience amounted to 14,745 years by February 2012 (See *3 in the literature).

To date, the world has seen the occurrence of a number of major nuclear reactors accidents (rated 5 and above on the International Nuclear Event Scale by the International Atomic Energy Agency). For Fukushima we consider one accident (although more than one reactor was involved) to ensure the list is made of "independent" accidents. The reason Level 5 and higher is selected lies in Level 4 definition as "Accident with local consequences" which might not be comparable to a TD major failure discussed in the prior sections. Finally, to counter any possible comments depicting the nature of Fukushima quake magnitude and resulting tsunami as "exceptional", we note that:

a) in many areas of the world, seismic potential was/is poorly understood and therefore many structures were/are under-designed,
b) it is difficult, if not impossible, to structurally upgrade a working reactor,
c) power plants' risk assessments apparently focused on the safety of the nuclear reactor, but often underestimated the impacts and consequences on its environment and ancillary structures/ equipments.

Assuming seven accidents, the "historic" world average rate of Scale 5+ accidents is: 7/14,745 total operating time= $4.75*10^{-4}$ Scale 5+ accident/annum.

| Level 5 | Level 6 | Level 7 |
|---|---|---|
| Accident with wider consequences | Serious accident | Major accident |
| Chalk River (1952)<br>Windscale (1957),<br>Lucens (1969),<br>Three Mile Island (1979) | Kyshtym (1957) | Chernobyl (1986)<br>Fukushima (2011) |

## 3 FAILURE RATES VS. HISTORIC AND ANCOLD ACCEPTABILITY THRESHOLDS

Figure 3 displays acceptability criteria developed independently by various authors over a peirod of more than forty years, together with some examples of industrial, transportation and dams accidents dating back to the 1960s (G. Morgan, L. Lave, 1990, R.V. Whitman, 1984, ANCOLD, 2003). Among these accidents, depicted as "bubbles" to include scatter of data, it is of particular interest to observe the "(hydro) dams bubble". If we compare these to the values defined in Section 2, we notice immediately that world-wide (but, surprisingly, not so much in the US) the situation has improved considerably with the $p_f$ of TDs creeping down to values similar to those of hydro dams in the 1960s, and hydro dams lowering their $p_f$ by one order of magnitude.

