

Project Name: Pebble Project EIS
Date: November 20, 2019
Time: 8:30am-5pm
Location: The Megan Room, 6591 A Street, Anchorage
Subject: Cooperating Agency Technical Meetings, Day 3
Introduction: Safety, housekeeping, opening remarks

Attendees and Affiliation:	
AECOM and subcontractors	Bill Craig, Elizabeth Bella, Dan Delaney, Sasha Forland, Nancy Darigo, Cara Wright, Lindsey Flagstad, Arika Mercer, Jim Munter, Jim Aldrich, Mark Allen, Tim White, Tara Bellion, Mike Gray
ACHP	No attendees
BSEE	John McCall
Curyung Tribal Council	No attendees
EPA	Molly Vaughan, Patty McGrath, Matt LaCroix, Barbara Butler, Betsy McCracken, Cindi Godsey, Palmer Hough, Chris Eckley, Don Clabaugh, Tim Maley, Muche Muluken, Joe Ebersole, Kate Schofield
LPB (Jade North)	Bob Loeffler
Nondalton Tribal Council (represented by NARF)	Meghan Condon
NPS	Sharon Kim, Kerensa King, Paul Berger, Kelsey Griffin
State of Alaska (SoA)	Gary Mendivil, Kate Harper, Allan Nakanishi, John Clark, Josh Brekken, Brock Tabor, Lee McKinley, Ron Benkert, Tom Barrett
USACE	Shane McCoy, Katie McCafferty, Sheila Newman, William James, Jennifer Moyer, Josh Moffi, Heather Markway, Ryan Winn
USCG	David Seris
USFWS	Douglass Cooper, Catherine Yeargan, Melissa Burns, Angela Matz
PHMSA	Robert Guisinger

Agenda/Discussion:
<p>Morning Session – Water Topics</p> <p><u>Groundwater Hydrology</u></p> <p>AECOM – introduced topic</p> <p>AECOM – introduced new groundwater model, employs USGS code, key issue is groundwater flow into pit after closure, confidence intervals now incorporated and plan to be added to all predictive components to address concern over uncertainty associated with model.</p> <p>No substantial changes to document.</p> <ul style="list-style-type: none"> Summary of Model Differences from DEIS, Set Up, Uncertainties SOC: Groundwater Hydrology – Effects of groundwater model uncertainties on EIS (row 255) Drawdown SOC: Groundwater Hydrology – Groundwater model pit capture zones (row) SOC: Groundwater Hydrology – Groundwater permanent sink (row)

Agenda/Discussion:

AECOM – addressed SOC's collectively, began by showing figure of modeled groundwater drawdown and mounding; defined zone of influence for group = area of measurable drawdown of groundwater; explained that useful resolution of model is 3 ft.

Moved to new zone of influence figure showing K (permeability) at 10 times the base case scenario.

Explained that K value is uniformly applied to bedrock and sediments as model is calibrated to recharge to system (instead of hydraulic conductivity) as key issue is maintenance of base flow to downgradient aquatic resources. Showed table of model sensitivities, highlighting variables with greatest effect on rate of groundwater extraction from open pit.

Showed new figure of particle tracking at K=10, to demonstrate the containment of groundwater at the Bulk TSF. Noted that future geotechnical work can and should be used to refine the model.

EPA – asked for an explanation of the seepage collection system

ADEC – asked for clarification on particle tracking model with respect to full containment.

AECOM – moved to figure showing generalized groundwater flow conditions for bulk TSF cross-section

ADEC – asked for clarification on the distribution of the underdrains

AECOM – directed group to project description. Discussion deferred to upcoming SOC

EPA – what is driving the differential particle size of the tailings?

AECOM – some variation in tailings particle size will result from processing, will find out more during State Permitting process for the dam; main goal in tailings management is to keep phreatic surface away from dams. Expected for finer material to fall out closer to the spigot.

NPS - Since we haven't seen the actual model yet. I was wondering under the high K scenario why there was only dramatic expansion of drawdown to the west and not the east. Is there some kind of boundary condition set on the eastern side of the model?

AECOM – explained that at the mine site to the west there is steeper terrain, thus more exaggerated groundwater flow.

