



DATE: May 15, 2019

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RE: Palmer Project Draft Waste Management Permit (2019DB0001),
Draft Reclamation Plan Approval Amendment 1 (J20185690RPA),
Phase II Plan of Operations

Overview

The Takshanuk Watershed Council's (TWC) primary concern with the draft Waste Management Permit and Application, with the draft Amended Reclamation Plan, and with the Alaska Mental Health Trust Land Office Phase II Plan of Operations, is that they are lacking analysis of a number of critical project operational components, specifically:

- 1) alpine and winter conditions at the Palmer Project site,
- 2) the efficacy of the Land Application Disposal (LAD) system with regard to preventing ground and surface water contamination, and
- 3) an analysis of wastewater flows from the full length of the proposed tunnel, including the Kudo Fault zone.

Because of these flaws in the permit documents, TWC is requesting that DEC require, under 18 AAC 15.040, that Constantine Mining withdraw their application, conduct additional site investigations, and provide additional information before resubmitting their permit applications, plans, and supporting documentation. The draft WMP should then be amended accordingly, and a public comment period of at least 90 days should follow, providing sufficient time for the public to assess and respond to a new application document and Phase II Plan of Operations.

No Plan for Managing Winter Conditions, Snow, and Avalanches

In order for the Land Application Disposal (LAD) system to function through the five or six months of winter, it must not freeze. And in order for Constantine to be able to monitor the system's functionality, and to conduct the permit-required water quality monitoring activities, the entire LAD facility must be accessible to daily inspection and not covered by 20 feet of snow and avalanche debris. No information at all is provided in nearly 2000 pages of documents as to how this might be accomplished. In fact, the draft Waste Management Permit (WMP) completely ignores the need to keep the system from freezing, as well as the need for active avalanche mitigation in order to protect the LAD system, as well as a

10,000-gallon fuel storage tank, from damage or destruction. The Phase II Plan of Operations (POO) also ignores the freezing issue, and addresses avalanches only very briefly, as discussed below.

On page 38 of the POO it states *“an avalanche and snow observation program within the Glacier Creek Valley was designed to gather baseline information about avalanches, weather and snowpack. This information is being used to guide the design and planning of certain elements of the plan of operations, such as road design, snow deflection berms and mounds, portal and other facility placement and identifying mitigation options for the avalanche impacts. Constantine has prepared annual reports for the snow depth and temperature monitoring for 2015, 2016 and 2017. These reports are available on request.”* On March 30, TWC submitted a request for this information to Constantine Mining, but the request was denied.

On page 36 of the POO it states that Constantine *“will likely implement some form of active avalanche management including mechanically triggering controlled avalanches”*. No further details are provided. This active management will presumably involve explosives. On May 10, TWC discussed this issue with regional ADF&G wildlife biologists, and they were not aware of the proposed avalanche management. ADF&G biologists also stated that there are bear dens near the project site, as well as mountain goats, wolverines, and lynx all making regular use of the area. All would be impacted by the use of explosives for avalanche control, as well as by other development activities in general.

The permit application for a waste management system is incomplete without a plan for dealing with winter conditions, large amounts of snowfall, and the nearly constant threat of avalanches. An assessment of the effects of avalanche control on wildlife is also necessary, with the assistance of ADF&G wildlife biologists.

Lack of Supporting Evidence for the Efficacy of the LAD System Design

The ramp seepage wastewater is predicted to exceed DEC water quality standards for aluminum, manganese, and vanadium. Additionally, in blasting and excavating this tunnel, Constantine estimates that between 7 to 15 tons of waste nitrite, nitrate, and ammonia will enter the wastewater stream and be disposed to ground through the LAD system. From the WMP Application Attachment 2, page 6: *“the predicted water chemistry from the underground ramp may not meet AWQS [Alaska Water Quality Standards] for Al, Mn and V”*. And from the WMP Application Appendix C, page 14: *“It is estimated that approximately 110,000 kg of explosives will be used for drift development”* and *“the percentage leached [nitrogen waste] was assumed to be between 6 and 12% of the total explosives usage and speciated as 56% nitrate, 4% nitrite and 40% ammonia”*.

