UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
ECOSYSTEMS,
TRIBAL AND PUBLIC
AFFAIRS

March 29, 2013

Mr. Don Kuhle, Project Manager
U. S. Army Corps of Engineers, Alaska District
Regulatory Division
Post Office Box 6898
Joint Base Elmendorf Richardson, Alaska 99506-0898

Re: The Donlin Gold Project Scoping Comments. EPA Region 10 Project No.12-0057-COE

Dear Mr. Kuhle;

The U.S. Environmental Protection Agency has reviewed the December 14, 2012, Notice of Intent to prepare an Environmental Impact Statement for the proposed Donlin Gold Project. Our scoping comments are provided pursuant to the National Environmental Policy Act, Section 309 of the Clean Air Act, the Clean Water Act, and our responsibilities as a cooperating agency.

The CAA §309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Our review of the Draft EIS will consider the expected environmental impacts and the adequacy of the EIS in meeting the procedural and public disclosure requirements of NEPA. The EPA's review criteria for rating EISs are available on our website http://www.epa.gov/compliance/nepa/comments/ratings.html.

The NOI indicates that Donlin Gold, LLC, is proposing the development of an open pit, hardrock gold mine in Southwest Alaska, ten miles north of Crooked Creek. The proposed project would include a waste rock facility, tailings storage facility, a mill processing facility, mine camp, and other ancillary facilities, such as a natural gas-fired power plant supplied by a 313-mile long, 14-inch diameter buried pipeline from the west side of Cook Inlet. Transportation infrastructure would include a 27-mile long access road, a 5,000-ft long airstrip, port faculties at Jungjuk and Bethel, and a 40 million gallon diesel fuel storage facility.

The EPA highlights the importance of establishing and disclosing the details of financial assurance for post-closure, reclamation, and long-term water management. We recommend that the EIS provide a detailed level of information to ensure that there will be adequate financial assurance to cover the costs of implementing closure and reclamation plans, monitoring, contingency measures, and long-term water management to avoid unacceptable adverse environmental impacts. Financial assurance information should be provided for public review and comment.

We encourage the Corps to evaluate the CWA §404 permit application concurrently with the NEPA process and the National Historic Preservation Act Section 106 coordination process. We recommend the Corps identify a preferred alternative at the Draft EIS stage, and include a draft CWA §404(b)(1)

Guidelines analysis. We believe this would result in a more streamlined and consistent agency decision, enhanced public disclosure, and predictability for the project proponent.

In addition to evaluating the environmental consequences from the construction and operation of the proposed Donlin Gold project, we recommend that the EIS evaluate unanticipated, but reasonably foreseeable mine failure scenarios within the scope of NEPA analysis. There are inherent environmental and human health risks associated with the development of a new mine project that may not be anticipated or expected during the early project planning stages. Accidental fuel and chemical releases and spills do occur despite precautions to manage for those risks. An evaluation of the environmental effects resulting from the failure of the mine facilities, such as the tailings storage facility dam and liner, is also important as alternatives are developed for siting, design, closure, and financial assurance.

Finally, the proposed project may result in significant environmental and human health impacts to over 60 Alaska Native and other rural communities in the Yukon-Kuskokwim region. The release of acid rock mine drainage and metal leaching of pollutants, such as mercury, arsenic, and cyanide into the adjacent wetlands and waterbodies could affect traditional cultural practices including hunting; fishing and gathering of subsistence foods and drinking water sources relied upon by the local native communities. The transportation of diesel fuel and other chemicals on the Kuskokwim River represents a potential spill risk and conflict with local uses. The EIS should fully disclose the potential direct, indirect and cumulative impacts of these project-related activities on their traditional way of life.

As a cooperating agency, the EPA appreciates the opportunity for early involvement in the NEPA planning process by providing comments on the proposed Donlin Gold Project. The detailed comments (Enclosure 1) reflect the scope and range of issues, and potential impacts that we believe warrant consideration in the EIS.

Please do not hesitate to contact me at (907) 271-3411 or by electronic mail at jen.mark@epa.gov, if you have any questions regarding our comments. We look forward to working with your office, the applicant, and the other cooperating agencies and tribes to advance this important Alaska resource project.

Sincerely,

Mark S. Jen, Project Manager
Environmental Review and Sediment Management Unit

cc: Donlin Gold, LLC

Enclosures

Enclosure 1

EPA Detailed Scoping Comments on the Donlin Gold Project
Region 10 Project No. 12-0057-COE

Purpose and Need
The EIS should present a clear and concise statement of the underlying purpose and need for the proposed project consistent with the implementing regulations for NEPA (40 CFR 1502.13). This statement should be framed broadly enough as to allow for the analysis of a range of reasonable alternatives.

Recommendations:
- The EIS should reflect not only the project proponent's and the Corps' purpose and need, but also the broader public interest and need based on the scoping comments; and
- The purpose and need statement for the EIS should be developed in coordination with the cooperating tribes and agencies.

Range of Alternatives
The EIS should evaluate a range of reasonable alternatives to meet the project purpose and need that are responsive to the issues identified during the public and agency scoping process and through tribal government-to-government consultation. A range of reasonable alternatives will ensure that the EIS provides the public and the agency decision-makers with information that sharply defines the issues and identifies a clear basis for choice among the alternatives, as required by NEPA. The Council of Environmental Quality recommends that all reasonable alternatives be considered, even if some of them could be outside the capability or the jurisdiction of the lead federal agency preparing the EIS for the proposed action.

Recommendations:
Criteria Development
- Develop criteria that would be used to (1) identify a range of reasonable alternatives; (2) eliminate alternatives from further consideration (3) identify the environmentally preferred alternative , and (4) identify the least environmentally damaging practicable alternative;
- Criteria could be based on the conservation of important aquatic and terrestrial habitats, maintaining wildlife and fish passage, maintaining subsistence and socio-cultural resources, practicability (e.g., logistics, technology, and costs), regulatory requirements, etc.;
- Comments identified during public and agency scoping, and tribal consultation should be used to develop alternatives criteria;
- Describe the process, the rationale, and the basis for how these criteria were developed; and
- The alternatives criteria should be developed in coordination with the cooperating tribes and agencies.

Range of Reasonable Alternatives
- Evaluate the unanticipated but reasonably foreseeable mine failure scenarios, which may include the potential failure of the tailings storage facility dam and liner, as well as other accidental chemical releases and spills associated with the mine site, the natural gas pipeline, and the transportation logistics;
- Evaluate alternative energy sources, such as wind, diesel, solar, hydroelectric, and geothermal;
- Evaluate alternative pipeline and road alignment routes and options;

- Evaluate the use of winter ice roads and snow roads for (1) transportation of cargo and fuel to the mine site, and (2) logistic associated with construction activities;
- Evaluate alternative locations for the proposed port facilities;
- Evaluate alternative configurations for the mine and camp facilities, facility designs;
- Evaluate alternative mine processes, best available technologies, physical-chemical treatment options, alternatives to cyanide for gold ore processing, etc.; and
- Compare environmental impacts between the proposed project and alternatives analyzed in detail.

Cost Benefit Analysis

- For each alternative analyzed in the EIS, develop a general life cycle economic cost analysis; and
- Cost of the project would be used to determine the practicability of the proposed project under Clean Water Act (CWA) §404(b)(1) Guidelines.

Agency Preferred Alternative(s)

The Draft EIS should include an agency preferred alternative, if one or more exists. This would provide the public, the tribes, and the agencies with an opportunity to conduct a more detailed review and comment of the environmental consequences associated with the preferred alternative.

Recommendations:

- Concurrent review and analysis under the National Environmental Policy Act, CWA §404, and Section 106 National Historic Preservation Act;
- A draft CWA §404(b)(1) compliance determination for the preferred alternative should be included in the Draft EIS as an Appendix; and
- The Least Environmentally Damaging Practicable Alternative identified as the preferred alternative in the Draft EIS.

Financial Assurance – Reclamation, Post-Closure Monitoring, Long-Term Management

NEPA provides for the disclosure to the public, the tribes, and the decision-makers regarding information concerning environmental consequences of a proposed action before the decisions are made and before actions are taken. A key component in determining the environmental impacts of a proposed mine is the effectiveness of closure and reclamation planning and activities, including long-term water management. The amount and viability of financial assurance are critical factors in determining the success of reclamation and closure activities and, therefore, the significance of the environmental impacts.

The EIS should disclose the costs associated with implementing the closure and reclamation plan, as well as the contingency measures to address the reasonably foreseeable but not specifically predictable project outcomes. This is necessary to inform the public, the tribes, and the decision-makers of the financial risk to the public posed by the conditions at the site. Financial assurances should be in a form that protects the public interest in the event that a company is unable to implement contingency measures or perform long-term operation and maintenance at a closed mine site. The EPA has expertise in this area and would be available to work with the Corps, the State of Alaska, and the project proponent to develop appropriate cost estimates and funding criteria.

The level of information that should be included for financial assurance is outlined in our recommendations below for site reclamation and long term-term site maintenance. We have also enclosed an example of a narrative description for financial assurance cost categories (Enclosure 2) and a cost estimate spreadsheet (Enclosure 3).

Recommendations:

Site Reclamation (e.g., facility closure, earth moving/stabilization, revegetation, etc.):

- Estimate the cost (+/- percent) to reclaim and close the site in a manner that achieves reclamation goals and post-mining land use objectives;
- Identify criteria for determining success of reclamation activities for bond release;
- Estimate the direct costs for site reclamation, monitoring, long term management, maintenance, and contingencies, including removal of structures and facilities, and revegetation; and
- Include the costs associated with implementing contingency measures to address reasonably foreseeable but not specifically predicted outcomes.

Long-Term Site Management (e.g., post-closure water treatment, mitigation of aquatic resources, site maintenance, and monitoring):

- Itemize the cost estimates (including reasonable contingencies) and appropriate economic variables to calculate the net present value of future expenses, including the time period to complete long term treatment, monitoring and maintenance; and
- Describe the "mechanics" of the financial assurance mechanism for the site, for example, if a trust is being used, include such details as:
  - Requirements for timing of payments into the trust fund and for "true-ups";
  - Discount rate used, if any, including assumptions for inflation, management fees, and tax rates;
  - Acceptable investment instruments;
  - Tax status of the trust fund and how management fees and taxes are paid; and
  - Identification of the trust fund beneficiaries.

To ensure that financial assurance for both site reclamation and long-term maintenance are adequate, the agency should also:

- Reevaluate financial assurance cost estimates every three to five years or whenever a major change to the mine operations has occurred;
- Identify the responsible party for any post-closure clean up actions, should they be necessary. The financial assurance should not depend on the continued financial health of the mine operator or its parent company;
- Disclose detailed information about the process used to develop and secure financial assurance, including, but not limited to, costs, calculations, models, assumptions, inflation adjustments and rates, rates of return, contingencies, labor rates, net present value to consider costs many years into the future;
- To minimize the amount of financial assurance required, consider removal of the tailings material and potentially acid generating material off-site;
- Base the financial Assurance estimates on the reasonable spill or failure scenarios, such as the largest disturbances and material volume, water treatment, soil amendments, and hazardous materials;
- Identify the responsible party for any post-closure clean up actions, should they be necessary. The financial assurance should not depend on the continued financial health of the mine operator or its parent company;
- Disclose detailed information about the process used to develop and secure financial assurance, including, but not limited to, costs, calculations, models, assumptions, inflation adjustments and rates, rates of return, contingencies, labor rates, net present value to consider costs many years into the future;
- Estimate the indirect costs, such as mobilization and demobilization, contingencies, engineering design, etc.; and

- Evaluate the indirect and cumulative costs associated with the long-term impacts to subsistence and water resources.

Acid Rock Drainage/Metal Leaching

Site Analogs

The geology and geochemistry of the project area may be unique or may exhibit similar features and characteristics as other gold mines in the State. Site analogs may be a way of comparing and evaluating acid mine drainage and metal leaching potential, and can be used to predict future site conditions. The EIS should include information regarding other historic and/or present gold mining projects and claims as a basis of comparing the environmental effects of the proposed project.

Recommendations:

- Discuss the regional mineralization and existing gold deposits and mine project in Alaska as site analogs for evaluating the proposed project geology and geochemistry;
- Compare the ore, waste rock, and tailings characterization (e.g., chemical/physical composition, metals leachability and acid-generating potential) of the proposed project mine site to other existing gold mines in Alaska (e.g., Fort Knox, Pogo, Nixon Fork, Kensington, etc.); and
- Identify and describe historic, present and proposed gold mining claims, and activities in the region.