ADEC – explained 'treatment works' term used in state permitting process, groundwater would be required to be contained within the treatment works – it will be key to demonstrate containment for the purposes of permitting.

AECOM – noted that figure shows groundwater flow opposed to contamination, conceded that potentially contaminated groundwater is molded to flow through fractured bedrock below the bulk TSF

EPA – expecting clarification of percent containment of groundwater in the document

ADEC – explained that their involvement is twofold – to provide technical expertise as well as to prepare the applicant for permitting — applicant would be required to develop an integrated waste management plan, within the boundary of a treatment works, water quality standards are exempt allowing the treatment works to be permitted under state solid waste regulations.

Action Item – ADEC to provide regulatory framework to cooperators.

Agenda/Discussion:

AECOM – moved to figure showing particle tracking results in groundwater under base case that shows full containment. Prediction is difficult especially when it is about the future, however this is the best representation of containment.

NPS - can the model take into account major faults, and average earthquake movement?

AECOM – yes, faults can be incorporated, however seismic activity cannot. Noted that bedrock is old and already highly fractured thus earthquakes not expected to produce much movement along existing faults and fractures. Moved to figure showing simulated open pit catchments at the end of mining. Defined capture zone as area within which groundwater would be returned to the open pit. Talked about the groundwater flow equation, specifically how hydraulic conductivity influences flow; also discussed zone of stagnation, which can be conceptualized as a subsurface groundwater divide. We do not have this exact information for Pebble. Moved to a figure showing schematic of groundwater flow for Pebble under open pit. Highlighted the need to know if groundwater return will flow through tailings returned to the open pit at the end of mining.

AECOM – asked about monitoring at the end of mining, how would containment be documented?

ADEC – explained that pit waters would be tested as well as groundwater monitoring wells.

AECOM – showed how faults and water level in the open pit, post closure change the containment scenario. Discussed the importance of maintain water levels via pumping to preserve hydraulic containment. Noted that assuming a 50 ft rise in lake level (without pumping) annually, there would be about a year window before catchment is breached.

EPA – asked how the 50 ft/yr rate of rise was estimated.

AECOM – not sure, will check but feels that estimate is reasonable

AECOM – directed group to Closure Water Management Plan, figures in 4.18, RFI 19c(?)

AECOM – explained that this information is not revised from the DEIS

- Drawdown

SOC: Water and Sediment Quality – Pit Lake Management in Closure (row 682)

BIN ask Richard Henry about SOC row 682, discussion of liners

EPA – noted that this comment has contradicting direction from USACE (i.e. no change), versus response to SOC (i.e. change proposed)

USACE – contradiction has to do with scope and also that the SOC's are designed to address multiple comments.

- Seepage

SOC: Groundwater Hydrology – Bulk TSF Filter/Transition Zone (row 250)

AECOM – felt that the SOC had been addressed.

AECOM – added that the filter transition zone design is not complete, but functional goal is to both depress the phreatic surface (aka a chimney drain) and also to prevent internal erosion that could compromise the stability of the dam.

AECOM – explained that the filter transition zone will be placed adjacent to coarse tailings.

Agenda/Discussion:

EPA – asked about the availability of material on site to construct both filter transition and core zone. See RFI 129 – applicant expects to use material extracted from the pit. See also Appendix K 4.15 for summary of dam design.

SOC: Groundwater Hydrology – Underdrains

AECOM – felt that the SOC had been addressed.

(Break 10:45am-11:00am)

USACE – in the interest of time solicited concern from group regarding groundwater

EPA – asked where to find the calibration for the root mean square for streamflow, commended the work done on new model. Explained that he is trying to forecast ambient water quality criteria, and water temperature for habitat, both are related to stream flow, so uncertainty associated with streamflow could be translated to these forecasts.

AECOM – Calibration for the root mean square for streamflow can be found in section 6.2 of BGC groundwater model report. Clarified that there are two different models for seepage, one preferred and will be used moving forward. Not modeling water quality and temperature, however, groundflow is certainly related to streamflow. Showed figure of gaining and losing streams, specifically how groundwater drawdown would affect streamflow.