Essential to the LAD system design is the assumption that all of these chemicals will exit through pipes buried 7 to 10 feet below the ground, and this pollution will disappear into the surrounding rock and soil without having any effect on either the groundwater, which is just 10 feet below the diffuser pipes, or Hangover Creek, which is just 30 feet to the east. But no studies were done to support this assumption. It is a common practice, and it would have been relatively simple, to have added fluorescein tracer dye to the water in the leach field test pits, and then look for that dye in the nearby creek or in the groundwater monitoring wells. In fact, it was noted in the WMP Application Appendix A, on page 8, that *“Infiltration testing indicated a hydraulic connection from the upper Waterfall Creek test pit (TP18) to the lower test pit (TP27) over a distance of about 100 m (330 ft), as evidenced by seepage observed in the lower test pit during the infiltration test in the upper test pit”*. This occurred at the exact location of the

upper diffuser and is less than 200m from the lower diffuser. The water traveled a distance of 100m, underground, and quickly enough to be observed in real time.

Constantine neglected to perform any investigations whatsoever that would have helped determine where, ultimately, the contaminated wastewater from their tunnel would end up after it left the treatment system. If there is a hydraulic connection between the LAD diffusers and either the groundwater or surface water (both situations appear likely based upon the information in the permit application cited above), then that is a violation of the conditions of this draft waste management permit and the disposal system must be redesigned and a new permit application filed.

Lack of Appropriate Information on Tunnel Seepage Water Quantity

From the WMP Application Attachment 2, page 5: *“Tundra Consulting (2018) estimates seepage inflows for the first 1,250 m (4,100 ft) of ramp to peak at approximately 200 gpm (highest during spring freshet) and then stabilize at a sustained rate of approximately 160 gpm. Tundra suggests that a higher flow rate should be anticipated for the remainder of the ramp, although an estimate of those flows was not developed.”*

The tunnel will be 2012m long, but only the first 1250m is addressed and analyzed for seepage water quantity. Just after that 1250-meter mark is the Kudo Fault zone. In crossing this fault zone Constantine is *expecting* to encounter large amounts of pressurized groundwater that will possibly exceed the capacity of their LAD system.

From the WMP Application Attachment 2, page 6: *“based on the hydrogeological model and the available data for the Hanging Wall Basalt, Tundra (2018) concluded that a higher flow rate is expected in the remainder of ramp [beyond 1250m].”* And from page 10: *“the estimate can still have a range that is as large as an order of magnitude (i.e. 50 to 500 gpm, or 10 to 100 gpm).”* Tundra Consulting has estimated 200 gallons per minute (about the same as a fire hose wide open) will come from the first 2/3rds of tunnel. The settling ponds are designed to handle 500gpm (WMP Application Appendix A, page 10). Tundra predicts that this flow rate will increase after 1250 meters, and these preliminary estimates could be off by an order of magnitude. The 200gpm could turn into 2,000gpm, in other words. It would then exceed the 500gpm capacity of the LAD system by 300%.

If this happens, wastewater will bypass the treatment system and flow over a spillway directly into Glacier Creek (a violation of this draft WMP). It will pass through the ponds too quickly for sediments to settle out. If the shut-off valves are not immediately closed, the underground diffusers are likely to clog, rendering the whole system inoperable until the diffusers are excavated from the ground and repaired, an activity that may be impossible in winter due to frozen ground and deep snow. The wastewater will continue to flow, whether or not the LAD is functioning. Meanwhile, Constantine will try to stem the water flowing from cracks and holes in the tunnel walls with grout and cement—a problematic, time-consuming, and often only partially-effective operation. (WMP Application Attachment 2, pages 10-11)

The DEC draft WMP states: *“This permit prohibits the discharge of wastewater to surface water.”* In order to discharge to surface water, the water must meet DEC water quality standards, and an Alaska Pollutant Discharge Elimination System (APDES) permit is required. Constantine is not treating the wastewater to meet DEC standards, and no APDES (surface discharge) permit has been applied for. This

is despite the seeming likelihood of contaminated wastewater finding its way to surface waters, as discussed above.