Mine Site

In order to evaluate the effects of acid rock drainage/metal leaching, the geology and geochemistry of the mine site should be fully characterized. There is a potential for acid rock drainage/metal leaching to occur from surface runoff and from the ore, waste rock facility, and infiltration/seepage from the tailings storage facility. The EIS should include a characterization of the ore and waste rock and mine tailings for potential acid rock drainage/metal leaching. This characterization should be conducted prior to mine construction and operations, and throughout the 27 year mine life, as well as during mine closure and reclamation.

Recommendations:

- Characterize the ore and waste rock, and tailings, including the chemical/physical composition, metals leachability, and acid-generating potential;
- Develop a detailed acid rock drainage and metal leaching testing plan and include a schedule and timeframe. The open pit mine lithologies should be tested regularly during the active life of the mine operations for potential acid rock drainage/metal leaching, as well as during closure and reclamation;
- Identify measures and options to minimize the release of acid rock drainage/metal leaching. It is presumed that all waste rock from the mine site will generate acid. This must be accounted for and managed in perpetuity;
- Evaluate and model potential rates and volumes of infiltration/seepage from mining facilities into groundwater and surface waters;
- Identify the constituents and pollutants in the infiltration/seepage stream. Evaluate how unintended and/or unmitigated releases of seepage from facilities would affect surface/groundwater quality;
- Evaluate the feasibility of adding a thicker, denser impoundment cap to the tailings pile to reduce oxygen flux, slow down oxidation of the tailings, and reduce hydraulic conductivity and water movement down through the tailings;

- Evaluate the feasibility of mixing amendments to the tailings to reduce the potential of acid rock drainage/metal leaching;
- Evaluate the use of a geomembrane liner for the waste rock facility to minimize infiltration/seepage; and
- Identify monitoring plans to test for acid rock drainage/metal leaching in the adjacent groundwater and surface waters. Discuss the process for treatment of water impacted by acid rock drainage/metal leaching.

Pipeline Corridor

The proposed pipeline corridor would extend over 300 miles and cross the rugged Alaska Range. The proposed pipeline would be buried and would require trenching in mineralized areas of the state. Analysis should be conducted along the proposed buried pipeline corridor to determine whether trenching could result in acid rock drainage/metal leaching into adjacent surface waters and groundwaters.

Recommendations:

- Characterize the bedrock for acid rock drainage/metal leaching potential (including neutral or high pH metal leaching);
- Use site analogs for comparison of acid rock drainage/metal leaching with other minerized areas and historic and present gold mines;
- Develop detailed acid rock drainage/metal leaching testing and monitoring plans during trenching activities; and
- Identify measures to reduce and/or capture runoff of acid rock drainage/metal leaching into adjacent surface and groundwaters.

Mercury (Air Emissions)

Point Source Emissions

On December 16, 2010, the EPA promulgated National Emissions Standards for Hazardous Air Pollutants for gold ore processing and production facilities to regulate mercury air emissions, which is the seventh largest source of mercury emission in the United States.[1] The final rule establishes mercury emission limits for four types of processes found at gold production facilities: ore-pretreatment processes (primarily heating processes used to prepare ore for gold extraction); carbon processes with mercury retorts; carbon processes without mercury retorts; and non-carbon concentrate processes. Table 1 identifies the final mercury air emission limits for new sources.

Table 1			
Affected Source	**Existing Sources**	**New Sources**	**Units**
Ore pretreatment processes	127	84	lb/million tons of ore
Carbon processes with mercury retorts	2.2	0.8	lb/ton of concentrate
Carbon processes without mercury retorts	0.17	0.14	lb/ton of concentrate
Non-carbon concentrate processes	0.2	0.1	lb/ton of concentrate

The final rule also establishes requirements for monitoring, which include annual mercury emissions tests at all emissions stacks. The EIS should describe how this proposed project would meet the new

[1] National Emission Standards for Hazardous Air Pollutants (NESHAP): Gold Mine Ore Processing and Production Area Source Category. Final Rule 40 CFR Parts 9 and 63.

mercury air emission limits and monitoring requirements associated with the types of gold ore processing and production facility at the Donlin mine.

Recommendations:

- Characterize the amount of mercury in the ore.
- Describe the mercury abatement process and the type of control technologies (e.g., mercury scrubbers, condensers, carbon absorbers, etc.) that would be implemented to meet the new mercury air emission limits;
- Discuss the efficiency of the mercury capture system and estimate the expected amount of mercury air emissions from the mill exhaust stack;
- Describe the predicted speciation of mercury emissions in order to identify if releases will be deposited locally or enter the global pool;
- Provide an estimate of the amount of mercury that would included in the tailings effluent stream and stored in the tailing storage facility;
- Describe the amount and the physical/chemical form of mercury captured, and how this mercury would be contained and stored. Discuss transportation of the mercury if sold to lower 48 markets as recycled mercury. Identify the names of the authorized mercury recyclers, if any;
- Describe the type and method of monitoring, frequency and schedule for monitoring, and mercury emission testing at emission stacks to ensure control technologies are effective;
- Provide a process flow diagram identifying the location of the control technologies, where monitoring of mercury emissions would occur, how much mercury would be captured, and how much mercury would be released from the mill exhaust stack; and
- Describe any corrective actions that would be taken if mercury air emissions exceed the allowable limits;

Nonpoint Source Emissions

Studies have demonstrated that mercury associated with solid material or dissolved in an aqueous solution can volatize directly to the atmosphere. Often only a relatively small percent of the solid/liquid associated mercury volatizes; however if the solid or solution concentrations are high (as they often are at mines in geologically enriched mercury areas) and/or cover a large surface area (also often the case at major mine operations), then there is potential for significant amounts of mercury to be released from nonpoint sources. Previous studies from Nevada gold mine areas indicate that surface volatilization can range from 10 to over 100 kg/year per mine—depending on many different mine characteristics (study details available upon request). A general mercury assessment and bioaccumulation study should be conducted for this project based on evaluation of the point and nonpoint sources of mercury emissions, identification of mercury receptors in the environment, and the pathways for environmental and human exposure.

Recommendations:

- In order to have a full understanding of mercury air emissions from a mine operation, these nonpoint sources will need to be identified and quantified. Prior to the development of the mine, these emissions can be estimated based on anticipated mercury concentrations of the different mine surfaces;
- Surface-air fluxes are not unique to mining areas. They can also occur from natural landscapes—with landscapes containing geologically enriched mercury having larger emissions. To help contextualize the emissions from a proposed mine, there may be utility in first quantifying the baseline mercury emissions from the natural landscape;

- Apart from volatilization, particulate bound mercury can be mobilized through wind erosion, which may be deposited locally. The potential for wind erosion of mercury enriched particles should be discussed in the EIS; and
- Identify and quantify the mercury receptors in the environment. The potential for this mercury to be deposited to local wetlands and other surface waters, and methylated should also be described.

Mercury Methylation (Water)

The impact of mercury on aquatic systems may be dependent on the amount that is methylated. Mercury methylation requires inorganic mercury and methylating bacteria. The predominant (though not exclusive) methylators of mercury are sulfate reducing bacteria, which require anoxic conditions, sulfate, and an organic carbon source. Therefore, any landscape alterations that affect the activity of SRB can have a large effect on methylmercury concentrations in aquatic biota. As such, in evaluating the impacts of the proposed mine, it is not adequate to look at just releases of inorganic mercury. The EIS should discuss how the mining activity influences the methylation potential of mercury. The pathways for environmental and human exposure to methylmercury should also be described.

Recommendations:

- In 2007, measurements of methylmercury were added to the mercury baseline study. These measurements focused on stream/river sediments. While measuring sediments may have the benefit of being less temporally variable than water; the water measurements may be more representative of the methylmercury available for accumulation in the food web. It is likely that mercury methylation in the area is mainly occurring in wetlands. The export of methylmercury from these wetlands is likely in the dissolved phase. Therefore, it may be the case that sediment methylmercury concentrations are not representative of water methylmercury concentrations. The export of methylmercury from wetlands is likely highly temporally variable and would be dependent on hydrological connectivity between the wetlands and streams. An efficient way to identify the baseline methylation potential of the ecosystem is to collect measurements directly from the wetlands;
- Numerous studies have shown that methylmercury concentrations in water have large seasonal variability—with the highest concentrations in the late summer/early fall. Over the winter, methylmercury typically decreases, resulting in lower spring time concentrations. As such, to understand the maximum amount of methylmercury being produced, measurements should be made in the late summer or early fall;
- The EIS should discs the potential for methylation to occur downstream from the mine site and the role that export of dissolved organic carbon, sulfate, and inorganic mercury may have on facilitating downstream methylation;
- Releases of mercury or methylmercury associated with the mine need to be contextualized with the releases from Red Devil and other mines upstream, and naturally occurring background levels to understand any cumulative impacts of releases; and
- Discuss the potential pathways for environmental and human exposure to methylmercury, and the potential for methylmercury to bioaccumulating in fish and other subsistence foods relied upon by the local communities.

Cyanide

The proposed gold extraction process would require the use of cyanide, which may pose a risk to human health and the environment if released in large quantities. Accidental spills of cyanide at gold mine processing facilities do occur. For example, the Fort Knox Gold Mine north of Fairbanks had spill

releases of 300,000 gallons of cyanide containing water (May 2010) and 45,000 gallons as a result of a bulldozer breaching the supply line (August 2012).

The transportation, storage, and disposal of cyanide present potential risks and many opportunities for accidental spills and releases of cyanide. As proposed, cyanide would be transported to the mine site using marine cargo vessels, river tug/barges, and trucks on a gravel road. In transit, the cyanide would be stored at the Bethel and Jungjuk ports. Considerations should be made to minimize transportation and multiple transfer points for cyanide.

Furthermore, recent studies have shown that residual cyanide in mine tailings can cause persistent release of toxic metals (e.g., mercury) into groundwater and surface waters. Potential steps should be considered to detoxify, remediate, and remove cyanide from the tailings effluent. Wildlife, particularly birds, can also be exposed to residual cyanide in tailings ponds. The EIS should include a cyanide management plan and a discussion on the environmental and human health impacts associated with cyanide exposure and strategies aimed at reducing exposure to resident and/or migratory wildlife.

Recommendations:

- Discuss the transportation and storage of cyanide. Identify opportunities to minimize transit times and multiple transfer points. Explain how cyanide would be properly stored and contained during transit and at the mine site. An alternative should include the use of air cargo to transport cyanide directly to the mine site;
- Develop a plan to manage cyanide during transpiration and at the mine facility and how to respond to accidental releases of cyanide;
- Evaluate control technologies and/or additives to detoxify, remediate and/or remove cyanide from the mining process effluent. Any cyanide removed should be properly disposed at an approved faculty;
- Provide an estimate of the amount of cyanide that would included in the tailings effluent stream and stored in the tailing storage facility; and
- Evaluate the environmental fate and pathways for human and wildlife exposure to cyanide.

Arsenic

Arsenic is a naturally occurring element in the earth's crust and widespread throughout Alaska. The proposed project activities would expose the aquatic environment to arsenic and potentially result in subsequent exposure to humans by drinking contaminated water and/or eating contaminated foods. The EIS should include an arsenic assessment and determine potential impacts to human health.

Recommendations:

- Identify the sources and the amounts of arsenic potentially released from this project. Identify the receptors of arsenic in the environment. Describe the potential pathways for human exposure. Provide the toxic exposure limits for arsenic to humans and wildlife;
- The mobility and toxicity of arsenic vary depending on the form (e.g. arsenite, arsenate) and is heavily influenced by oxidation/reduction conditions. The EIS needs to include a discussion of predicted arsenic speciation in the context of potential changing redox conditions and how this influences the potential environmental transport and impacts;
- Identify any control technologies that would be implemented to detoxify, remediate, remove and/or treat arsenic from the mining process effluent. For any arsenic removed, identify the proper disposal facility; and

- Provide an estimate of the amount of arsenic in the tailings effluent stream and in the tailings storage facility.

Air Quality Assessment

The temporary short-term and long-term air emissions from the proposed project may result in direct, indirect, and cumulative impacts on the environment and human health. Concerns have been expressed regarding mercury, arsenic, and cyanide emissions into the atmosphere resulting from gold ore processing. The EIS should include an air quality assessment for comparing the existing baseline air quality conditions with the air quality during project construction, operations, maintenance, and reclamation/closure. Winter and summer conditions should be considered in the assessment. The air quality data should meet the EPA's Prevention of Significant Deterioration collection requirements.