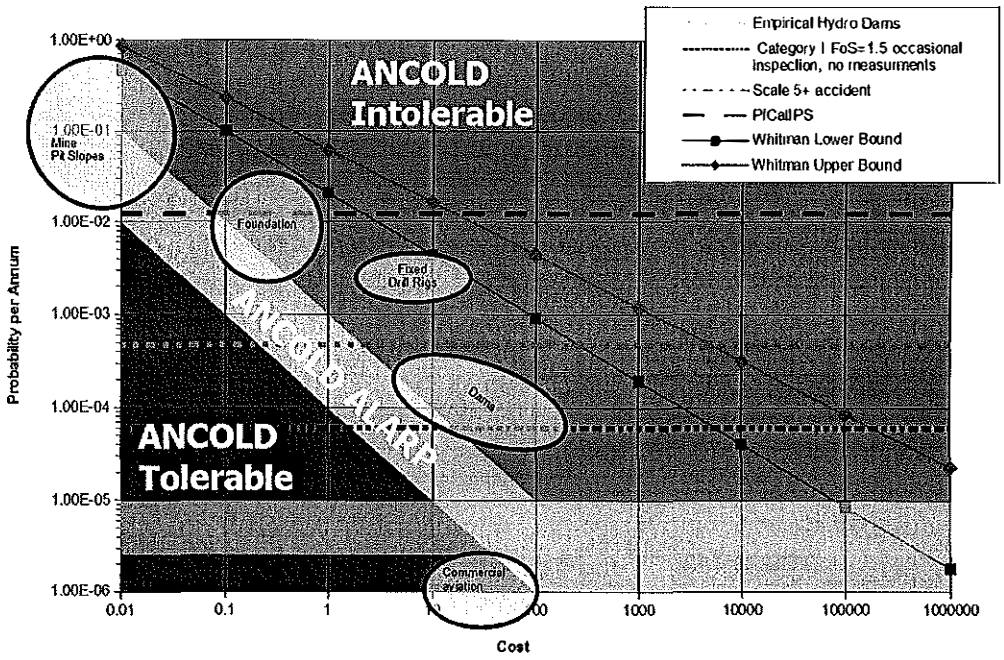


*Fig. 3 A probability (vertical)-Consequence (Horizontal) graph showing p-C "bubbles" from various industrial, transportation and dams accidents in the 1960s (R.V. Whitman, 1984 & G. Morgan, L. Lave, 1990), Whitman tolerability curves (upper bound and lower bound) as well as the ANCOLD (2003) "acceptability zones" (Tolerable, ALARP, Intolerable). The horizontal lines correspond from bottom to top: to the $p_f$ of a Category I dam with occasional inspections and no monitoring/measurements, to Scale 5+nuclear accidents (See Section 5), and a Category I dam under total neglect and after seismic events.*

The recent ANCOLD 2003 acceptability criteria (Fig. 3) are compatible with Comar, Wilson (Comar, 1987, Wilson & Crouch, 1982) and later criteria published in the field of chemical industry, such as those from Renshaw (Renshaw, 1990), who defined simple societal risk acceptability criteria expressed as probability of fatality of one individual per year of risk exposure. Many publications from reputable (governmental, research) sources point at a probability (of a casualty per annum) of $10^{-4}$ (similar to ANCOLD lower bound) as being the limit of "safe", however with a lower limit of $10^{-6}$ for unwillingly exposed public.

The $p_f$ of:

- a Category I dam with occasional inspections and no monitoring/measurements,
- a Scale 5+nuclear accidents, and a
- Category I dam under total neglect and after a number of seismic hits

can be compared to ANCOLD and other published historic tolerability thresholds (Fig. 3). It becomes immediately apparent that any accident with more than 1 to 15 casualties is considered intolerable by ANCOLD or other modern "technical" tolerability thresholds when paired with the selected cases' $p_f$, whereas historic societal thresholds would have been complied with.

## 4 COMPARING RISKS OF TWO VERY DIFFERENT INDUSTRIES

### *4.1 Empirical probabilities of mishaps*

The Table below (Data from Section 2.1, 2.2) compares TD and nuclear 5+ accidents including occurrence decade and empirical rate of return.

| Where | What | When (decade) | $p_f$ | Approx. $p_f$ |
|---|---|---|---|---|
| World-wide | TD | Around '79 | 44/(3,500*10) | $10^{-3}$ |
| World-wide | TD | Around '99 | 7/35,000 | $2*10^{-4}$ |
| US | TD | Around '79 & Around '99 | 7 or 8/ (1,000*10) | 7 or $8*10^{-4}$ |
| World-wide | Nuclear 5+ accidents | Since inception | 7 Scale/14,745 | $4.75*10^{-4}$ |

Despite the fact that nuclear industry is highly regulated, its safety record to date is far from optimal. One would like to see severe mishaps to be, as for hydro dams, border-line credible, but historic data unfortunately prove the contrary.

### *4.2 Cost of Consequences*

In order to evaluate risks we need now to evaluate consequences using the selected metric, i.e. casualties. Even such a "simplified" metric is difficult to apply as there might be for nuclear accidents a long delay between exposure and health effects, as explained below.

#### *4.2.1 Nuclear*

In some class 5+ accidents the estimate of casualties has been equated to nil. It is not within the scope of this paper to discuss that evaluation.

According to a June 2012 Stanford University study by John Ten Hoeve and Mark Jacobson, the radiation released at Fukushima could cause 130 deaths from cancer (the lower bound for the estimates being 15 and the upper bound 1,100) and 180 cancer cases (the lower bound being 24 and the upper bound 1,800), mostly in Japan. Radiation exposure to workers at the plant was projected to result in 2 to 12 deaths. An additional approximately 600 deaths have been reported due to non-radiological causes such as mandatory evacuations. Evacuation procedures after the accident may have potentially reduced deaths from radiation by 3 to 245 cases, the best estimate being 28; even the upper bound projection of the lives saved from the evacuation is lower than the number of deaths already caused by the evacuation itself. We can assume based on these numbers that a class 5+ accident to date has caused between nil and a maximum of 3,500 casualties, with a "best estimate" at 890 casualties.