Potential seepage flows from the last 1/3rd of the tunnel need to be fully investigated and a valid estimate generated. And the likelihood of a 10-fold increase in wastewater quantity, far exceeding the capacity of the disposal system, should be addressed now. A LAD system that can handle 100% of predicted wastewater flows from the *full length* of the proposed tunnel needs to be a part of the permit application, and because surface discharge is likely, an APDES permit should be required.

Lack of Baseline Groundwater Data

The baseline groundwater data used to establish natural conditions in the area of the LAD underground diffusers is based upon two wells, sampled twice, 11 days apart (on 9/17/2018 and 9/28/2018). These four samples are used in the draft WMP to set the self-monitoring trigger limits that will indicate whether or not the LAD system is performing as designed, and as permitted. Many more samples need to be collected. A rule-of-thumb minimally acceptable sample size would be eight samples from each well taken throughout the course of at least one year.

No Plan for Managing Acid Rock Drainage

The draft permit proposes that Constantine will self-monitor for potentially acid-generating rock (PAG). If PAG is encountered, the permit requires that it be covered with a tarp and placed on a lined storage pad (Draft WMP, page 10). Leachate water can be discharged to the environment with DEC approval. The PAG is to be returned to underground when mining operations are complete—which could be in five years, fifty, or longer.

A plan for dealing with the potential for *actual acid rock drainage*, not simply the acid rock itself, needs to be included in the draft WMP and supporting documents.

The Draft Amended Reclamation Plan is Based on Inaccurate and Misleading Assumptions

From the Reclamation Plan (RP) Application Appendix C, page 2: *“In determining the Indirect rate for each of the 7 categories of Indirect Costs, we referred to the DOWL (2015) report for the discussion of factors affecting the range of indirect costs in each category. In general owing to the low risk (no PAG, good predicted water quality, low project uncertainty, good access, the lack of project complexity, fact that equipment rates already include contractor profit, history of civil contractor experience on site, and the low overall direct cost of the reclamation, and manageable climate the guidance suggests using the lower range of indirect costs...”*

Assumption 1: *No PAG*. There is a chance that PAG will be encountered, as discussed by Constantine Mining elsewhere in these application documents, and a plan for storing PAG is included in the draft WMP.

Assumption 2: *Good predicted water quality*. The wastewater is *not* expected to meet DEC water quality standards (WMP Application Attachment 2, page 6). Furthermore, the wastewater disposal system is

not designed to handle 100% of anticipated flows from the tunnel (see above), and no plan is presented for operation of the system in winter.

Assumption 3: *Low project uncertainty*. Constantine Mining does not know how much water will flow from the final 800m of the tunnel, and estimates could vary by an order of magnitude (see above and WMP Application Attachment 2, pages 6-10). How these overflows will be dealt with in a manner that satisfies the conditions of the DEC draft WMP is not made clear in the application documents.

Assumptions 4 and 6: *Good access and manageable climate*. Winter access will require plowing and actively managing avalanches on a 15-mile length of access road, although no plan for such is presented in these application documents. Watershed Council staff visited the project site on March 27. The road was blocked in four places by recent avalanches, and the site of the proposed LAD system and 10,000-gallon fuel storage tank was almost completely surrounded by avalanche debris. This is despite the fact that the winter of 2018/19 was one of the driest on record--roughly ¼ of the average amount of snow fell on the Palmer Project site. It is possible that 10 times as much fell over the record-setting winters of 2006/07 and 2011/12. A request to Constantine Mining for climate and avalanche data was rebuffed, and there is no plan presented in these application documents for how to deal with either freezing temperatures or avalanches.

Assumption 5: *Lack of project complexity*. When compared to the Greens Creek, Kensington, or Fort Knox mines, this project is extremely complex for a number of reasons.