Recommendations:

Background Information

- Identify the physical, climatological, meteorological, and visibility characteristics of the project area, which are important to understanding air pollution and transport. Include the representative climate data in the vicinity of the project, including mixing height information, a discussion on whether the data is representative enough to characterize movement of the air mass in the area of interest, and a discussion of variables that affect air pollution and the fate and transport of pollutants, including air dispersion patterns, complex terrain interactions, extreme temperature affects, seasonal variations, and presence of other atmospheric phenomena;
- Discuss surrounding topography, pollutant transport and dispersion, and potential secondary formation of air pollutants;
- During the scoping meetings, local knowledge and wisdom were shared regarding local wind patterns. This information should be included in the air quality assessment;
- Provide existing baseline air quality data, including on a map the locations and terrain elevation of all past and present air quality and meteorological data collections stations, methods and frequency of monitoring, criteria air pollutants (e.g. SO_2, NO_2, CO, O_3, PM_{10}, $PM_{2.5}$. and Pb), measured maximum, minimum, and average concentrations, data quality assurance and quality control;
- Describe the natural resources, ecosystems and human communities that may be adversely affected by any additional air emissions, including critical habitat areas or sensitive areas, wildlife refuges or sanctuaries, sensitive wetlands and waterbodies, threatened and/or endangered species or species of special concern, water resources, or archeological or cultural resources;
- Class I Areas - In Alaska, there are four federal land units identified as a Class I area under the Clean Air Act to protect and improve visibility. These areas include the Denali National Park, the Bering Sea Wilderness Area, the Simeonof Wilderness Area, and the Tuxedni Wilderness Area. Evaluate whether there would be any adverse effects to these Class I areas and develop mitigation measures to minimize impacts;
- Discuss project area air quality designations (i.e., attainment, non-attainment or unclassified), if any and the need to conduct conformity analysis;
- Discuss and provide a map showing the project definition of ambient air; and
- Summarize and discuss the representativeness of the measured air quality data used for background levels.

Air Emissions Inventory

- Develop an air emissions inventory to provide a comprehensive accounting of the sources and the total quantities of air pollutant emissions from all aspects of the proposed project and alternatives. Emission sources considered should include support activities, such as site

preparation, project construction and start-up, as well as operations, maintenance, reclamation and closure activities. An emissions inventory should cover all potential pollutant releases and cover a specific geographic area for a certain timeframe. Include scaled schematics and process flow diagrams that identify product flow and emission-generating activities and points. Fugitive emission points, emission leaks, gas flaring, and ancillary activities that have the potential to generate air emissions should also be included;

- Provide emission inventories of all project combustion and non-combustion, mobile and stationary sources. This would include sources of emissions during the construction and operation phases, and the total quantity of air pollutants emitted (e.g., diesel engines, turbines, mobile sources, aircraft, marine vessels and river tugs/barges, pipeline, and fugitive road dust);
- Identify sources of potential gas flaring and describe the gas flaring system for the proposed pipeline. Evaluate the air emissions associated with the source of gas flaring.
- Identify any nearby sensitive receptors (i.e., schools, hospitals, churches, etc.) and vulnerable populations (i.e., children, elderly, asthmatics, pregnant women, etc.). Consider various pathways of exposure, such as direct contact, inhalation of particles or gaseous pollutants and potential impacts to receptors as a result of pathway exposure;
- Identify and discuss applicable air quality laws, regulations, standards, and guidance. Verify the data meets the National Ambient Air Quality Standards and/or State standards, increments and thresholds. Provide date(s) for any monitoring data that indicates an air quality violation. Identify and discuss required air quality permits;
- Include a plot plan/facility layout showing the ambient air boundary, location of all emission sources, buildings, structures, north arrow and scale;
- Provide tables summarizing the data and model results, and graphics/isopleths to display the locations of predicted concentration. This applies to both a project only analysis and a cumulative analysis; and
- There should be reference sections for sources of assumptions, information and data.

<u>Air Modelling</u>

- Identify the type of modeling used to predict changes in ambient air quality associated with the propose action and alternatives;
- Conduct air quality modeling to determine whether or not emissions from the proposed project activities will cause adverse environmental impacts. Models are selected for their ability to predict changes in ambient air quality and any significant pollutant deposition associated with the preferred action and alternatives being considered. Identify the type of air quality modeling necessary to consider air quality impacts;
- Provide and discuss the calculation methodologies and assumptions of all emission rates, both short term (g/sec, lbs/hr, lbs/dy) and long term (tns/yr). This would include operating hours, fuels, heat input, etc.);
- Provide stack parameters for point sources (height, temperature, exit velocity and diameter), and dimensions for area and volume sources;
- Conduct and provide a Good Engineering Practice stack height analysis i.e., Building Profile Input Program for PRIME;
- Discuss and provide a map showing project modeling domain. This would include ambient air boundary, near field, far field, sensitive receptor locations, map scale and north arrow;
- Identify the representative meteorological data that will be used with the EPA guideline or non-guideline model(s) to predict project concentration impacts during construction, start-up/shutdown, and operation phases;
- Identify the EPA guideline or non-guideline that will be used to predict project compliance with air standards, increments, and *de minimus* levels. In addition, identify any options selected that

are not regulatory defaults. (Note: If a non-guideline model is proposed to predict concentrations in complex terrain, please inform the EPA as soon as possible. This approach will require a Section 3.2.2.e demonstration pursuant to Appendix W in 40 CFR Part 51);
- Conduct an Air Quality Related Value analysis consistent with Bureau of Land Management requirements; and
- Address secondary formation of O_3 and $PM_{2.5}$ (i.e., sulfates, nitrates and VOCs). The latter three should be included with primary $PM_{2.5}$ to determine compliance with air standards.

Hazardous Air Pollutants
- Hazardous Air Pollutants - Include a list of project specific HAPS emitted, estimated quantity, and the mobile (e.g., trucks, vehicles, heavy equipment, tugs/barges and marine vessels, airplanes) and stationary (e.g., mine processing facility, power generator) sources;
- Compare the emissions to the National Emissions Standards for Hazardous Air Pollutants. Discuss whether the standards are achieved or explain why the standards have been exceeded;
- Identify mitigation measures, and control technologies that would be implemented to minimize the emission of HAPs. Mitigation measures could include the use of natural gas to power heavy equipment and vehicles during project construction and operations; and
- Any pollutants not considered in the analysis, there should be a discussion for their omission and an explanation why omitted pollutants are not expected to contribute to reasonable significant impacts.

Fugitive Dust (Particulate Matter)
- In the emissions inventory, include estimates of $PM_{2.5}$ and PM_{10} (particulate matter) emissions from project sources during construction, operation, and reclamation/closure, such as the mine site, gravel roads and pads, gravel source sites, etc.;
- Evaluate the magnitude and significance of fugitive dust emissions (e.g., ore processing operations, gravel roads and pads, construction activates, etc.) and impacts on human health and sensitive populations (e.g., children and elderly);
- Identify mitigation measures, such as wetting the source material, installing barriers to prevent dust from leaving the source area, and halting operations during high wind events; and
- Provide monitoring of fugitive dust during construction, operations, maintenance, and closure/reclamation to ensure effectiveness of mitigation measures.

Water Resources

Water Quality Assessment

The proposed project may contribute in potential adverse direct, indirect, and cumulative impacts to water quality in the region. Water quality impacts to wetlands, rivers, streams, lakes and other surface waters could result from storm water discharges from construction, operation, and reclamation and closure of the mine and camp facilities, the access road, the pipeline, and other support facilities. Accidental releases of fuel and chemicals into adjacent waterbodies could also be a source of water quality pollution. The EIS should include a framework for comparing the baseline water quality to the water quality monitored during construction and operations of the proposed project.

Recommendations:

Baseline Water Quality Information
- Collect baseline water quality information in the project area. Identify the period of record of the collected water quality data. List the water quality parameters for which data has been collected (if certain parameters have been dropped, specify the basis);
- The QA/QC should be maintained at adequately low detection levels;

- Include maps showing the locations and terrain elevation of all past and present data collection stations (explain any that have been dropped or location changed);
- Identify and discuss applicable national and state water quality regulations, standards, and guidance;
- Identify and discuss required wastewater permits;
- Include a plot plan/facility layout showing affected watershed boundaries with location of all discharge points, buildings, structures, north arrow and scale;
- Describe proposed water treatment options and alternatives;
- Provide estimates of the mine effluent water quality – type of pollutants and quantities, etc;
- A draft Alaska Pollutant Discharge Elimination System permit should be included as an appendix to the EIS. This would be beneficial for the public, local and tribal governments, and agency decision-makers; and
- There should be a reference section for the sources of assumptions, information and data.

303(d) Listed Waterbodies

Clean Water Act §303(d) requires States to identify water bodies that do not meet water quality standards and to develop water quality restoration plans to meet established water quality criteria and associated beneficial uses. The list of Alaska's impaired waters (2010) can be obtained on line at: http://www.dec.state.ak.us/water/wqsar/Docs/2010impairedwaters.pdf.

Impaired waterbodies listed in the project area include the Kuskowkim River and the Red Devil Creek (at the confluence of the two rivers), which are both Category 5 and therefore, requires the development of a Total Maximum Daily Load. The Kuskokwim River (AK ID No. 30501-002) and the Red Devil Creek (AK ID No. 30501-002) are listed for exceeding water quality standards for antimony, arsenic, and mercury associated with mining activities, including the Red Devil Mine. The EIS should evaluate the direct, indirect, and cumulative impacts on any impaired waterbodies in the project area.

Recommendations:

- Identify and evaluate impacts to any listed impaired waterbodies in and adjacent to the project area that is on the current EPA approved §303(d) list. Specify the pollutant(s), source(s) and the water quality standard(s) exceeded that was the basis for its listing. Identify whether a water body recovery plan and/or a Total Maximum Daily Load has been developed and/or implemented;
- Describe any enhancement efforts for those impaired waters, and how the proposed project would coordinate with on-going protection efforts, if any,
- Identify mitigation measures to minimize further degradation of impaired waters in the project area; and
- Identify the monitoring efforts to ensure that mitigation measures are effective in achieving water quality standards.

Source Water Protection Areas

The proposed project may impact potable drinking water sources and/or their source areas utilized by the community. Construction of the buried natural gas pipeline would require trenching, excavation, and water withdrawal. Mine construction and operations could result in other impacts to source water areas. The EIS should describe potential direct, indirect, and cumulative impacts to source water protection areas associated with this project.

Recommendations:

- Identify and map the location of known public drinking water supplies and their sources, surface and groundwaters, aquifers, recharge zones, natural springs, etc. within the project area;
- Identify the local traditional drinking water sources, which may include rain barrels, melting ice in the winter, etc. Discuss impacts to these sources from dust and other contaminants;
- Identify the location of known water supply wells in the project area. The Alaska Department of Natural Resources maintains a well log tracking system database that provides information on reported sources of drinking water;
- Identify project construction and/or operational activities that could potentially impact known source water areas;
- Identify potential contaminants that may impact known source waters through infiltration/seepage;
- Distinguish the effects that any current or historic activities, including mining activities, have had on source waters of the project area; and
- Identify mitigation measures and monitoring activities to protect known source water areas.

Storm Water Management

The CWA requires any construction site resulting in the disturbance of one or more acres to have authorization under the construction storm water discharge permit for industrial activities, as part of the APDES permit program. The EIS should evaluate the direct, indirect, and cumulative impacts from storm water discharges.

Recommendations:

- The EIS should disclose that this project would meet the requirements of ADEC's APDES permit program, including development of SWPPPs, submittal of NOIs, reporting, and monitoring; and
- Identify specific best management practices, erosion and sediment control, and other mitigation measures to minimize impacts.

Water Body Crossings

Numerous rivers, streams, lakes and wetlands would be crossed for the construction of the natural gas pipeline, the gravel access road, and other mine related facilities. Different types of water body crossing construction methods and techniques would be implemented, including, but not limited to culverting, bridging, horizontal directional drilling, etc. HDD should be considered for all waterbody crossings. The EIS should evaluate the impacts associated with these construction methods. A water body crossing plan should be developed and included in the EIS.

Recommendations:

- Characterize all proposed the water body crossings, and summarize the information for width, depth, streamflow, presence/absence of fish, fish species, etc.;
- For each water body crossing, identify the type of construction methods (open cut – dry or wet, trenching, HDD, etc.) and/or structures (bridges, culverts, etc.) that would be implemented;
- Identify mitigation measures, such as maintaining no disturbance buffers, in water timing restrictions for fish migration and spawning, etc.; and
- Identify monitoring provisions to ensure effectiveness of mitigation measures.

Water Withdrawal

The proposed project would require large volumes (millions of gallons) of water for construction of permanent and temporary gravel roads, facility pads, hydrostatic testing of the pipeline, HDD, and other mine operations. The EIS should include an evaluation of the water resources of the project area.

Recommendations:

- Identify existing and potential surface water locations where water withdrawal for project construction and operation would occur. Provide the water withdrawal locations on a map;
- Characterize each water resource and identify its surface area, maximum depths, available volume of water, volume of proposed withdrawal, and presence/absence of resident and/or anadromous fish species;
- Identify the maximum water requirements for project construction and operation;
- Identify any mitigation measures/commitments, such as establishing water withdrawal rates, timing of water withdrawal, and screening to avoid impacts to fish; and
- Identify monitoring activities to ensure that fisheries resources are protected.