#### *4.2.2 Dams*

If we look at the history of TD accidents (221 accidents: USCOLD, 1994; UNEP, 1996; 2001) in terms of victims, we record a few accidents with approximately 260 casualties (2008, Taoshi, Linfen City, Xiangfen county, Shanxi province, China; 1985, Stava, Trento, Italy). In

1966, the Mir mine disaster in Sgorigrad, Bulgaria, killed 488 people. In 1965, the El Cobre New Dam in Chile killed more than 200 people. Very few cases killed around 100, and most cases had 1-15 casualties. This leaves us with a minimum of nil, a maximum of ~500, and an expected value of ~80 casualties.

*4.3 Risks and their Evolution*

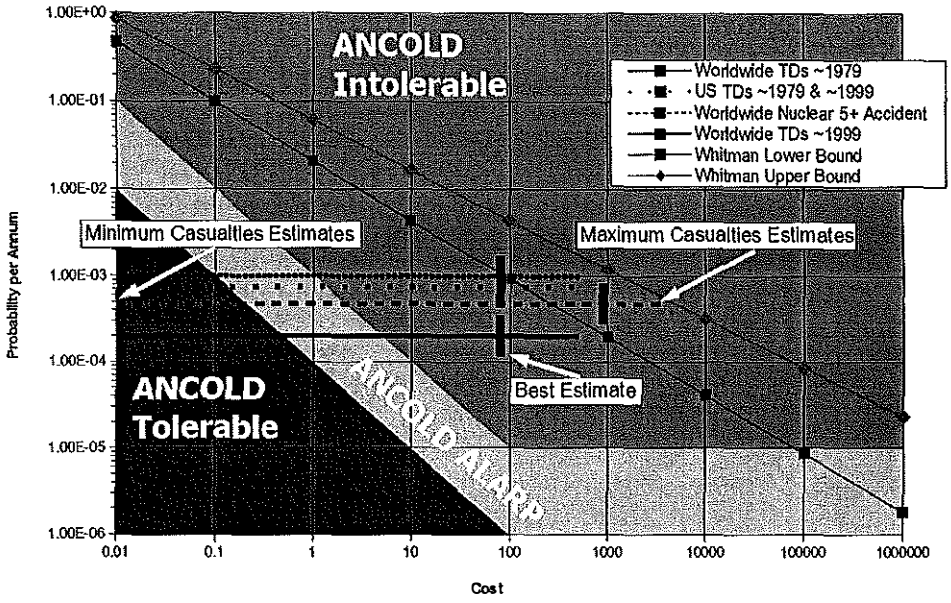


*Fig. 4 Same pf-C (Casualties) diagram as in Fig. 3, but "historic bubbles" have been removed and Casualties Estimates for TDs' and Class 5+ nuclear accidents have been added.*

If we look at Whitman tolerability thresholds, most of the recent (1999) TD failures fall within societal acceptability lower bound, unlike the more ancient ones or US failures. However, should a TD failure result in a number of casualties greater than 1000, we should expect a very serious re-think of the industry world-wide similar to the one that the nuclear industry has just seen. Should a TD be abandoned and undergo in the long run a number of natural hazards hits, the risks will become socially intolerable even if there are less than ten casualties.

These results lead to the following set of conclusions:

a) Unless a TD is built as a Category I geo-structure, then is highly monitored and maintained, the ANCOLD tolerability guidelines suggest no one should ever be exposed to it.
b) unless a TD is designed, built and cared for like a hydro dam, which means "at perpetuity" high-level monitoring and care (TD cannot be breached, unlike hydro dams) no residents should be allowed downstream of the structure (this paper does not consider environmental damages), within reach of possible run-out from a breach, to ensure ANCOLD compliance.
c) risk assessments have to be sufficiently sophisticated to allow $p_f$ estimates compatible with the ANCOLD tolerability thresholds.
d) Standard practice matrix-based risk assessments (F. Oboni, C. Oboni, S. Zabolotniuk, 2013, C. Oboni, F. Oboni, 2012) cannot be used as they lack the necessary finesse and resolution and could actually severely mislead TD owners/operators to the point of exposing them to severe liabilities.

