

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF MINING, LAND AND WATER

MEMORANDUM

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To: Pogo Project File
From: Steve J. McGroarty, PE and Brent Martellaro
Date: April 13, 2012
Subject: Pogo Plan of Operations Amendment - Dry Stack Expansion – Response to Public Comments

Comments were timely received from David Chambers of the Center for Science in Public Participation (CSP2) and from Sally McLeod of Sumitomo Metal Mining Pogo LLC (“Sumitomo”).

Comment and responses can be found below:

David Chambers (CSP2):

1. **ADNR review of the proposed reclamation financial surety.**
 - a. ADNR should comment on whether the amount allowed for “Contract Administration” would be adequate for ADNR and ADEC to administer their responsibilities under a bankruptcy situation.

Response: ADNR and ADEC believe the amount provided for contract administration will be adequate should the agencies need to oversee closure of the Pogo Mine in the event of a company default and failure to cure the default.

According to information from Sumitomo, indirect costs allowed for in the Pogo Reclamation Cost Estimate (RCE) are 49 percent of the direct costs and 32 percent of the total closure costs with 5 percent of the total direct costs allowed for Contract Administration. These costs are higher than the actual indirect costs reported for six case studies from the Northern Region of the Western U.S. (including Alaska) where actual indirect costs varied from 1.3 to 36.4 percent of the direct costs and 1.1 to 26.7 percent of the total costs respectively. (Source: “Hardrock Reclamation Bonding Practices in the Western United States prepared by James R. Kuipers, PE, Center for Science in Public Participation for the National Wildlife Federation, February, 2000).

Contract administration fee ranges of 2 to 7 percent of the total direct costs is within ADNR’s recommended cost estimate methodology. The Pogo mine’s 5 percent fee in the RCE is within that range.

- b. The “Inflation Proofing” appears to have been applied for only one year. Does this mean that ADNR will conduct another adjustment of the financial surety in one year?

Response: Inflation must be accounted for in closure cost estimates. The company has the option of doing so for the life of the authorization or on an annual basis. Pogo will need to adjust the closure cost in future years to account for inflation. According to information from

Sumitomo, the inflation proofing in the Pogo RCE was calculated as the average Consumer Price Index for Anchorage, Alaska over the previous three years and has been applied for only one year. This is within standard ADNR practices allowing mines to inflation-proof their RCEs annually or for the duration of the individual plan approvals. Sumitomo has elected to use annual inflation proofing which requires annual adjustment of financial assurance.

- c. ADNR should submit for public review its review comments of the reclamation financial surety calculations performed by Sumitomo Metal Mining Pogo. ADNR has submitted only the costs calculated by SRK/Pogo. Even better ADNR should commission its own contractor to review Sumitomo Metal Mining Pogo submission.

Response: The closure cost estimate for the Pogo Mine was public noticed in January 2012. In the Response to Public Comments, the State indicated that a revised cost estimate would be submitted for public review when the company submitted a Plan of Operations Amendment for the DSTF Expansion. The company included costs for reclamation of a larger DSTF and updated labor, equipment and fuel costs. ADNR reviewed these cost estimates and determined that they reflected the reasonable and probable costs for closure of the Pogo Mine. ADNR does not public notice internal review documents. ADNR does not need to contract with a third party consultant to review the closure cost estimate, because we have that expertise in-house.

The Pogo RCE was prepared using the same methodology used for developing the Red Dog Mine RCE spreadsheet which was customized to reflect Pogo Mine reclamation activities. SRK Consulting prepared the Red Dog RCE spreadsheet. The Center for Science in Public Participation reviewed and accepted the Red Dog RCE. ADNR reviewed the spreadsheets for both mines and was satisfied that the Pogo RCE used the same approach before approving the Pogo RCE in 2011. The calculation methods used in this proposed Pogo RCE meets ADNR's requirements.

2. Stability Analysis for the Dry Stack Tailings Facility.

- a. ADNR should require that the Maximum Credible Earthquake (MCE) be used to determine the Peak Ground Acceleration (PGA) used for seismic safety analysis for the dry stack tailings facility (DSTF).