Mine Site Water Management

The proposed water management objectives for the Donlin Gold Mine are: (1) no discharge of process water during operations, (2) ensure sufficient supply of water during operations, and (3) minimize the amount of water that has to be treated. The EIS should evaluate plans, contingencies and options to ensure that these water management objectives are achieved throughout the 27 year mine life, as well as during mine closure, reclamation, and long-term site management.

Water Balance

The mine site water balance should be estimated for each phase of the mine development (e.g., construction, operations, closure, reclamation periods, and post-closure), and cover a range of hydrological conditions (extreme and average) and potential variations or disruptions in process flow (e.g., temporary suspension of operations as well as closure). The mine site water balance should be described in detail in the EIS.

Recommendations:

- Characterize all potential water source(s) (e.g., surface water, ground water, snow, precipitation, run off, etc.) and estimate the amount of water from each source;
- Specify the volume of water needed for construction and operation of the mine facility;
- Estimate peak flood flows, precipitation, and duration and intensity of storm events on a seasonal basis;
- Estimate changes in water flow patterns for surface drainage modifications, groundwater aquifer dewatering, surface water dewatering, water use, water storage and discharge, and for different seasons;
- Identify the location of meteorological stations and water monitoring stations, length of monitoring and data collection;
- Provide a detailed water balance evaluation at the mine facilities during the full lifecycle– water flow patterns for surface water, water use, land application and discharge systems, pond storage and discharge, seasonal changes, etc. during steady state and peak flow conditions; and
- Provide a detailed schematic diagram depicting the water balance changes throughout the mine life cycle - construction, start up, operations, closure, reclamation and post-closure and monitoring.

Water Treatment

The EIS should provide detailed information regarding the proposed water treatment and long-term treatment and monitoring for the proposed mine facility. An effective water treatment system would ensure that impacts to water quality of the adjacent surface and groundwaters are minimized.

Recommendations:

- Describe in detail the water treatment systems, type of filtration and removal system – active or passive, type of pollutants to be removed. Evaluate the effectiveness of the waste water treatment measures;
- Provide a detailed schematic diagram depicting treatment schemes through mine construction, start up, operations, closure, reclamation and post-closure and monitoring;
- Discuss effectiveness of the water treatment systems during seasonal and high flow events, and during pit dewatering;
- Identify back up options, as needed to address water management concerns throughout the mine lifecycle. For example, during high water periods, can the excess water be managed or stored beyond the capacity of the proposed treatment system. In predicting the water treatment capacity needs, does this account for climate change effects; and
- Provide estimates of the quantities and composition of process solutions, tailings water, runoff waters, mine drainage, and treated effluent at the proposed operation.

Watershed Characterization – American and Anaconda Creeks

The proposed mine facility is located within the two adjacent watersheds – the American and Anaconda creeks. Both creeks provide source water to Crooked Creek, which drains into the Kuskokwim River. The proposed waste rock facility would permanently impact American Creek. The proposed tailings storage facility would permanently impact Anaconda Creek. The EIS should evaluate the direct, indirect, and cumulative impacts to American and Anaconda creeks. The watershed characteristics of both drainages should be evaluated in detail.

Recommendations:

- Conduct a watershed characterization of American and Anaconda creeks;
- Analyze the watershed geomorphological and other characteristics, such as basin shape, slope, vegetation cover, soil type and land use conditions;
- Evaluate the seasonal water levels, flow regimes, and channel morphology (i.e., channel bed and bank erosion and sediment transport capacity), and impacts caused by stream diversions, channelization, and altered drainage patterns;
- Evaluate the types of resident and anadromous fish resources;
- Demonstrate how construction of the proposed mine and its associated facilities might alter runoff responses to both average and extreme precipitation events;
- Evaluate the downriver effects to Crooked Creek and the Kuskokwim River, such as reduction in seasonal and annual water flow, sediment and nutrient transport, etc.; and
- Evaluate the effects of surface water discharge, and impacts to adjacent wetlands or stream reaches from mine dewatering activities.

Mine Closure and Reclamation

Long-term contamination of the mine site and adjacent areas should be minimized by implementing appropriately engineered methods and plans for closure and reclamation. A major goal is to ensure that residual fluids and soluble metal complexes from the tailings storage facility and other mine facilities are neutralized or permanently contained. Otherwise, seepage of metals-laden acidic or cyanide-rich

fluids into adjacent groundwater and surface waters could result. The EIS should include a detailed mine closure and reclamation plan that describes the closure procedures and methods for stabilizing all contaminated material, decommissioning and reclaiming all process facilities, and ensuring long-term water management and treatment.

Recommendations:

- Describe the methods that would be implement to lower the risk of long-term contamination from the waste rock and tailing storage facilities, such as low permeable caps, covers, and capillary barriers following recontouring;
- Describe any land treatments, such as grading, recontouring of facility slopes to reduce the potential for erosion, slope failure, and sedimentation in surface waters. Describe the type and methods for revegetation or reseeding, using native plants, that would aid in reducing erosion and evapotranspiration of water from surface layers;
- Discuss any additional best management practices that would be employed to minimize long-term contamination; and
- Discuss the long-term monitoring program that would be implemented to ensure that water quality of surface and groundwaters would be maintained.

Wetlands, Aquatic Resources, and Riparian Areas

The proposed project would contribute to the direct loss or degradation of wetlands, aquatic resources, and riparian areas for the construction of permanent and temporary facilities. For example, American Creek and Anaconda Creek would be permanently altered from the construction and operation of the waste rock facility and tailing storage facility, respectively. The EIS should quantify and disclose the direct, indirect, and cumulative wetland impacts associated with construction of the mine site and support facilities, the pipeline, the access road, and the port facilities.

Recommendations:

- Describe the appropriate and practicable steps taken to avoid, minimize, and compensate for unavoidable impacts to wetlands, aquatic resources, and riparian areas. Alternatives should consider options for avoiding and minimizing wetland impacts;
- Integrate NEPA process with the CWA §404 permitting process, such as including a draft 404(b)(1) analysis in the Draft EIS as an Appendix;
- Characterize acreages, habitat types and quantify areas of wetlands and aquatic resources within the project area – include their location and information on aerial photograph maps;
- For the proposed natural gas pipeline, jurisdictional Waters of the United States should be mapped using aerial photo interpretation within a minimum 1,000 feet corridor. Field delineation of wetlands should be conducted within a minimum 300-ft wide corridor, as agreed to for other Alaska pipeline projects;
- Describe mitigation measures/commitments to minimize the unavoidable impacts to wetlands; and
- Develop a monitoring plan for wetlands, aquatic resources, and riparian areas to ensure implementation of mitigation measures and their effectiveness. The monitoring plan should also specify any corrective measures.

<u>Function and Condition Assessment</u>

In order to evaluate the function and conditions of the wetlands, aquatic resources, and riparian areas, a functional assessment should be conducted in the project area. A functional assessment would provide an estimate of the quantity and types of wetlands that would be impacted based on their ecological

functions in the landscape. The function and condition assessment would be used to evaluate compensatory mitigation under CWA §404.

Recommendations:

- Identify the condition and functional assessment methodology to evaluate the project area wetlands, riparian areas, drainages, and other aquatic resources;
- In particular, a functional assessment for Anaconda Creek and American creek watersheds should be conducted; and
- Provide the functions and conditions of wetlands on a map and include information, such as the acreage, habitat or vegetation type, percent cover in the project area, etc.

Compensatory Mitigation

On April 10, 2008, the EPA and Corps issued final regulations governing compensatory mitigation for authorized impacts to wetlands, streams, and other waters of the United States.[2] The regulations establish the performance standards and criteria for the use of permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee programs to improve the quality and success of compensatory mitigation projects.

Recommendations:

- To compensate for the unavoidable impacts to wetlands and other aquatic resources, the EIS should identify the appropriate compensatory mitigation type – permittee responsible, mitigation banks, in-lieu fee programs that would be utilized for this project;
- Compensatory mitigation must be based on the functional assessment of wetlands and aquatic resources and replacement of those functions lost according to an ecologically appropriate mitigation ratio; and
- The project proponent should consider establishing a mitigation bank for this project to compensate for the wetland impacts. A combination of compensatory mitigation options, such as in-lieu fees, mitigation bank, and/or permittee responsible mitigation should be evaluated in the EIS.

The Kuskokwim River

The Kuskokwim River is an important aquatic resource for the native communities of the region. The Alaska Department of Fish and Game considers the Kuskokwim River a significant salmon fishery and serves as the running grounds for Chinook, chum, sockeye, pink, and coho salmon. The Kuskokwim River is one of the biggest subsistence fisheries in the state with more than 1,500 households currently fishing. Approximately 38 communities live within the Kuskokwim River drainage, representing 4,600 households. The direct, indirect, and cumulative impacts to this important aquatic resource may be significant, particularly to the traditional subsistence way of life. The potential project impacts could result from the daily tug and barge transportation (open water season) of fuel, cargo, and cyanide, which may contribute to the risk of fuel and chemical spills, increase river traffic, conflicts with navigability and other river users, and erosion of the riverbanks.

Recommendations:

Riverbank Erosion and Wakes

[2] EPA and Department of Defense, U.S. Army Corps of Engineers (2008). *Compensatory Mitigation for Losses of Aquatic Resources, Final Rule; Federal Register Vol. 73, No. 70.*

- Conduct a geomorphology study for the Kuskokwim River. Evaluate the historic bank erosion rates and quantify the loss of river bank along the reach of the river between Bethel and the proposed Jungjuk port site;
- Conduct a boat wake study using modeling techniques to evaluate the magnitude in which boat traffic and wakes contribute to bank erosion along the Kuskokwim River;
- Evaluate mitigation measures to minimize wake and riverbank erosion, such as establishing a maximum tug/boat speed and load limits, and reconfiguration of the tug/barge, which may minimize boat wakes; and
- Monitor the effectiveness of these measures by evaluating the annual river bank loss.

Navigation, Traffic, and User Conflicts

The tug and barge transportation of cargo and fuel on the Kuskokwim River may result in potential navigation challenges, boat traffic, and conflicts with multiple user groups. Subsistence and commercial fishing activities on the Kuskokwim River could include the use of boats, set and drift gillnets, seines, fish wheels, long lines, and dip nets, which may result in conflicts with tug and barge transportation. The EIS should evaluate the potential impacts resulting from navigational challenges, traffic, and user conflicts on the Kuskokwim River.

Recommendations:

- Evaluate alternatives to tug/barge transport of cargo and fuel, such as winter transportation over land using ice and/or snow roads and trails between the Bethel port and the mine site. This option could reduce the tug and barge traffic on the Kuskokwim River during the open water season;
- Identify the multiple user groups on the Kuskokwim River and estimates the number and type of each user group;
- Evaluate the carrying capacity of the Kuskokwim River to support navigation, tug, barge, and commercial and subsistence boat traffic, etc.;
- Identify where the user groups are located and their number and frequency, type of equipment used (e.g., set nets, fish wheels, etc.);
- Identify existing and historic fish camps, cultural sites, etc. Such information may be proprietary and sensitive. Precautions should be made to ensure the confidentiality of the information;
- Establish mitigation measures/commitments to avoid and minimize potential conflicts with these user groups, such as agreements to reduce the frequency of barge traffic during King salmon openings, etc.; and
- Monitor the effectiveness of the mitigation measures to avoid/minimize river traffic conflicts.

Sediment Dredging and Disposal

Tug and barges would transport fuel and cargo on the Kuskowim River from Bethel to the proposed Jungjuk Port site during the open water season. Concerns have been raised regarding the navigability of barges up the Kuskokwim River during the open water season. Water levels may be lower and certain reaches of the river may be shallower, preventing certain draft tugs/barges from navigating up the river. The EIS should discuss potential problems associated with tug and barge navigation along the Kuskokwim River. If navigational dredging would be required as part of this project, the direct, indirect and cumulative environmental impacts should be evaluated. A navigational dredging plan should also be developed and included in the EIS.

Recommendations:

- Evaluate the need to conduct navigational dredging of the Kuskowkim River;

- Evaluate the open water season past and current water levels, depths, seasonal changes, etc. along the Kuskokim River between Bethel and Jungjuk port site;
- Specify the size, weight, and draft limits for the proposed river barges. Specify the minimum clearance to the river bottom required for the tugs and barges;
- If dredging is required, identify the location of dredging along the Kuskowkim River and the quantity (cubic yards), surface area and depth to be dredged; and
- Identify the location of where the dredged material would be properly disposed of on upland locations.