## 5 CONCLUSIONS

Fukushima, with a "best estimate" casualties count at ten times the average of past TD accidents and the specter of radiations, brought the Japanese nuclear industry to an immediate halt and caused a very serious re-think of the industry world-wide. No TD failure has yet created such a socio-political shift. However, in the present climate of social awareness and social licensing to operate, should a severe accident happen anywhere in the world, we could expect "industry-wide" repercussions of some kind as failure will be deemed socially intolerable. To give an example of such repercussion, following the 2010 British Petroleum/Deepwater Horizon oil spill in the Gulf of Mexico, President Obama issued a moratorium on offshore drilling that halted work on 33 exploratory drilling rigs in the Gulf of Mexico. The ban was lifted in October 2010 but, by February 2011, no one had received a permit to drill because those applying had to prove the ability to contain a spill.

Perpetual care design means ensuring survival for repeated major hazards hits, thus design criteria should be more stringent for the closure phase than for the production phase, especially if the consequences of dam failures will increase because of population, land-use, etc.

Especially in the case of TDs located in areas where demographic pressure leads to settlements in the downstream areas, social and legal consequences of a failure will dramatically increase. This will particularly be the case if the methodologies used to perform the risk assessments prove to be in disconnect with the needs of our modern society.

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*1 http://www.wise-uranium.org/mdaf.html

*2 http://www.wise-uranium.org/mdaf.html

*3 http://www.euronuclear.org/info/encyclopedia/n/nuclear-power-plant-world-wide.htm

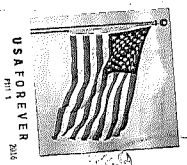
**The public comment period on the Donlin Gold project has been extended.**
Use this postcard to comment.

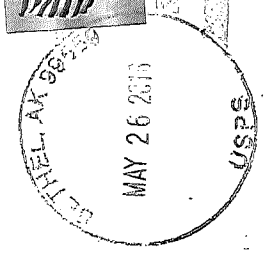
Please send your postcard to the U.S. Army Corps of Engineers with postmark before the **May 31, 2016** deadline.

I WOULD LIKE TO SEE THE FINAL DEIS SHOW A TAILINGS DAM MODELS ANALYSING THE EFFECTS OF A PARTIAL DAM FAILURE FOR 10% AND 30% RELEASES. THE 0.5% MODEL IS NOT ACCEPTABLE AS A REALISTIC MODEL

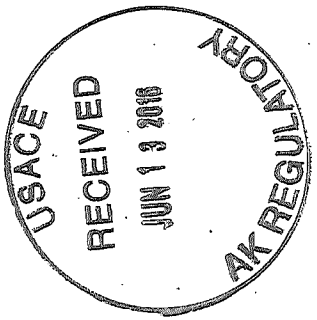
DAM 4

GRANT FAIRBANKS
SLEETMUTE AK
99668




U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
P.O. Box 6898
JBER, AK 99506-0898



| | |
|---|---|
| **From:** | Michelle Toohey |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Please see attached public comment letter Donlin Gold Draft EIS |
| **Date:** | Tuesday, May 31, 2016 12:47:54 PM |
| **Attachments:** | LInda Leary public comment ltr.pdf |

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Michelle Toohey
907-229-7855

FAIRWEATHER LLC

May 25, 2106

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

Dear Mr. Gordon,

Thank you for allowing me this opportunity to comment on the Donlin Gold Project Draft Environmental Impact Statement (EIS). In October of 2015, I was appointment as the new President of Fairweather, LLC and the Deadhorse Aviation Center, LLC (DAC) in Alaska. I am a long-time Alaskan with over 30 years of logistics and sales experience, formerly serving as the president of Carlile Transportation Systems – one of Alaska's largest trucking and logistics companies – and Senior Vice President of Alaska Communications.

What fuels Alaska's economy is our natural resource industry where I've been in the trenches mainly with a focus on transportation and logistics. It's with that perspective that I write in support of the Donlin Gold Mine Draft EIS. The opportunities the mine can bring to the Yukon-Kuskokwim region are many and are desperately needed. The project will bring good long-term jobs to the Y-K region and help the residents there maintain their subsistence lifestyle.

