



Ms. Lynn Tomich Kent  
Deputy Commissioner  
Department of Environmental Conservation  
410 Willoughby Avenue, Suite 303  
Juneau, AK, 99811

Dear Ms. Tomich Kent,

I wanted to follow up on the brief conversation I had with you at the Permitting Initiative meeting in Fairbanks several weeks ago about Donlin Gold. I'm writing because this issue affects DEC. It sounded from our conversation as though it may not have sufficiently presented itself to you yet, so I wanted to provide some background.

I and several colleagues have been closely studying the Donlin Gold proposal and while we understand this is a very complicated issue with many moving parts, we believe one of the more compelling unaddressed potential impacts is that of mercury in the milling process. This mine will mill rock that contains 1-2 parts per million mercury. At 59,000 tons per day mill throughput, this equates to about 20-40 tons of mercury per year that will enter the mill. Of this, some will go through thermal processing and be captured while the remainder will enter the tailings pond.

Some gold mines around the world are leaving serious mercury-related health problems for downriver subsistence communities, such as the [Tapajos River communities in the Amazon](#). Similarly, the Red Devil cleanup site, also on the Kuskokwim, is another example that mercury has the potential to cause ecosystem impacts in the region. Abandoned mine tailings at Red Devil contain 52,000 times DEC standards (among extremely elevated levels of other contaminants as well). In 2009 the state of Alaska began issuing fish consumption advisories for pike and burbot on the Kuskokwim, and the [cleanup efforts](#) have since cost the state more than \$10 million.

While we realize that Red Devil – a mine devoted to mining mercury itself – was built a long time ago and permitting is different these days, we should not lose sight of the fact that Donlin will be many orders of magnitude larger of a mine (Red Devil is 10 acres, Donlin's footprint may exceed 10 square miles) and currently only has plans to remove from stack emissions a fraction of the mercury that will move through their mill in total. More importantly, Red Devil was a mercury mine and although it exported the bulk of the mercury it processed, it still managed to contaminate the area. Donlin, on the other hand, is dealing with mercury as a by-product and only has to comply with the EPA air ruling for mercury stack emissions from mines, which leaves a tremendous amount of mercury unaccounted for at Donlin.

We all know permitting is complex, but after a year of trying to find evidence that the Alaska permitting system will address the issue (and satisfactorily mitigate problems identified) over the life of mine and beyond, we still have no indication that anyone is taking it seriously at NovaGold, Donlin LLC, village or regional corporations, or at the state. We are not concerned with the stack emissions from thermal processing at Donlin – the EPA rule was strong and we applauded it. The rule allows for 82 pounds of stack emissions per million tons of ore processed at Donlin, which, despite causing at least a 20-fold increase in total mercury emissions from all sectors in Alaska (using 2010 Toxic Release Inventory data), remains a major improvement over otherwise unregulated stack emissions. The rule will require Donlin to capture all but the 82 pounds of stack-emitted mercury and send it to a proposed repository down south.

However, there are important details that need to be brought to light. It is not clear in what form mercury will be captured and stored. At Barrick's Nevada mines, it is stored as calomel or as liquid mercury. NovaGold technical reports indicate they may try to precipitate it as cinnabar – solid HgS – to decrease the buildup of mercury in process water (2009 NovaGold Technical Report NI-43-101, Section 16.1). How captured mercury will be moved off site, including how often and to where, needs to be discussed; plant logs and shipping manifests need to be available to regulators to ensure that what is captured is eventually received at a civilian repository outside Alaska. Great care needs to be exercised if the mercury is to be shipped off-site by barge, down one of the most critical subsistence rivers in Alaska. Should mercury be precipitated in a solid form, the final disposal of this material needs to be discussed. This is very important, given rumors that some mining companies capture mercury from thermal units only to dispose of it in tailings ponds.

Beyond this, thermal processing and capture only deals with the portion of ore that goes through thermal units. After crushing and separation, vast amounts of pulverized ore are not treated thermally, yet still end up in the tailings pond as waste. It is not really known how much mercury could be emitted (off-gassed) from the tailings. There has been no assessment of the effect of cyanide in the tailings on mercury complexation, speciation, or its ability to release into the environment. Nor has there been any assessment that we are aware of concerning potential

dissolution and release of mercury into water bodies should the liner leak, particularly given that there will be some PAG (potentially acid generating) areas within the pond.