Waste Material and Fluids

Drilling Muds and Cuttings

HDD for the natural gas pipeline is being proposed for a number of river body crossings. The HDD process typically requires the use of drilling muds to install the pipeline underneath the waterbody. Soil cuttings and other drilling fluid additives are mixed with the drilling muds. Potential releases of drilling muds, cuttings, and additives into adjacent wetlands and waterbodies could adversely impact resident and/or anadromous fish species. A drilling mud plan should be developed and incorporated into the EIS.

Recommendations:

- Describe how drilling muds and cuttings, fluid additives, etc. would be managed, stored, transported, and properly disposed of;
- Describe the types of drilling fluid additives that would be used and their potential impacts on the aquatic environment; and
- Describe potential environmental impacts, proposed mitigation measures, monitoring procedures and contingency planning for accidental releases of drilling fluids, muds and cuttings during HDD construction activities.

Hydrostatic Test Water

The proposed natural gas pipeline would require hydrostatic testing to ensure pipeline integrity during construction. Hydrostatic testing may require large volumes of water, which may be heat treated and/or added with freeze depressants if construction is during the winter season. The EIS should provide information to evaluate the direct, indirect, and cumulative environmental impacts associated with the discharge of hydrostatic test water into adjacent lands, wetlands, and waterbodies containing resident and/or anadromous fish. A pipeline hydrostatic test water plan should be developed and incorporated into the EIS.

Recommendations:

- Describe the location of water sources, volume of water, and withdrawal rates that would be required for hydrostatic testing of the natural gas pipeline;
- Identify the discharge locations to land and/or surface waters, and discharge methods;
- For winter hydrostatic testing, identify the use of any chemical additives, such as anti-freeze or freeze depressants, and how these chemicals would be treated prior to discharging;
- Avoid discharging hydrostatic test water into surface waters containing resident and/or anadromous fish; and
- Describe mitigation measures/commitment and control devices that would be implemented to minimize environmental impacts associated with discharging hydrostatic test water.

Blasting Plan

During project construction, blasting would be required for the open pit mine, and for certain areas along the pipeline corridor route and ancillary facilities. Blasting would result in increased noise levels and related effects to residents, and disruption and displacement of local birds and wildlife. A blasting management plan should be developed and incorporated into the EIS.

Recommendations:

- In the project area, identify the location of proposed blasting, and describe the blasting methods that would be used;
- Specify how blasting effects, such as noise, and wildlife displacement would be controlled and mitigated. A table with this summary information and a map identifying the blasting locations should be provided in the EIS; and
- Noise levels in the project area should be quantified. The threshold levels of noise impacts should be described and the effects of blasting to human health, birds and wildlife should be evaluated.

Material Source Sites

The Donlin Gold project will require large volumes of gravel material for construction of permanent and temporary access roads and development pads, and other project related facilities. The EIS should evaluate the direct, indirect, and cumulative impacts associated with the development of material source sites to cultural and historic resources, wetlands, and other resources.

Recommendations:

- Estimate the total volume (cubic yards) of gravel material that would be required for construction of this project, including the mine facility, access roads, natural gas pipeline, port facilities, airplane runway, camp, etc.;
- Identify the location of any existing and proposed new material source sites on a map; and
- Summarize in a table the information regarding each material source site, such as the location, surface area impacts, quantity of material available, land ownership, permit status, etc.

Fuel Management and Response Planning

The storage and management of petroleum products is regulated by the EPA under 40 CFR Part 112. The applicant will be required to develop Spill Prevention Control and Countermeasures plans and Facility Response Plans and submit these plans to the EPA for review. The EIS should discuss the implementation of these plans.

Recommendations:

- Identify and fully analyze the risks associated with potential fuel spills and other emergency response scenarios along the Kuskokwim River;
- Evaluate the risks of fuel spills from multiple fuel transfer and storage points at Dutch Harbor, Bethel, and Jungjuk port sites;
- Describe the proposed project fuel planning, transportation, storage and containment, and spill planning and response; and
- Identify impacts to area users, as well as any strategies employed to communicate risks or actual emergencies to those users.

Hazardous and Solid Waste Materials Planning

Over the lifetime of the proposed project, large quantities of hazardous and solid waste material would be generated during construction, operation, maintenance, closure and reclamation. The EIS should address the potential direct, indirect, and cumulative environmental impacts of hazardous and solid waste from the proposed project. A hazardous and solid waste material handling, storage, management, and disposal plan should be developed and incorporated into the EIS.

Recommendations:

- Identify the sources, types, and volumes of hazardous and solid waste material;
- Discuss how the hazardous and solid waste material would be properly handled, stored, and disposed at the camp and/or mine sites or at an offsite facility;
- Identify whether an on-site lined solid waste landfill would be constructed to dispose of solid waste material from the camp and mine activities. Specify whether on site burning of solid waste would be proposed;
- For clean solid waste material, develop and implement a recycling and/or composting program. Consider backhauling recyclable material offsite and incorporating the composting material on site;
- For hazardous waste materials, identify any facilities where the material would be properly disposed. The facility should be approved and certified to accept hazardous waste material;
- As an alternative to disposing of hazardous waste, an onsite underground injection control well should be considered to handle hazardous waste material disposal. The EIS should evaluate this alternative; and
- Identify other hazardous material sites within the adjacent project area and determine the potential cumulative impacts from the proposed project (e.g. the Red Devil Mine and other abandoned or historical mines).

Marine Vessel Traffic

The proposed project would result in the increase of marine fuel tanker traffic between the Pacific West Coast and Dutch Harbor, Alaska. Fuel would then be stored in Dutch Harbor until transported onto barges to the Port of Bethel. Additionally, marine cargo would be transported to Bethel from the West Coast. The EIS should evaluate the marine cargo and fuel transportation system and analyze their potential direct, indirect and cumulative impacts on the marine environment, including marine mammals, threatened and endangered species, critical habitats, and subsistence resources. A marine barge and tanker traffic plan should be corporate into the EIS.

Recommendations:

- Evaluate potential environmental impacts associated with marine fuel tanker and cargo barge traffic between the Pacific West Coast Ports to Dutch Harbor and Bethel on marine mammals, threatened and endangered species, and subsistence resources;
- Identify the marine barge/tanker classes, timing and frequency of travel, volume handled, and marine transportation routes to address potential environmental impacts;
- Identify the seasonal migration routes and timing for marine mammals, threatened and endangered species, and subsistence resource harvesting along the marine navigation routes and evaluate any potential conflicts between barge/vessel traffic and marine resources and uses; and
- Identify mitigation measures to minimize impacts to marine resources and monitoring efforts to ensure that marine resources are protected.

Invasive Species
Executive Order 13112 Invasive *Species* (February 3, 1999) requires that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species may cause.

Vegetation
Construction activities which disturb the ground may potentially expose areas and facilitate propagation of non-native invasive species. Climate change resulting in warmer temperatures may encourage invasive species growth which may not normally occur at this climate zone. An invasive species management plan should be developed and incorporated into the EIS.

Recommendations:
- Conduct an invasive non-indigenous plant study (pre- and post- project construction);
- Identify mitigation and control measures to minimize the establishment of noxious invasive plant species. Conduct monitoring activities during and after project construction to ensure that non-native invasive species are not establishing in the area; and
- Utilize native plants and grasses for restoration and reclamation of disturbed areas after project construction and during mine closure activities.

Ballast Water
Ballast water from marine barges and vessels serves as a conduit for the introduction of non-native invasive organisms into the marine ecosystem. Non-indigenous species may compete with or prey upon native species of marine algae, fish, and wildlife, may reduce biodiversity of species inhabiting coastal waters, may carry diseases or parasites that affect native species, and may disrupt the aquatic environment and economy of affected nearshore area.

Concerns have been raised that aquatic nuisance species may be transported and introduced into the Kuskokwim River, as well as the marine and intertidal waters by cargo and fuel tankers and river barges. The EIS should evaluate the potential impacts associated with non-native invasive species introduced from marine cargo and fuel barge ballast water.

The National Invasive Species Act of 1996 provides for ballast water management to prevent the introduction and spread of nonindigenous aquatic species into the waters of the United States. A ballast water management plan should be developed and incorporated into the EIS.

Recommendations:
- Include a commitment to use commercial marine vessels and river barges that operate with a ballast water management plan; and
- Include a commitment to use marine vessels and river barges that have onboard ballast water treatment systems to prevent invasive species into the Kuskokwim River.

Permafrost and Vegetation
The proposed project may result in the melting of permafrost as the overlying vegetation is removed or disturbed, gravel fill material is placed on the surface for access roads and facility pads, or the area is excavated and trenched to install the buried natural gas pipeline. Thawing permafrost may destabilize the ground that supports proposed project roads, buried pipelines, and other facilities. In addition, methane and carbon dioxide gas would be released, contributing to greenhouse gas emissions and

climate change. As baseline information for this project, the EIS should include a permafrost and vegetation mapping analysis.

Recommendations:

- Evaluate surface disturbance activities to permafrost and vegetation resulting from the removal of vegetation, the placement of gravel for permanent and temporary access roads, pads, work areas, airstrips, mine facilities, etc.; and
- Identify mitigation measures to minimize impacts to permafrost and vegetation resulting from the construction and operation of this project.

Seismic and other Risks

Seismic activities in tectonically active areas of the region may affect the structural integrity of the tailing storage facility dam, the buried natural gas pipeline, secondary containment for the fuel storage tanks, and other related facilities. The EIS should include a seismic hazard study and evaluate the risks and potential impacts associated with earthquakes and other geologic activities in the project area.

Recommendations:

- Conduct a seismic hazard study for the project area;
- Identify the seismically active areas, geological faults, tectonic activity, etc. in the project area. Include this information on a map;
- Describe the potential risks associated with seismic activities and the effects to project related facilities and structures;
- Appropriate seismic design and construction standards and practices should be implemented for all proposed facilities;
- Identify mitigation measures/commitments to minimize impacts from seismic activities; and
- Describe how the seismically active areas will be monitored and managed to respond to structural failures of facilities.

Terrain Mapping

Terrain mapping is a classification system that describes the characteristics and spatial distribution of surficial materials, landforms, and geomorphological processes. This mapping approach should be used to identify areas of geological, landslide, and avalanche hazards, glacial terrains, soil stability, erosion problems, etc. for the proposed pipeline route. The EIS should evaluate the proposed pipeline route based on terrain mapping information.

Recommendations:

- Use terrain mapping to identify, classify, and map soil, rock, and geomorphic and seismic features; and
- Identify areas of potential geological and landscape hazards, such as erosion, slope instability, ground freezing, glacial terrain, thawing of permafrost, landslides, avalanches, etc.

Protected Species

The proposed project may impact protected species listed under the Endangered Species Act and the Marine Mammal Protection Act, their habitats, as well as Bureau of Land Management and the State of Alaska sensitive species. The EIS should include identification of endangered, threatened, and candidate species under ESA and MMPA, and other sensitive species within the project corridor and surrounding areas and the impacts of the project to these protected species.

Recommendations:

- Identify all listed species – endangered, threatened, and candidate species, within the project area;
- Describe the critical habitat for these species and their migratory range, breeding and feeding areas, etc.;
- Include the Biological Assessments and description of the outcomes under ESA Section 7 consultations with the federal resource agencies; and
- Federal actions should promote the recovery of declining populations of species and protection of their habitat.

Climate Change and Greenhouse Gas Emissions

On February 18, 2010, CEQ issued draft guidance on analyzing the effects of climate change and greenhouse gas emissions.[3] Greenhouse gas includes carbon dioxide, methane, nitrous oxides, hydrofluorocarbons, per fluorocarbons, and sulfur hexafluoride.[4] The EIS should evaluate and disclose GHG emissions and climate change effects resulting from the proposed project, including all phases of development (e.g., mobilization, staging, construction, operation, monitoring and maintenance, and closure and reclamation), and all components, such as the mine and associated facilities, the natural gas pipeline, marine and river, air, and ground cargo/fuel transportation, etc. Please refer to the CEQ guidance for information on quantifying GHG emissions.

Recommendations:

- Develop a GHG emission inventory that includes baseline emissions, direct and indirect projected related emissions, and emissions from reasonably foreseeable activities over the life of this project. Identify the sources of GHG emissions and evaluate their contributions;
- Characterize and quantify the expected annual and cumulative emissions due to construction and operation of the mine and ancillary facilities, and the pipeline using CO2-equivalent as a metric for comparing the different types of GHG emitted over the life of the project, including post mine reclamation and closure;
- Evaluate future needs and capacity of the open pit mine and ancillary facilities, and the natural gas pipeline to adapt to project climate change effects;
- Establish reasonable spatial and temporal boundaries for this analysis;
- Disclose the differences between GHG emissions associated with each alternative analyzed in detail;
- Describe the link between GHG and climate change, and the potential impacts of climate change on the structural integrity of the proposed project, such as impacts to the TSF liner and dam, and the melting of permafrost on gravel pads and roads, etc.;
- Consider impacts of climate change on vulnerable communities, such as to Alaska Native communities and their traditional way of life;
- Estimate the extent that melting permafrost associated with this project would contribute to GHG emissions;
- Discuss options for minimizing project related emissions, including consideration of mitigation measures and reasonable alternatives; and
- Describe efforts to monitor for GHG emissions and climate change impacts throughout the lifecycle of this project.