The region's Native Corporation, Calista selected the mineral rights at Donlin Gold, and TKC selected the surface estate during ANCSA so that their shareholders would benefit from the development and production of the mine. The residents do not take such a large project lightly and want to ensure the mine is built with the integrity to maintain safety during production and at mine closure. The company has spent over 20 years of due diligence and has given residents many assurances that their project will be state of the art and environmentally sound. The companies involved have worked tirelessly with Calista shareholders, have listened to their concerns, and have made changes to their plans to address them.

SER 5 The people of the Y-K need jobs and economic opportunities Donlin Gold will bring. The project offers the younger generation work and a chance to learn new skills. I support this environmentally responsible project, which will move the quality of life for Alaska residents forward with economic opportunity, and hope for a prosperous future. Your consideration is appreciated.

Sincerely,

Linda Leary

Linda Leary
President

| | |
|---|---|
| **From:** | Michelle Toohey |
| **To:** | donlingoldeis, POA |
| **Subject:** | [EXTERNAL] Please see public comment letter on Donlin Gold Draft EIS |
| **Date:** | Tuesday, May 31, 2016 12:48:57 PM |
| **Attachments:** | Rick Fox Public Comment Ltr Donlin.pdf |

--
Michelle Toohey
907-229-7855

FAIRWEATHER LLC

May 31, 2106

Mr. Keith Gordon, Project Manager
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Attn: CEPOA-RD-Gordon

Dear Mr. Gordon,

Developing Alaska's natural resources has played a huge part in my career here and I'm thankful for the opportunities this state has to offer. Currently I serve as the Senior Vice President and General Manager of Alaska Operations for the Edison Chouest Offshore Group of Companies (ECO). I am responsible for leading all ECO vessel activities in the Arctic, as well as overseeing the operation of Chouest affiliates Fairweather, LLC, Deadhorse Aviation Center, Tulugaq, LLC and VDOS, LLC (Virtual Data Operations Support).

Prior to this position and starting in 2002, I was picked to lead Shell's operations capability strategy, responsible for growing and developing the operating workforce and leadership for the Americas. I became the Alaska asset manager in 2006, taking a lead role in Shell's growing exploration and development activities in the Arctic. I was charged with bringing innovative ideology to the Arctic oil and gas industry and building relationships with the communities and villages of the North Slope and retired from that position in 2010.

I have first hand knowledge of what is required for companies to partner with local villages and communities on projects of mutual benefit. I strongly believe that the Donlin Gold Project in the state's Yukon-Kuskokwim Region is a standout example of a company that is doing it right, and am pleased to comment on the Draft EIS before you for consideration.

I'm confident given the company's years of work, money invested and commitment to surrounding communities that the project will be conducted in an environmentally responsible manner with respect for the land, fish and game, and the residents' subsistence way of living.

SER 18 In a region that is one of the poorest in the state, the project will not only bring jobs and opportunity but the infrastructure included such as the natural gas pipeline, will allow the region the potential to bring in fuel less expensively.

Donlin Gold has been working hard for over twenty years to bring this project on board. In that time, the company has held many meetings with Y-K Region residents, has listened to their concerns and has made substantial changes to the project as a result. The company has spent hundreds of millions to ensure the safety and security of the region.

The project has been a long time coming allowing time for due diligence in planning for construction, production and closure. Now is the time to move forward with the Donlin Gold Mine Project for the benefit of Alaska's people. Your consideration is appreciated.

Sincerely,

Rick Fox
Senior Vice President & General Manager

301 Calista Court Anchorage, AK 99518 | Phone: (907) 562-2111 | Fax: (907) 349-1920 | | www.fairweather.com

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AK REGULATORY

April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15 Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

Donlin Gold has also demonstrated a notable commitment to the environment. Donlin has 16+ years of extensive studies focused on creating an environmentally and socially responsible project; and has purposefully designed its project to reduce the overall footprint of the mine and diminish any social impacts it may have on the YK region. Proposals such as building a natural gas pipeline have been developed in an effort to minimize barge traffic on the Kuskokwim River. Furthermore, a specific route for the pipeline has been selected to minimize disturbance to IDIT 1 known historic landmarks such as the Iditarod Trail. It is worth noting that the Iditarod Trail was originally created and used for the purpose of the Gold Rush in 1910. While we certainly want to preserve the beauty of our Alaska heritage, let us not forget how that history was created.