Response: The seismic event with a 2% probability in 50 years is mentioned in the Pogo EIS and was adopted as the Maximum Design Earthquake (MDE) for the both the drystack and the Pogo Recycle Tailings Pond (RTP) Dam. A peak ground acceleration (PGA) of 0.2g for this earthquake was determined based on a probabilistic seismic hazard analysis for the Pogo project using USGS published data. The Maximum Credible Earthquake (MCE) which is based on a deterministic seismic hazard analysis has not been defined for the Pogo project. However, the tectonic setting was reviewed for the design of the Pogo RTP Dam and the ground acceleration from the M7.9 Denali Fault temblor in 2002 was reported as 0.1g at the project site, which is

located approximately 75 miles from the epicenter of that event. As the commenter pointed out, the drystack is a permanent structure at the mine, in contrast to the dam, which is a temporary structure. However, the drystack does not impound water and is not subject to a catastrophic, life threatening failure in the event of excess deformation during an extreme seismic event, although some deformation could occur. Consequently, the MDE as defined is believed to be a reasonable and appropriate seismic standard for the drystack.

- b. ADNR should require that a rigorous analytical modeling, instead of pseudostatic analysis, be used for seismic safety analysis for the DSTF.

Response: An instrumentation plan is under development to verify and monitor design assumptions about pore water within the drystack. During the original design (AMEC, 2004), a review of liquefaction potential was conducted for the drystack and foundation. The engineer specified compaction for the drystack shell which was intended to result in dilatant behavior under seismic shaking that would not result in a build-up of pore pressure that could result in liquefaction. The general placement area was designed with zero strength to preclude the significance of liquefaction in loose, saturated tailings that could potentially occur in that portion of the drystack. The foundation area was determined to be dense and not subject to liquefaction. Using pseudo-static analytical methods, the ground acceleration at yield for the expanded drystack was determined to be 0.28g and 0.35g for a 3H:1V tailings slope and the drystack shell, respectively. Using deformation analysis methods on the 5.5 million ton configuration, a yield acceleration of 0.38g (almost twice the peak ground acceleration of 0.20g for the MDE) was determined to result in 4 inches of displacement. The seismic event that could generate the yield acceleration was not defined. No deformation was expected during the MDE for the 5.5 million ton configuration. However, a deformation analysis was not reported for the 20 million ton configuration. This may be conducted for the pending detailed stability review of the expanded drystack. The original design report indicated that up to 40 inches of deformation would not result in any negative impacts on the drystack.

3. US Fish and Wildlife Service vegetation clearing recommendations.

- a. ANDR should either require that Sumitomo Metal Mining Pogo (SMMP) accommodate USFWS recommendations for migratory bird protection, or explain in reasonable detail why accommodating this recommendation is not possible.

Response: Pogo has advised that their contractor is scheduled to begin tree clearing operations on Monday April 16, 2012 and complete tree clearing prior to April 30, 2012. In the unlikely event that the contractor is unable to harvest all standing trees by the May 1st deadline, Pogo has indicated they will employ a wildlife biologist to identify any migratory bird nesting sites ahead of tree clearing operations. The Plan of Operations Amendment Approval has been modified to include the following stipulation: "Vegetation clearing associated with the construction of the new diversion ditches should be timed to avoid disturbing nesting migratory birds (May 1 through July 15) if practicable".

Sumitomo Metal Mining Pogo LLC:

1. Under Project-Specific Stipulations, the Plan of Operations Amendment Approval should clarify that Pogo will first submit to ADNR, for its review and approval, a Study Plan for the Dry Stack Tailings Facility (DSTF) Closure Study, include a date for the submittal of the Study Plan and a reasonable time for ADNR to submit comments.

Response: The Pogo Mine Plan of Operations Amendment Approval Project Specific Stipulation regarding the Pogo Reclamation and Closure Plan has been modified to read:

1. Permittee shall complete a dry stack tailings facility closure study approved, by ADNR, to evaluate the hydrologic, geochemical and geotechnical characteristics of the facility and proposed cover design. The study should model impacts to post-closure down-gradient water quality. Pogo shall submit a draft Study Plan to ADNR within 90 days from the effective date of this Plan of Operations Amendment. ADNR will provide comments, if any, to Pogo within 30 days of receipt of the draft Study Plan. Pogo shall incorporate ADNR's comments, if any, and complete the study. A report of the DSTF study should be submitted to ADNR by the end of 2013.