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[3] CEQ (February 18, 2010), Draft Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions.

[4] CEQ defines "GHGs" in accordance with Section 19(i) of Executive Order 13514

Cumulative Impacts

Cumulative impacts on the natural and human environment results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. The EIS should evaluate the past, present, and reasonably foreseeable projects and actions in the proposed project area. Where significant cumulative impacts may exist, the EIS should disclose the parties that would be responsible for avoiding, minimizing, and mitigating for those adverse impacts. Refer to CEQ's *Considering Cumulative Effects under the National Environmental Policy Act*[5] for information regarding methods, tools, and techniques for the cumulative effects analysis.

Recommendations:

- Evaluate the proposed project impacts along with other past, present, and reasonably foreseeable future projects and actions, and considering their cumulative impacts in their entirety;
- Identify the geographic scope and timeframe for the CEA;
- Describe the CEA methodology and explain any assumptions and models used in the analysis;
- Identify the current condition of the resource as a measure of past impacts. For example, the percentage of species habitat lost to date;
- Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resources is improving, declining, or in stasis;
- Identify the future condition of the resource based on an analysis of the cumulative impacts of reasonably foreseeable projects or actions added to existing conditions and current trends. For example, what will the future condition of the watershed be?
- Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives; and
- Identify opportunities to avoid and minimize impacts, including working with other federal and state agencies, Alaska Native Regional and Village Corporations, regional and health non-profit organizations, and local and tribal governments and communities.

Past and Present Actions

- Identify and evaluate existing, and abandoned mining projects and mining claims in the region, such as the abandoned Tuluksak River Mine, and Kolmakof Mine (near Napaimute), and placer mines north of Tuluksak;
- Evaluate the Red Devil Mine, an abandoned mercury mine upriver from the proposed project. Discuss the efforts of BLM and other agencies to evaluate the impacts and potential remedial activities; and
- Evaluate the Nixon Fork Mine and existing operational mine near McGrath, Alaska.

Reasonably Foreseeable Future Actions

- Evaluate the proposed future projects, such as the Chikuminuk Lake Hydroproject (Nuvista Light and Electric), the road between the Yukon River and Kuskokwim River; Susitna Watana Hydroelectric project; Neumont Mining (exploration near Napaimute); NYAC Gold (exploration near Tuluksak); Holitna Basin natural gas (mid Kuskokwim exploration).

Mitigation and Monitoring

On January 14, 2011, CEQ issued final guidance on the Appropriate Use of Mitigation and Monitoring on establishing, implementing, and monitoring mitigation commitments identified

[5] Council on Environmental Quality (January 1997). Considering Cumulative Effects under the National Environmental Policy Act.

and analyzed during the NEPA process.[6] This guidance enables agencies to create successful mitigation planning and implementation procedures with robust public involvement and monitoring programs. Mitigation mechanisms may include avoidance, minimization, rectifying, reducing or eliminating, and compensation.

A monitoring program should be designed to assess impacts from the project activities and the effectiveness of mitigation commitments being implemented. The level of effort afforded monitoring should be commensurate with the complexity of the project and the risk to and sensitivity of the affected environment. The public and tribes should have an opportunity to participate in the monitoring efforts for this project.

Recommendations:

- Develop a project mitigation plan for each the project lifecycle (e.g. pre-construction, construction, operations, maintenance, rehabilitation and closure) to assess mitigation needs, identify mitigation measures/commitments, best management practices, etc., and evaluate their effectiveness;
- Involve the tribes and the public in mitigation planning, and monitoring;
- Ensure mitigation measures/commitments are implemented and documented;
- Provide estimates of the timeframes for each mitigation measure to ensure a start date and duration for implementation. This would avoid and minimize impacts associated with tribal subsistence activities;
- Evaluate whether proposed project mitigation measures would result in additional environmental impacts;
- Describe any corrective actions that would remedy failed mitigation or ineffective mitigation measures;
- Develop an overall monitoring strategy for the project - define the goals and objectives of monitoring, provide summary information on monitoring (including a list of measurement parameters, methods, locations, and frequency, etc.) data analysis, and reporting;
- Specify terms of measurable performance standards or expected outcomes to establish clear performance expectations;
- Identify the source of funding to implement mitigation and monitoring measures, and disclose the lack of funding. Assess the resultant environmental effects; and
- Identify who is responsible for mitigation implementation and monitoring – lead agency, cooperating agency, project proponent, and third party.

Disclosure of Uncertainty

For all predictions of effects, regardless of whether they are qualitative or quantitative, the NEPA analysis should disclose the limitations of the predictions, and the associated uncertainty. It should also disclose uncertainty or risk associated with implementation of mitigation measures Sources and magnitude of uncertainty should be discussed. Understanding of uncertainties and risks are absolutely necessary for informed decision-making. If uncertainty cannot be reduced by data collection or analysis, it may be possible to mitigate for some uncertainty by developing an alternative or imposing mitigation measures that include monitoring, and contingency planning (see discussion below).

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[6] Council on Environmental Quality (January 14, 2011). Memorandum for Heads of Federal Department and Agencies, Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact.

Adaptive Management Planning

The NEPA analysis should describe the strategy for responding to unforeseen circumstances at the project site. Adaptive management and contingency planning are particularly important aspects that carry a high level of uncertainty in predictions of environmental consequences. The strategy should include "trigger levels" (e.g., exceedance of ecological benchmarks) or observations (e.g., statistically significant trends in indicators, permit violations, water balance problems, changes in discharge or chemistry of springs/seeps) that would set in motion a follow-up action. An adaptive management strategy or plan should be described so that reviewers may comment on its adequacy. This type of plan when coupled with the monitoring program is necessary to mitigate for uncertainties and risks associated with predictions of environmental outcomes. Such plans are necessary to ensure that post-mining land use objectives can be achieved and sustained in the future.

Recommendations:

- Develop an adaptive management and contingency strategy to respond to an unforeseen and unexpected worst case/mine failure conditions. This plan should be discussed in the EIS; and
- Identify project situations and scenarios where additional corrective actions and response activities should be established, such as the failure of the TSF liner and dam, accidental spills of cyanide, etc.

Consultation with Federally-Recognized Tribal Governments

Executive Order 13175 *Consultation and Coordination with Indian Tribal Governments* (November 9, 2000) directs each Federal agency to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have implications on tribes. The proposed project may potentially affect traditional subsistence and cultural practices, access to subsistence areas, and resources of certain tribal members in the project areas. In addition, there is a potential for those who obtain subsistence resources, and other traditional and cultural resources through barter and trade to be adversely impacted. Tribal governments, whose members or traditional resources may be impacted, either directly and indirectly, by this proposed project, should be invited to consult on a government-to-government basis consistent with E.O. 13175. The EIS should document these consultation activities, as well as any actions taken to address the concerns identified by the tribal governments. The EPA offers our experience and special expertise working with Tribal governments to assist the Corps in fulfilling our tribal consultation and coordination responsibilities for this project. The EPA has developed Region 10 Tribal Consultation and Coordination Procedures which may be helpful in developing this plan.[7]

Recommendations:

<u>Consultation Plan</u>

- Develop a Tribal government-to-government Consultation Plan which would outline the process for working effectively with tribal governments during the EIS development process. The G2G Plan should include a schedule with agreed upon timelines and milestones for consolation, meetings, and decision points;
- The G2G Plan should determine the best timing for conducting the consultation meetings which would avoid conflict with Alaska Native Village subsistence, cultural and religious seasons, which varies with each community; and
- The G2G Plan should be developed in collaboration with the affected and/or interested tribal governments. Tribes should have the opportunity to review, provide comments and concurrence with the G2G Plan.

[7] The EPA Region 10 Tribal Consultation and Coordination Procedures can be found at the following website: http://www.epa.gov/region10/pdf/tribal/consultation/r10_tribal_consultation_and_coordination_procedures.pdf

Consultation and Coordination Process

- Tribal government-to-government consultation and coordination should be open, meaningful, and occur throughout the EIS process until the Record of Decision is issued;
- Discussion how tribal government concerns and issues raised during government-to-government consultation meetings will be recorded, whether or not the tribe wishes that information to be made publicly available and an opportunity to correct any information prior to it being included in the record should be discussed and agreed up front for each meeting. Some tribes may wish to have their comments entered into the record or wish the meeting to be held confidentially as it is a government-to-government consultation. Therefore discussing this up front prior to the meeting is critical;
- The EIS should document the tribal consultation and coordination process by providing a chronology with the dates and locations of meetings with tribal governments, and results of the meeting.
- The EIS should discussion of how the tribal governments 'comments were addressed through changes in the project design, evaluation of alternatives and impacts, and development of mitigation measures;
- Meetings, milestones, and decision points in the EIS process should avoid conflicts with subsistence, cultural, religious, and other traditional activities, whenever possible;
- Tribes should be notified of the key decision points and milestones in the EIS process.
- The consultation and coordination process should be used as an opportunity to provide educational outreach and technical exchange of information regarding the project. Fact sheets and workshops (either in person, teleconference, or webinar) should be provided to Tribes throughout the NEPA process; and
- The consultation and coordination process should be used as an opportunity to gather Traditional Ecological Knowledge and Wisdom from the local tribal members who may be affected by this project. This should be done in partnership and close consultation with the federally recognized tribal governments.

Traditional Ecological Knowledge and Wisdom

There are over 60 Alaska Native communities who may be affected by this proposed project. Individual tribal members engage in traditional subsistence activities and have knowledge and experience with their land, wildlife, wetlands, fish, birds, plants and other resources of the region. Traditional Ecological Knowledge and Wisdom in coordination with empirical scientific data should be used to develop and evaluate alternatives, assess environmental and human health impacts, and identify mitigation measures. The identification, inclusion, and integration of TEKW into the EIS analysis would result in a more robust agency decision making document. The cooperating agencies, including the EPA, the State of Alaska (Department of Fish and Game, Subsistence Division), the cooperating tribal governments, and the Kuskokwim River Watershed Council could potentially provide expertise for developing the TEKW studies. Additionally, through government-to-government consultation, tribes can help design an appropriate study.

Recommendations:

- Coordinate with the communities in the region to identify special habitat areas, migration corridors and seasonal patterns, current and historical traditional and cultural uses, timelines and schedules for subsistence, hunting, fishing, harvesting, trapping, recreation, etc. and their way of life;
- Review current information available from previous EISs and databases regarding subsistence resources. Identify TEKW data gaps, and conduct additional TEKW studies as necessary to

clearly identify concerns and potential impacts, including cumulative, from the proposed project and proposed alternatives;

- TEKW should be incorporated into the EIS to evaluate project modifications, alternatives, environmental and human health impacts, and to develop mitigation and monitoring measures; and
- In working with the communities to document and incorporate TEKW into the EIS, it is important to acknowledge up front appropriate tribal protocols for how this information could be used and how to ensure that sensitive information is protected. The Alaska Native Science Commission has principles that were developed in regards to appropriately working with TEKW, http://nativescience.org/issues/tk.htm.

Environmental Justice and Public Participation

Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994) requires each Federal agency to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations, low-income populations, and Native American tribes. The EPA also considers children, the disabled, the elderly, and those of limited English proficiency to be potential Environmental Justice communities due to their unique vulnerabilities.

Additionally, per the Executive Order 12898, "Federal Agencies, whenever practicable and appropriate, shall collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. Federal Agencies shall communicate to the public the risks of those consumption patterns." Tribes have expressed concerns regarding declining Chinook salmon stocks, climate change impacts, barge traffic and erosion, mercury and other contaminants in the Yukon Kuskokwim Region. It is particularly important that human health exposure and pathways for contaminants and other impacts from the proposed project be fully discussed and mitigation measures developed in close consultation and coordination with the communities. This should include a discussion regarding any human health or cultural impacts from the proposed project, as well as any risk from accidents or failures along the transportation corridor and at the proposed mine site. This discussion will require enhanced communication efforts throughout the process of developing the EIS.