Lastly, I think it's worth noting that this region of land and its resources belong to the shareholders of Calista and The Kuskokwim Corporation. This area in particular was specifically selected during the Alaska Native Claims LAND 1 Settlement Act (ANCSA) due to its rich mineral content and the economic potential it would provide for its shareholders and descendants. ANCSA understands the importance of heritage and a subsistence lifestyle, but also recognizes the potential for achieving unity and managing the land for both modern and traditional uses.

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Lukas Fellman
NC Machinery Co.
Anchorage, AK
(907) 441-5213

**From:** Michael Ferris
**To:** donlingoldeis, POA
**Subject:** [EXTERNAL] Donlin Gold Draft EIS comment
**Date:** Monday, May 23, 2016 11:39:43 AM

SER 4 Please support Alternate 2 for the Donlin Gold Project. This project will bring much needed jobs to an area of Alaska that has a high unemployment rate. It would bring lower cost energy to many families and village that live in that area and with a life span of 27 years it will offer long term stability to a region of Alaska that desperately needs help

Sincerely

Mike Ferris

Michael S. Ferris
Xerox Sales Agent

**Alaska Enterprise Solutions**
Xerox Authorized Sales Agency
557 E Fireweed Lane
Suite A
Anchorage, AK 99503
office (907) 561-5100
CELL (907) 306-8475
fax (907) 561-5101
email mike@aesalaska.com

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April 25, 2016

U.S. Army Corps of Engineers
Alaska District
CEPOA-RD-Gordon
PO Box 6898
JBER, AK 99506-0898

To Whom It May Concern,

I am writing to express my support for Alternative 2, the Donlin Gold Project.

SER 15

Donlin Gold has a proven record of commitment to the people of the Yukon Kuskokwim (YK) Region. The economic potential it has for the local communities is destined to have a grossly positive impact to a region that is currently experiencing one of the highest unemployment rates in the state. With Donlin Golds commitment to local hiring, young and future generations have much to look forward to, including: well-paying jobs in a variety of career fields, educational opportunities, and economic stability that will be broadly felt throughout southwest Alaska.

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IDIT 1

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LAND 1

Again, I am writing to express my support for Alternative 2, the Donlin Gold Project.

Regards,

Signature

Andrew Flagan
Print Name

Anchorage, AK
City & State of Residence

**From:** donlingoldeis, POA
**To:** Craig, Bill
**Subject:** FW: [EXTERNAL] Donlin Gold
**Date:** Thursday, February 25, 2016 6:55:15 AM

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-----Original Message-----
From: Elizabeth Fox [mailto:elizabeth_fox@lksd.org]
Sent: Wednesday, February 17, 2016 10:01 AM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold

Elizabeth Fox

P.O. Box 1652

Bethel, Alaska 99559

907-545-9493

elizabeth_fox@lksd.org <mailto:elizabeth_fox@lksd.org>

February 17, 2016

U.S. Army Corps of Engineers

Keith Gordon, Project Manager

907-753-5710

To Whom it may concern,

TWL 1 Hello, I am Elizabeth. I am from Bethel. Are you for or against the Donlin Gold mine? I am against the mine because the land and water will be polluted, the mine could hurt our subsistence food and it could hurt our native culture and traditions of cutting and preparing

HZM 2 My first main point is that the land and the water will be polluted, I say this because of all the waste products and the chemicals that will be used to treat the rock at the mining site. It is called “tailings” or waste. If there is a disaster, all the chemicals could be in our land where we won’t be able to grow any plants or crops. My last point is erosion and sedimentation. Erosion is the process in which soil is being eroded by the wind and rain. The mines create the soil by eroding it.