1. There is the very real potential for 40 feet of snowfall in a season, as in 2006/07 and 2011/12.
2. The terrain is steep and the ground unstable owing to its recent emergence from under glacial ice.
3. There are frequent magnitude 5-plus earthquakes in the area: a 5.0 on 6/7/09, 5.7 on 6/4/14, 6.0 on 7/17/14, 6.1 on 7/25/14, 6.2 on 5/1/17, 5.2 on 5/1/17, 6.3 on 5/1/17, 5.1 on 9/16/17 (earthquaketrack.com).
4. The area experiences high precipitation, and groundwater hydrology is uncertain, as stated by the company in the permit application documents and cited elsewhere in this letter.

Given just these six inaccurate assumptions, it is clear that the process used for generating a reclamation bonding dollar amount is consistently and significantly underestimating potential costs.

Plans for both Temporary and Permanent Closure are Inadequate

RP Application Appendix C, page 4: *"The Care and Maintenance Plan for the temporary closure scenario includes the following key components:*

- *Continuation of baseline water quality monitoring at select sites,*
- *Continuation of seasonal underground seepage water quality monitoring at the monitoring point down-gradient of the LAD diffuser as long as water is being discharged through the LAD diffuser,*
- *Continuation of discharge of underground seepage water through the LAD disposal system..."*

As stated elsewhere in this letter, it is not at all clear how Constantine Mining plans to monitor and maintain a functioning wastewater disposal system while *in operation* during 5 or 6 months of winter. How this will be accomplished during closure is even less clear. On page 4 of the RP Application Appendix C, it states that Constantine Mining will *"continue to perform all maintenance, monitoring and reporting tasks that are necessary to protect public health and the environment during the temporary closure."* Then on page 6 of the RP Appendix C document, under *Table 3: Biweekly Inspection Costs* is

says: "Assumes team of two from Haines, 2X month during 6 snow free months and when access road is passable." This implies that the site, as well as the LAD system, will not be monitored or maintained at all during the winter. 160 to 2,000 gallons per minute of wastewater will be flowing from the tunnel (WMP Application Attachment 2, pages 6-10). This wastewater will flow in winter just as in summer. As discussed above, there is no explanation in these application documents as to how the LAD system will function in winter, below freezing and beneath many feet of snow. Unless the flow of contaminated water from the tunnel is reduced to zero, the LAD system must be maintained year-round, both while the mine is in operation as well as in closure. And the costs associated with this year-round maintenance need to be included in this reclamation bond. Presumably, this year-round maintenance will more than double the current estimate for summer-only activities.

The reclamation bonding estimates for permanent closure are also insufficient. There is no plan, nor associated costs, for if the portal plug is not immediately successful at stemming the flow of wastewater from the tunnel. Based on situations at other mines, there is a significant chance that a plug will not be 100% successful, especially after the tunnel fills completely with water and that water becomes pressurized. This draft RP should include an estimate for ongoing water treatment after permanent closure, and continued monitoring and repair of the portal plug until such a time as all tunnel seepage that does not meet DEC AWQS is stopped. The plug will then have to be monitored for many years into the future to insure it remains functional, and repairs applied as appropriate.

Conclusion

Constantine Mining's draft permit application is incomplete and inadequate for the reasons outlined above. The draft Reclamation Plan is also incomplete and lacking important information, planning, and associated costs. Following a reassessment of the DEC permit application and the draft Reclamation Plan, it would follow that the Mental Health Trust Land Office would also ask for additional information, include this in an amended Phase II Plan of Operations, and re-submit that plan for public review.

We are requesting that DEC require, under 18 AAC 15.040, that Constantine Mining pull their application and conduct additional inquiries and provide additional information in the supporting documentation. The draft WMP should be amended accordingly, and a public comment period of at least 90 days should follow, providing sufficient time for the public to assess and respond to new application documents.

Thank you,



Ben Kirkpatrick, President

On behalf of the Takshanuk Watershed Council Board of Directors



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