ADFG – asked how drawdown would affect streams at end of mining and closure

AECOM – showed figure of modeled net change in stream baseflow as a result of drawdown during operations, noting that outputs are also available for end of mining and closure, all for various K values.

EPA – asked if figures were absolute values

AECOM – clarified that all values represent net reductions in baseflow. Moved to a figure showing gaining stream segments (as determined by field survey, suggesting groundwater baseflows), and losing stream segments (also determined by field survey). Highlighted difficulty of capturing hyporheic flow and that this is an important interaction of ground and surface water. Noted that salmon preferentially use areas of groundwater return for redds.

ADFG - Noted that downwelling areas are also important to salmon.

USFWS – do we have modeling to support identification of fish habitat?

USACE – BIN deferred discussion of fish habitat to tomorrow.

USFWS – also interested to know how groundwater modeling could be used to evaluate fish impacts.

- Liner under Bulk TSF Covered under earlier discussion

SOC: Groundwater Hydrology – Groundwater leakage from TSFs and WMPs

SOC: Proposed Action and Alternatives – Reasonable Range of Alternatives

SOC: Groundwater Hydrology – Bulk TSF Seepage Analysis

- Groundwater/surface water interaction – covered under earlier discussion

SOC: Groundwater Hydrology – GW/SW Interactions Details

SOC: Groundwater Hydrology – Stream stage effects on groundwater

SOC: Groundwater Hydrology – Liners and core zones (row 286)

see earlier discussion for row 286

Surface Water Hydrology

Agenda/Discussion:

- Watershed Model – Summary

AECOM – began with summary of surface water model. Three models are: 1. groundwater, 2. watershed (surface water), 3. mine site water balance model. Noted that an integrated model is not possible if data to calibrate the model is not available, thus the individual models are considered sufficient. Showed a figure of model domains; moved to a flow chart schematic showing relationships among the three models. Scaled precipitation is used as numerical input to groundwater and mine water balance models, groundwater flow is used as input to watershed and mine water balance models, surface water flow is used as input to groundwater and mine site. Showed figures of subwatershed and elevation band boundaries used in model, explained that precipitation and temperature were input for each elevation band; directed group to explanation in RFI 109q. Watershed model was calibrated with groundwater discharge data. Validated model with three years of baseline surface water data. Noted independence of calibration and validation datasets decreases model uncertainty and increases model accuracy/predictive power. Model run at 10, 50, 90% flow (i.e. low, mean and high flow conditions) to capture historical variability across a 78-year period.

EPA – asked if flow was generated from mean monthly flows

AECOM – Yes, monthly time step employed, r2 shows this is adequate.

Afternoon Session – Water Topics (continued)

EPA – asked if the SOC response row 566 will be incorporated to related SOC

USACE - explained that the revisions will take place in the SOC

EPA - incorporate climate change in the watershed modeling.

AECOM – climate change is discussed quantitatively with respect to historical precipitation record, not explicitly modeled

USFWS – thankful for modeling that has been done, appreciates their complexities, encourages continued evaluation of downstream effects on fish.

SOC: Surface Water Hydrology – Modeling

- Streamflow

SOC: Surface Water Hydrology – Streamflow reduction

- Mine Site Water Balance Model

SOC: Surface Water Hydrology – Water Management Plan

- SW/GW Interchange – Connection of watershed model and groundwater model

SOC: Surface Water Hydrology – SW/GW Interchange

Water Quality and Sediment Quality

AECOM – introduced topic

- Water Quality

SOC: Water and Sediment Quality – Combined PWZ + PEZ Dataset (row 654)

Agenda/Discussion:

SOC: Water and Sediment Quality – Sensitivity Analysis (row 688)

Summary of comments: was it appropriate to combine the east and west data set for geochemical characterization of the mine site? Is the dataset representative of geochemical conditions at the mine site?

AECOM – defended use of the 95% for the combined dataset, explaining that it is considered representative of geochemical data in developing water quality model source terms as these source terms are conservative inputs for water quality models; the combined dataset is more conservative than using the west dataset alone.

AECOM – returned to BIN item on row 682, what is the depth of water needed to prevent oxidization of PAG?