SUB 15 My second main point is that the mine could hurt our subsistence culture and animals. All the animals that live around the mine can be poisoned with Mercury, Arsenic, Cadmium, and Cyanide. Mercury is a heavy-silver white metal that is a liquid. Arsenic is a grayish-white element having a metallic luster. Cadmium is a silvery white metal. Cyanide is used for attracting gold. Also, the chemicals can also wreak havoc on the fish. Wreak havoc means to destroy the fish.

My third main point is there would be barely any fish. If there is a cyanide leak, the fish would be poisoned with Cyanide. There also would be barely any animals to catch for the families. In the winter, most people who rely on nature food and save them, they might not have food in their refrigerators or even in their freezers. Would you still want to go hunting and be able to catch?

So, in 25 years where do you see yourself? Do you see yourself eating fish and caribou with all your siblings and future families? Do you go against the mining? The mine is supposed to operate for 25 years.My point here is that Donlin Gold mine is not a good choice. I choose to go against it because there would be more pollution in the water and in the land, also the fish and the animals would be poisoned.

Sincerely,

Elizabeth Fox

**From:** Craig, Bill
**To:** Bellion, Tara; Evans, Jessica; Smith, Neal
**Subject:** FW: Donlin Gold Draft EIS comment
**Date:** Wednesday, April 20, 2016 1:06:16 PM

---

-----Original Message-----
From: donlingoldeis, POA [mailto:POA.donlingoldeis@usace.army.mil]
Sent: Wednesday, April 20, 2016 10:29 AM
To: Craig, Bill
Subject: FW: Donlin Gold Draft EIS comment

-----Original Message-----
From: David Friday [mailto:David_Friday@ykhc.org]
Sent: Tuesday, April 19, 2016 4:21 PM
To: donlingoldeis, POA <POA.donlingoldeis@usace.army.mil>
Subject: [EXTERNAL] Donlin Gold Draft EIS comment

I am concerned about the detrimental affects that the proposed Donlin Creek mine would have on our environment and our way of life. The proposed open pit mine is scary to say the least about the pollutants, chemicals and other toxins that it would release when exposed. These chemicals and other toxins will rise into the air and spread to other areas in that manner.

BIRD 3
PHL 3
DAM 8

Secondly, the holding pond for the deadly chemicals, no matter how secure, is going to attract waterfowl and contaminate them that way. These waterfowl then will be harvested by the locals who in turn are going to be infected with poison from the holding tanks. Cancer which is now growing as never before will be the major health risk from this type of occurrence. Plus, the holding pond, no matter how secure is chemical disaster waiting to happen. In the event of an earthquake in the area, it will release all these dangerous pollutants eventually into the Kuskokwim River that the length of the river inhabitants depend on for their livelihood. Kuskokwim River is our bread and butter for the whole region and more. 25 years of employment for a select few and a few dollars for the Native corporations involved does not even cover the enormous and potential risks involved in the magnitude of this type of project.

BARG 8
SUB 17

Furthermore, the mega barges that are going to be involved will disrupt the summer activities for all concerned for the length of the river from the mouth of the Kuskokwim River to the proposed dock below the proposed mine. Some parts of the Kuskokwim River villages are having erosion problems and the mega barge activities are going to exasperate this enormous problem. The subsistence fishing throughout the length of the river is going to be greatly compromised by this activity as never seen before.

In closing, there's just too much risk involved that could affect our subsistence and our way of life in a detrimental way and if anything should happen, no one, government or industry or those involved could not repair or reverse the damage in any way, shape or form. Just the enormity of the project creates uncertainty and the scenario of the disaster is too great to comprehend at this time for all involved. I am absolutely against this type of activity in the now pristine environment and wilderness.

Thank you,

David J. Friday

Citizen of Bethel and the United States of America

---

Confidentiality Notice: This email message and any attachments may contain confidential and private information of the Yukon-Kuskokwim Health Corporation (YKHC), which is protected by law from any further disclosure. If you are not the intended recipient, be aware that any further disclosure, copying, distribution or use of this email or any attachments is prohibited. If you have received this message in error, please forward this email and all attachments immediately to YKHC's Privacy Officer at: privacy_officer@ykhc.org and then immediately delete this email and all attachments.