Clearly the impacts to subsistence are not just lost food sources, but loss of healthy subsistence life ways, loss of practices, loss of cultural connections to the past, loss of connection to specific places, loss of teaching and learning, loss of sharing networks, loss of individual, community, and cultural identity, among others should be considered in the EIS. The cultural, social, psychological, and spiritual aspects of subsistence livelihoods should also be considered in addition in the socio-economic, environmental justice and human health impact assessments. For more information, refer to the EPA website, "Environmental Justice Considerations in the NEPA Process" http://www.epa.gov/compliance/nepa/nepaej/index.html.

According to the CEQ Environmental Justice Guidance under the National Environmental Policy Act (1977), when determining whether environmental effects are disproportionately high and adverse, agencies should consider the following factors: [8]

[8]Council on Environmental Quality (December 10, 1997). *Environmental Justice Guidance Under the National Environmental Policy Act.* Available online at http://ceq.hss.doc.gov/nepa/regs/ej/justice.pdf

1. Whether environmental effects are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and
2. Whether the disproportionate impacts occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

In addition, we emphasize the EJ analysis address the following:

Demographic Analysis. Gather geographic and demographic data about the area affected by the proposed action to determine whether minority populations, low-income populations, or Indian tribes are present, and if so whether there may be disproportionately high and adverse human health or environmental effects on these populations.

Baseline Conditions. Consult relevant public health data and industry data to establish the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards, to the extent such information is reasonably available.

Characterization. Describe the direct, indirect, and cumulative effects of the proposed action within this context: Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruption on the community structure associated with the proposed action; and the nature and degree of impact on the physical and social structure of the community.

Effective Public Participation Strategies. Agencies should, as appropriate, acknowledge and seek to overcome linguistic, cultural, institutional, geographic, and other barriers to meaningful participation, and should incorporate active outreach to affected groups. Strategies include using notices, mailings, fact sheets, briefings, presentations, exhibits, tours, news releases, translations, newsletters, reports, community interviews, surveys, canvassing, telephone hotlines, question and answer sessions, stakeholder meetings, and on scene information.

Meaningful Community Representation. Agencies should endeavor to have complete representation of the community as a whole and should be aware that community participation must occur as early as possible if it is to be meaningful. The EIS should describe what was done to inform the communities about the project and the potential impacts it will have on their communities, what input was received from the communities, and how that input was utilized in the decisions that were made regarding the project.

Tribal Representation. Seek tribal representation in the process that is consistent with the government-to-government relationship between the United States and tribal governments, and the federal government's trust responsibility to federally-recognized tribes.

Recommendations:

- Encourage meaningful engagement and participation by the community, particularly communicating in the regional native Yup'ik language;
- EJ analysis should be conducted in consultation and coordination with communities;

- Scheduling meetings and decision points in the EIS process should avoid conflicts with subsistence and other traditional activities whenever possible;
- Attention should be given to consideration of the dependence of local communities on local and regional subsistence resources, access to those resources, and perception of the quality of those resources;
- Provide more frequent opportunities to involve the tribal governments and the public (between the Scoping and the Draft EIS stage);
- Prepare and disseminate fact sheets on technical aspects of the project;
- Conduct educational workshops on various subjects that would bring in the Traditional Ecological Knowledge and Wisdom and local knowledge of the people of the region (e.g., information to help shape the NHPA Section106 process, the emergency response planning, characterizing impacts from potential failure scenarios, impacts to subsistence resources, and timing of the subsistence calendar and any special habitat areas for wildlife. The location, schedule, and agenda for these workshops should be coordinated with the local communities;
- In addressing potential adverse impacts, measures for avoidance or minimization of those impacts should be considered before resorting to mitigation measures. Where avoidance or minimization is not possible, develop appropriate mitigation measures and agreements. These should be developed with input from the affected population in a consensus-based process. Agreements should be developed between the project proponent and the EJ communities; and
- Include in the EIS a summary conclusion or an EJ determination which concisely expresses whether impacts have been appropriately avoided, minimized and/or mitigated.

Health Risk or Impact Analysis

Screening Analysis

The proposed project may contribute to adverse impacts to human health of individuals and communities in the Kuskowkim River region. In particular, attention should be given to vulnerable populations, such as the elderly, young children, and pregnant women, who may be more susceptible to exposure. In 2009, the Alaska Department of Health and Social Services issued a fish consumption advisory for children, pregnant women, and women of child-bearing age to limit intake of large pike (>2 feet long) in the lower Kuskokwim River. In 2011, preliminary consumption guidelines were issued for women of child-bearing age and children in the middle region of Kuskokwim River who eat pike and burbot.

Local residents have expressed concerns regarding potential contaminant exposure from the Red Devil Mine. The majority of residents in the region practice a subsistence lifestyle to provide for their families. Local residents may trap for fish in Red Devil Creek, net fish in the Kuskokwim River, and harvest berries from the site for their families. There have been concerns expressed regarding the higher cancer rates in former mine workers at the Red Devil Mine site.

We understand that ADHSS and the Yukon-Kuskokwim Health Corporation are undertaking a health screening process in the project area. Depending on the results of this screening analysis, additional evaluation of health effects, such as a Health Risk Assessment or Health Impact Assessment may be required to evaluate the direct, indirect, and cumulative impacts to human health and the environment resulting from this project. We look forward to reviewing and commenting on the draft screening analysis for this project. The final health screening analysis should be included as an appendix to the Draft EIS.

Recommendations:

- Complete screening analysis to determine which aspects of human health (including, but not limited to public, environmental, mental, social, cultural health, etc.) could be impacted;
- Consider historical impacts to health and overall cultural well-being;
- Identify human health exposure pathways related to environmental impacts and subsistence resource;
- Identify potential contaminants that may persist and bioaccumulate in the environment and up the food chain (e.g., consumption of berries, fish, drinking water, etc.); and
- When conducting a screening, we recommend using the "Standard for the screening stage" from the North American HIA Practice Standards Working Group document "Minimum Elements and Practice Standards for Health Impact Assessment (November 2010, Version 2).[9]

Scope of the Health Assessment

Human health effects from development projects are often more far-reaching than is commonly recognized. Contaminant exposure or cancer risks are common in areas for impact assessment. However, numerous other health impacts that could occur as a result of a new project are often overlooked. For example, the EIS should look for information that can be used to assess the project's effects by looking at how income from new jobs can have positive and negative health impacts. Income from new jobs has also been associated with increased rates of alcohol and drug use, and domestic violence and child abuse due to rapid social and community change, particularly in rural areas, and disrupted family structure due to unusual work schedules. During the scoping meetings we heard concerns specifically about this and whether or not there would also be an increase in infrastructure within the community to address these impacts, such as increased village safety police officers, health programs, etc. Increased income can also result in increased ownership of motorized vehicles, which often results in less physical activity, particularly in the village setting. Although such health impacts have been documented for other projects on numerous occasions, they are rarely addressed in project development or permitting.

Recommendations:

- Determine which health impacts to evaluate in the EIS based on the screening analysis;
- Identify and discuss the methods and process for developing the HIA analysis and the sources of information. Discuss how local communities and tribes would be involved; and
- Include a workplan and schedule for completing the health assessment;

Assessment and Data Collection

In order to appropriately evaluate human health, specific health data are required that may not be routinely collected as part of the EIS scoping process. In order to ensure that the necessary data are available for this evaluation, it is important to involve public health professionals early in the NEPA process.

Public health data and expertise for prospective health impact analysis or for providing input on health issues may be available from local and state health departments, tribal agencies, or federal public health agencies, such as the U.S. Centers for Disease Control and Prevention's National Center for Environmental Health, U.S. Agency for Toxic Substances and Disease Registry, or Indian Health Service. We are encouraged that the ADHSS and YKTHC are partnering to conduct the screening analysis and HIA for the Donlin Gold Project.

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[9] R. Bhatia et al. *Minimum Elements and Practice Standards for Health Impact Assessment, Version 2* (North American HIA Practice Standards Working Group, 2010), 3 – 4.

Recommendations:

- Include a profile of existing health conditions of the region and identify the sources of this information;
- Evaluate the potential health impacts of individuals and communities in the region; and
- Include the HIA as an appendix in the Final EIS.

Guides and Resources

The Health Impact Assessment framework is a combination of procedures, methods and tools that enables systematic analysis of the potential positive or negative effects of a policy, plan, program or project on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage or mitigate negative effects. HIA is currently the only widely accepted methodology or framework used to provide decision-makers with information about how a specific policy, project, or program may affect human health.

The World Health Organization and the U.S. Centers for Disease Control and Prevention support the use of HIA as a tool to address health impacts when policies, programs, or projects are being developed. Many other countries have successfully used HIA for these purposes. The International Finance Corporation, a member of the World Bank Group, has adopted HIA as the standard for evaluating health and requires it of any projects for which it provides funding.

Guides for conducting HIA are available from various sources. While the EPA does not endorse or recommend use of any single or particular guidance on HIA, these references are provided to assist with identifying additional resources on HIA.

- World Health Organization – *Health Impact Assessment Short Guides*;[10]
- International Finance Corporation – *Introduction to Health Impact Assessment (2009)*;[11]
- CDC – *Healthy Places, Health Impact Assessment*;[12]
- Human Impact Partners – *A Health Impact Assessment Tool Kit: A Handbook for Conducting HIA, 3rd Edition (2011) and Health Impact Assessment: A Guide for Practice (2011).*[13]

Mitigation Strategies

In order to minimize the potential identified adverse health effects resulting from this project, mitigation strategies should be developed and included in the EIS. For example, the Bureau of Land Management prepared the 2008 Northeast National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement which identified public health mitigation on 'social determinants of health.[14]

Recommendations:

- Identify strategies to manage identified adverse health impacts;

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[10] World Health Organization, *Health Impact Assessment Short Guides*; http://who.int/hia/about/guides/en/.

[11] International Finance Corporation, *Introduction to Health Impact Assessment* (2009).

[12] Centers for Disease Control and Prevention, *Healthy Places Health Impact Assessment*; http://www.cdc.gov/healthyplaces/hia.htm.

[13] Human Impact Partners, Health *Impact Assessment Toolkit: A Handbook for Conducting HIA, 3rd Edition, Oakland, CA (2011)* and Rajiv Bhatia, *Health Impact Assessment: A Guide for Practice, Oakland, CA (2011).* http://www.humanimpact.org

[14] See Appendix G: Examples of Public Health Mitigation Strategies in the BLM's 2008 Northeast National Petroleum Reserve-Alaska FEIS.

- Involve communities and tribal governments in developing health strategies and mitigation measures. Prepare a plan to monitor the health of individuals and the community during construction, operations and closure/reclamation; and
- Communicate the findings of the HIA to the tribes, communities, and the public.

Children's Health and Safety

Executive Order 13045 *Protection of Children from Environmental Health Risk and Safety Risks* (April 21, 1997) directs each Federal agency to make it a priority to identify and assess environmental health and safety risks that may disproportionately affect children. Analysis and disclosure of these potential effects is appropriate because some physiological and behavioral traits of children render them more susceptible and vulnerable than adults to health and safety risks.

Recommendations:

- Address potential direct, indirect, and cumulative impacts of the proposed project on children's health, including consideration of prenatal exposures;
- Assess children's potential exposures, pathways, and susceptibilities to the pollutants of concern;
- Identify pollutants of concern and their sources that represent health and safety risks to children;
- Conduct an exposure assessment for children – air, water, subsistence foods, noise, etc.; and
- Identify the children's baseline health conditions.

Social-Cultural Impacts

While it is anticipated that this proposed project will result in employment opportunities for Alaska Native residents, there would also be local and corporate revenues generated from this project in the region. While employment opportunities and local revenues generally increase a community's standard of living, there can also be negative impacts to families, communities, and cultures, especially in areas where residents are participating in traditional cultural practices. Noise and physical structures may disturb and/or displace subsistence wildlife from the project area. Other project impacts may also affect a community's ability to access traditional and accustomed subsistence use areas. The sociocultural impacts associated with this project should be fully evaluated and disclosed in the EIS.

Reports and Resources

There are a number of technical reports and other Environmental Impact Statements that have been completed throughout Alaska which consider impacts from resource extraction projects on Alaska Native communities. These resources should be reviewed and included, as appropriate, as references for considering the full range of impacts to Alaska Native communities and their way of life. While the EPA does not endorse or recommend use of any single or particular documents, these references are provided to assist with evaluating impacts on socio-cultural resources:

1. Ballard, C. and G. Barks (2003). *Resource Wars: The Anthropology of Mining*. Annual Review of Anthropology 32: 287:313.
2. Braund, Stephen R. & Associates (2009). *Impacts of Oil and Gas Development to Barrow, Nuiqsut, Wainwright, and Atqasuk Harvesters*. Report prepared for the North Slope Borough, Department of Wildlife Management.
3. Braund, S.R. and J. Kruse (ed.) (2009). *Synthesis: Three Decades of Research on Socioeconomic Effects Related to Offshore Petroleum Development in Coastal Alaska*. Minerals Management Service, Outer Continental Shelf Study 2009-006.
4. National Research Council (2003). *Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope*. Washington D.C.: The National Academies Press.