AECOM – confirmed that this has been addressed.

AECOM – introduced concern in row 692

AECOM – directed group to RFI 21f,g, summarized concerns that water quality model lacked sensitivity analysis, model assumptions not disclosed, and that rerunning of groundwater and watershed model should prompt rerun of water quality model with those new inputs. AECOM is waiting on data from PLP subcontractors and is in the process of addressing these concerns.

SOC: Water and Sediment Quality – Water Quality Model (row 653)

SOC: Water and Sediment Quality – Baseline Water Quality (row 657)

SOC: Water and Sediment Quality – Data and Process

SOC: Water and Sediment Quality – Sample Representativeness

AECOM - summary of comment: limitations of data quality and processes related to baseline environmental water quality were not adequately described. AECOM has added description of outlier analysis, data collection procedures, statistical measures (e.g. median, max, min and standard deviation, frequency of detection) for water quality samples, did not make changes with respect to temporal trends in data pertaining to seasonality. Cyanide sources have been updated with respect to relevant sources.

EPA – stressed the importance of acknowledging the breadth of spatial and seasonal variability as well as acknowledging that this variability is averaged for the purposes of modeling. While variability may not be important to meeting water quality standards, it is important to the understanding of impacts to the environment from unexpected events. Appreciative of the addition of the data quality assessment; requested addition of frequency of detections for elements (currently in the Appendix). Asked if low and high detects be linked to flow regimes?

AECOM – explained that we added the full range of detects, and standard deviation to disclose range of variability. Noted that the frequency of detection was added to the appendix. Level of detection has not been linked to flow regime, suggested that this was not necessary for the purposes of NEPA.

- Water Treatment Process

Agenda/Discussion:

AECOM – gave an overview of the water treatment process based on information provided in RFI 21e, received last week. RFI provides explanation on the operation of water treatment plant, also mass balances for individual treatment blocks. Effectiveness of treatment process is predicted to meet water quality standards; next step is to validate this assertion. Operational configuration is still unclear. Treatment largely follows accepted standards of practice, some innovations introduced due to scale of operation, this needs investigating. RFI 21e provides a good base document. Influent and effluent traveling through water treatment blocks. Salt is either trapped in tailings or discharged in effluent – difficult to validate this statement. Generally, need to clarify assumptions underlying treatment projections. Selenium use of a reductive model to transform selenium to a solid state and thus trapped in tailings – explained that this is very novel approach has not been demonstrated in industry, does not use industry standard of the biological approach. Voiced some concern that this could be accomplished on scale proposed. We have more information than was available for the DEIS but we need more to validate assumptions.

LPB – questioned selenium levels, what are the consequences of 5 ppb concentration in discharge.

AECOM – consequence of 5 or more ppb is that salt balance will fail, decreasing effectiveness of treatment. Further explained other options for dealing with salt balance if proposed selenium treatment is not effective.

ADEC – also had concerns with the transfer of ‘salts’ back to tailings pit – what is the potential for remobilization of these salts?

AECOM) – regarding this diffusion area issue – typically there is a more active effort to remove selenium from the system specifically because of the danger of remobilization.

USFWS – Selenium is a big deal for fish.

AECOM – agreed, selenium saturation can be significant should not be dismissed. Treatment at the mine needs to be robust. We need to validate their assumptions and challenge their propositions if we disagree.

AECOM - Asked if ADEC weights in on treatment system or more concerned with discharge meeting standards for water quality.

ADEC – would look at the proposed treatment system design with an eye towards that system meeting water quality standards.

Surface Water Quality

EPA – (row 654) had many comments on combination of east and west geotechnical datasets – had several comments on this – happy with the resolution. Otherwise response does not address original comment. Regarding datasets used to generate the predictive models, using air temperature to model ground temperature is not appropriate, not at all conservative, is dramatic and may overestimate sub surface water temperature.