There are no plans to measure off-gassing emissions that could occur at the tailings pond or from waste rock, nor has any modeling been done to determine whether off-gassing could occur in the climate at Donlin. Should off-gassing occur, and mercury vapor settle out on wetlands, methylation could occur, potentially adding to the impact of the mine's mercury emissions. Nevada gold mines have shown that tailings off-gas mercury, but this realm of mine science is not well understood yet and there has not been sufficient data collection (air samples) in Nevada to model the emission trends. Furthermore, it is unlikely that mercury off-gassed from Nevada mines would enter an environment where it could methylate, but the potential for such could be much higher in the Donlin region. Increasing data collection from off-gassing tailings from Nevada would be a good place to start to determine what we might be dealing with at Donlin to make sure we don't end up building a mine that has these issues on an even larger scale.

Furthermore, this lack of information represents a substantial potential liability in the event of a tailings dam failure, either gradual or sudden, and with post-dewatering and post-reclamation issues within ground and surface waters. Without a solid study to determine the quantities of mercury involved during various stages of milling, and their potential to become bioavailable once within tailings, we would be taking a huge short and long term risk. Red Devil should be a warning to what could go wrong at Donlin if this issue is not taken extremely seriously. Unfortunately, we have had little success obtaining technical information and data from Donlin LLC. Virtually all of our questions to them remain unanswered.

In our opinion, the best way to deal with all of this is one of two ways:

- 1.) Conduct a comprehensive, independent, peer-reviewed technical study and risk assessment specific to mercury, using data from Nevada to help model potential impacts. This study may in fact determine that, based on geochemical properties and mill engineering, tailings may only ultimately contain trace amounts of mercury available for methylation, that it may generally be bound tightly to rock material and unlikely to release as a vapor or be bio-available as fugitive dust. A study may determine that even with a sudden tailings dam failure, mercury would not be the largest concern and life of mine off-gassing would be negligible. I have discussed this with expert environmental chemists who specialize in mining issues and they see a study as a promising prospect. We figure this could be done for around \$100,000 – a drop in the bucket for NovaGold, but a major step in the right direction of long term environmental stewardship.
- 2.) Remove all mercury from the site entirely. This would eliminate potential problems. Mercury-laden waste slurry would need to be processed to remove all mercury before the slurry goes to tailings. There would be no chance for off-gassing or post-reclamation contamination. The mercury captured as required under the EPA ruling would be combined with mercury from

other points in the mill process and sent to the repository together. Although cutting edge technology for this exists (see work by Charlie Alpers and others at the [Combie Reservoir](#) in California – a mercury cleanup site), this is likely to be expensive, and perhaps unnecessary if we have a better understanding of how mercury is likely to behave at Donlin.

We'd also like to point out that the Alaska permitting system is not currently designed to address this issue directly. No modern Alaska mine of this scale has ever posed similar potential mercury problems before. Therefore, as Donlin moves to permitting, we will advocate that additional safeguards are incorporated into the permitting process to prevent mercury emissions and water contamination during the life of mine and beyond. The unresolved mercury concerns *must be addressed during permitting*, and must include monitoring requirements specific to mercury, including the ongoing measuring of off-gassed mercury levels around the tailings pond and water quality monitoring downgradient of the mill and tailings facilities for both surface and groundwater. We would also like to see requirements that mine operators provide logs of mercury capture and shipping manifests to regulators and the public so we know that captured mercury is not being dumped back into the tailings, as has been rumored in Nevada.

There may be critical information I'm missing at this point, and perhaps there may be other options to approaching the issue as well. But at this point we have not been able to make meaningful progress without the initiation of a study or information from the industry that might counter our concerns. We will remain engaged and interested in the mercury issue at Donlin during pre-permitting, permitting, and construction.

I look forward to discussing this issue further with you and would be happy to meet in person the next time I'm in Juneau. Thanks for your consideration.

Sincerely,

--Pete Dronkers

CC: Department of Natural Resources  
Brent Goodrum, Director, Division of Mining, Land, and Water

Note: blue text indicates web links. I will also email a digital version of this letter.