5. Palinkas, L.A., M.A. Downs, J. S. Petterson, and J. Russell (1993). *Social, Cultural, and Psychological Impacts of the Exxon Valdez Oil Spill. Human Organization* 52(1):1-12.
6. Storey, K. and L.C. Hamilton (2004). *Planning for the Impacts of Megaprojects: Two North American Examples.* Pp. 281-302 in R.O. Rasmussen and N.E. Koroleva (eds.) *Social and Economic Impacts in the North.* Dordrecht, Netherlands: Kluwer Academic Publishers.
7. Tetra Tech (2009). *Red Dog Mine Extension Aqqaluk Project Final Environmental Impact Statement* October 2009 for the U.S. Environmental Protection Agency, Region 10.
8. Gerard Duhaime & Bernard, Nick, editors (2008). *Arctic Food Security.* Canadian Circumpolar Institute (CCI) Press, University of Alberta and Centre inter-universitaire d'etudes et de recherché autochtones (CIERA), Univerite' Laval.

Recommendations:

Socioeconomic Impacts

- Evaluate impacts to families, communities, and cultures associated with transitioning from a subsistence economy to a cash economy; and
- Evaluate a post-mining scenario and the potential decline in the economy of the region.

Accessibility of Traditional Use Areas

- Identify community traditional use areas for subsistence, harvesting, hunting and trapping, fishing, travelling, etc.;
- Describe the access limitations to these traditional use areas and their impacts to local communities; and
- Coordinate with the community on options for mitigating impacts associated with accessibility to traditional and accustomed use areas.

Compatibility of Traditional Use Areas

9. Identify project activities that may conflict with traditional and accustomed uses (e.g. barge traffic on the Kuskokwim River conflicts with subsistence fishing and other traditional and cultural activities); and
10. Coordinate with the community to identify mitigation options for avoiding and minimizing conflicts between traditional and accustomed subsistence uses with the construction and operation of this project.

Historical and Cultural Resources

Section 106 National Historic Preservation Act of 1966 requires Federal agencies to analyze the effects of their actions on historic properties. Since the Donlin Gold project area represents a frequent and accustomed use area by the Alaska Native tribal governments for subsistence fishing, hunting, trapping, and harvesting, cultural activities, and migration routes, the Alaska State Historic Preservation Officer would need to be consulted. The 1992 amendments to the NHPA placed major emphasis on consolation with tribal governments. Consultation should respect tribal sovereignty and the government-to-government relationship between the Federal and tribal governments. Tribal governments must be consulted about actions on or affecting their lands or resources on the same basis, and in addition to the SHPO. Potential impacts to resources of concern to the tribes may include, but are not limited to, impacts to cultural resource areas, archaeological sites, traditional cultural properties of landscape, sacred sites, and environments with cultural resource significance. The tribal government(s) must be specifically engaged and consulted with in accordance with Section 106 of the NHPA. An additional resource in the Yukon Kuskokwim Region is the Association of Village Council Presidents as they have a department that focuses on protection and mitigation of impacts to cultural sites. We are encouraged that the Bureau of Land Management has started coordinating with AVCP.

To determine whether the area of potential effect would be eligible for the National Register of Historic Places, the perspectives of the tribal government(s) should be considered. Such considerations should include significant events that may have taken place in the past (tribal wars, establishment of trade routes, etc.)

The Section 106 consultation process should be run concurrent with the Federal permitting and NEPA processes. If adverse effects to traditional cultural properties, sacred sites, or other areas of cultural resource concerns are identified, any Memorandum of Agreement developed to resolve these concerns under Section 106 should be addressed in the Record of Decision for this EIS. Unless there is a compelling reason to do otherwise, the Section 106 MOA should be fully executed before the ROD is issued, and the ROD should provide for implementation of the terms of the MOA.

Recommendations:

- NHPA Section 106 consultation should be conducted with tribal governments, local governments, the public, in addition to SHPO;
- Evaluate the Alaskan historical and traditional significance of the project area, the importance of ethnobotany, hunting, fishing, and gathering uses of the area by Alaska Natives, any long term traditional ecological management of the area, and any significant historic events that took place in the area;
- The scope of impacts to these resources should include the direct, indirect, and cumulative impacts to sacred sites; traditional cultural properties or landscapes; hunting, fishing, gathering areas; access to traditional and current hunting, fishing, and gathering areas and species; changes in hydrology or ecological composition of springs, seeps, wetlands, and streams, that could be considered sacred or have traditional resource use association; historical and currently used travel and migration routes; and historic properties, districts or landscapes; and
- Conduct the Section106 NHPA consultation process concurrent with the EIS process. The Section 106 process should be completed prior to issuing the ROD, which would provide for the implementation of the MOA terms.

Enclosure 2
Narrative Description for Financial Assurance Cost Categories

EIS Alternative
Reclamation and Closure Costs

1.0 INTRODUCTION

This estimation of a financial assurance amount (bond) for the reclamation of the X Project is intended to generally follow guidelines presented in the USFS Training Guide for Reclamation Bond Estimation and Administration (USFS, 2004). This estimate utilizes information and format from an initial cost estimate compiled by X.

The agency bond calculation includes a separate itemization of indirect costs based on Forest Service standards and that reflect Region 4's experience with mine reclamation at other sites.

The reclamation cost estimate is broken into the following cost categories:

Direct Costs:

- Interim Operations and Maintenance
- Hazardous Materials Disposal
- Water Treatment
- Demolition and Disposal (structures, equipment and materials)
- Site Works
- Revegetation
- Groundwater capture
- Post Closure Operation, Maintenance and Monitoring
- Post Closure Water Treatment

Indirect Costs:

- Engineering
- Mobilization
- Contract Administration
- Insurance
- Bond performance and payment
- Contractor profit
- Contingency

2.0 BASIS AND ASSUMPTIONS

The basis for each cost category is discussed below. Unit costs for some specific items were provided by XXX from RS Means cost data books, other cost data sources, or from site specific vendor quotes. These unit costs were reviewed and checked, but have generally been retained. XXX's notes and EIS team notes on additional cost items are included in the cost estimate.

Enclosure 2
Narrative Description for Financial Assurance Cost Categories

2.1 Interim Operations and Maintenance

This category includes the activities needed to maintain the integrity of the project facilities during an unexpected shutdown or following closure until reclamation activities begin and contains three general subcategories: public safety; access and utilities; and water management. Public safety includes fencing and warning signs for the portals, removal of explosives, and site security personnel. Access and utilities include road maintenance, snow removal, and electricity for lights and basic facilities. Water management includes periodic inspection of ponds, wells, pipelines, and drainage works. Water pumping and treatment from the mine and the water management ponds are included in the water treatment cost item. For the purposes of this estimate it is assumed that an interim shutdown period would last up to one year.

2.2 Hazardous Materials

XXX will keep have hazardous materials on site and this category estimates costs for sampling, analysis, handling, transport, and disposal at the US Ecology RCRA Subtitle C landfill in Grand View, ID (250 miles from the site). It is assumed that 40 barrels would be sufficient for removal of all hazardous materials from the lab and mill facilities, based on the expected size of the operations. On-site fuels storage will remain for use at reclamation or be reclaimed by vendors. Fluids in the mill circuit are assumed to be processed through the water treatment plant.

2.3 Water Treatment

Water treatment costs for the agency preferred alternative and assume a conventional precipitation and solids removal system that produces a dewatered cake as the primary waste. It is assumed that one full time operator and a part time assistant would be required to run the plant. The water treatment costs are calculated on an annual basis and one-year of water treatment is included in the interim shutdown category. A separate category for post-closure water treatment is included and for the purposes of the financial assurance, it is assumed that water treatment would continue for 100 years following mine closure. The agency estimate includes costs for offsite disposal of post closure water treatment wastes.

2.4 Demolition

XXX assumed that facility equipment and the tram would be salvaged at no cost due to the salvage value of the equipment. This is not in accord with USFS guidelines and the agency estimate assumes that there would be demolition and disposal costs for the mill, buildings, tram and mining equipment. This estimate includes a cost (as a percentage of capital cost) for hauling and disposing of mine site materials even though some of these items would likely have some salvage value. Concrete foundations would be buried on-site, all other debris will be shipped to the nearest off-site RCRA Subtitle D landfill. Pipelines are assumed to be abandoned in-place. Powerlines would be removed. Roads would be regraded to approximate original topography and revegetated except for those roads that would be left following closure for access for private parties and USFS.

2.5 Site Works

Site works includes regrading, recontouring, TWSF cap placement and topsoil replacement related to roads and facilities. The following sub-categories are included in this category:

- Borrow Site (including the topsoil stockpile)
- Portals
- Roads
- TWSF
- Water Management Pond
- Millsite and Tram

Unit earthwork costs are based on equipment production (CAT Handbook) and site specific hourly costs. Material volumes for the TWSF and water management pond are based on the expected amount of regrading required and the volume of cover and growth media required by the preferred alternative. Material volumes for road reclamation are based on a unit volume/linear foot of road based on site specific road construction volumes. The overall length of road reclamation was based on the total length of on-site and off-site roads as described in the EIS alternative analysis.

2.6 Revegetation

This category includes all initial reclamation revegetation work consistent with the preferred alternative. The revegetation category assumes one replanting of the site to achieve successful revegetation. Growth media placement (earthwork) is included in the Site Works category. Post-reclamation revegetation monitoring and maintenance is included in Post Closure O & M category.

2.7 Groundwater Capture

Groundwater capture may be required post closure to maintain groundwater or surface water quality. Capture would include wells or an alluvial pumpback system and pumping to the water treatment plant.

2.8 Post Closure Opeations & Maintenance

Post closure operation and maintenance would include maintenance of facilities roads, long term water treatment facilities, water management facilities, etc. This task also includes reclamation performance monitoring and maintenance of the TWSF cover construction and revegetation and environmental monitoring.

The reclamation cost estimate includes costs for reclamation monitoring (water quality, revegetation, and cover stability), reporting/documentation of monitoring data, costs for periodic maintenance of the TWSF reclamation cover, maintenance of water control BMP's and annual weed control. Long-term water treatment costs are included in a separate category. A five-year time frame was used for this O&M category.

2.9 Post Closure Water Treatment

Post closure water treatment may or may not be required for this site. A post-closure water treatment cost for 100 years of operation is included to protect the public from having to assume treatment costs if water treatment is required. The calculation of a net present value of the 100 years of treatment costs requires the assumption of interest and inflation values. The inflation rate value selected (3.66%) is the 2000 to 2005 five year average of the Construction Cost Index from the Engineering News Record and the interest rate (4.85%) is the October 2006 average 30 US Treasury bond rate.

2.10 Indirect Costs

Indirect costs are based on guidance in USFS Manual (USFS, 2004) and USFS Region 4. Engineering redesign costs are based on a percentage of the site works costs only. Mobilization and demobilization costs are based on a percentage of the demolition, site works and revegetation costs only. A contingency of 20% of direct costs is consistent with general engineering practice.

Reference:

USFS, 2004. Training Guide for Reclamation Bond Estimation and Administration for Mineral Plans of Operation authorized and administered under 36 CFR 228A. U.S. Dept. of Agriculture – USFS. April.

Enclosure 3
Spreadsheet for Financial Assurance Cost Estimates

RECLAMATION COST ESTIMATE SUMMARY		
COST CATEGORIES		**AMOUNT**
Direct Costs		
Interim Operations and Maintenance (two years)		$
Hazardous Materials Removal and Disposal		$
Water Treatment		$
Demolition and Disposal		$
Site Works		$
Borrow Sites	$	
Portals	$	
Roads	$	
TWSF	$	
Water Management Pond	$	
Millsite and Tram	$	
Revegetation		$
Groundwater Capture		$
Post Closure Operations/Maintenance		$
	Total Direct Costs:	$
Indirect Costs		
Engineering Redesign	6% of Site Works & GW Capture Capital	$
Mob/Demob	3% of Demo, Site Works and Reveg	$
Contract Administration	4.5% of Direct Costs	$
Contingencies	20% of Direct Costs	$
Insurance	1.5% of Labor Costs	$
Bond (performance)	1.5% of Labor Costs	$
Bond (payment)	1.5% of Labor Costs	$
Contractor Profit	10% of Direct Costs	$
Indirect Agency Overhead	4.5% of Direct Costs	$
	Total Indirect Costs:	$
Post Closure Water Treatment Costs		
Post closure water treatment (NPV – beginning second year after closure)		$
Overhead and contingency	10% of post closure WT NPV	$
		$
Total Direct and Indirect Costs		$