Agenda/Discussion:

EPA – (row 697) water quality model presented dissolved water concentrations
AECOM – onus on user to convert to whole water concentrations
EPA row 698 – commended disclosure in document of pH as assumed and not specifically modeled, however presented as conservative due to buffering capacity of native waters, however waters presented in other sections as acidic, pH level needs better support
AECOM – explained that pH is somewhat addressed in RFI 21f, committed to addition of support in document.
EPA – wanted to make group aware of protocols for sediment sampling/monitoring developed in Puget Sound, has been applied in Alaska (e.g. Kensington Mine)
ADEC – (rows 698, 694), regarding pH, 70% of soil in project area is strongly acidic, need tighter discussion of soil pH and the relatively high pH assumed for modeling.
ADEC - (row 678) use of Nevada's NP/AP ratio 1.4 is too liberal as Alaska's environment is much wetter; (row 657) water quality should be measured in totals to totals
AECOM – NP/AP number is site specific, development addressed in RFIs 21f, 110
ADEC – state may look at a more conservative ratio for NP/AP for permitting
EPA – do we need to sort this ratio out now?
ADEC – determination of NP/AP ratio would be made in coordination with other state agencies.
AECOM – NP/AP values above 3 is considered to represent nonacid generating conditions, for values below 3 (more specifically the 1-2 range) development of a site-specific value is merited to determine potential for acid generation.
EPA – concerned about the ratio, voiced some dissatisfaction with how the value was generated, can a single site-wide value be representative of a varied system, suggests presenting information more clearly.
Action Item – present development of NP/AP site specific value more clearly in document.

Water Treatment

EPA – Action Item - Clarify that residuals from water treatment will be combined with tailings, and the potential for those residuals to be released under dam failure scenario back into the environment.
EPA – Action Item – requests follow-up meeting on water treatment, and buildup of selenium and salts after review of RFI 021e. Responses to SOC's (rows 705, 706, 708) pending review and discussion.
EPA – (row 674, 675) regarding Hg at water treatment facility. Action Item would like to see discussion of role of sulfate release in methyl mercury production in EIS. Important as fish uptake of Hg relate to both Hg presence, and activity of methylating bacteria (which is stimulated by sulfate addition).
NPS – Noted that although Hg amounts would be small, risk for methylation is elevated by presence of 176 k metric tons of sulfate. ties back to yesterdays discussion of the accumulation of toxins in the environment.

Agenda/Discussion:

Response to RFI 021e received November 11 – General updates and overview

SOC: Water and Sediment Quality – Water Treatment Plant Operations

SOC: Water and Sediment Quality – Water Treatment – Selenium/Salt Buildup

SOC: Water and Sediment Quality – Selenium

SOC: Water and Sediment Quality – Water Treatment in Closure/Post-Closure

USACE – revisited binned items.

1. Accumulation of toxins in environment, both biotic and abiotic fates – Action Item - slated for discussion among SMEs.
2. Concentrate Pipeline Water Discharge – EPA believes that the discharge is not allowable, as there is no water to comingle process water with at point of discharge. PLP claims a net precipitation loop hole, that EPA does not see as valid. As an alternative, PLP proposes to truck process water back for treatment, or build a return pipeline, depending on alternative chosen. Note, EPA has overview of Alaska Pollutant Discharge Elimination System Program (APDES) state permitting system, thus not pertinent to defer this issue to state permitting phase. Cindi noted that volume of wash water is likely too large to truck back to the mine site. Bill noted that a return pipeline for wash water is included as an option to a variant on Alternative 3. Action Item – EPA and ADEC will collaborate and provide input to inform the SOC response.
3. Steller's Eiders – assertion that impacted animals would be captured, rehabilitated and released. Angela – this is not a mitigation measure we should be relying on as successful rate of such rehabilitation is low (most often ends in mortality) – discussion was postponed until tomorrow.

BSEE – following up on question regarding compensatory mitigation requirements from yesterday – BSEE would not require compensatory mitigation. However, there is a chance that BOEM would require mitigation (avoidance and minimization), as a condition of permit approval. Explained that BOEM has responsibility over leasing and plans, whereas BSEE deals more with enforcement and inspection.

ADEC – regarding Monday's discussion of release of concentrate to flowing water – contingency needs to be developed for the point source and the downstream mixing zone (i.e. plume). ADEC SPAR would need to know contaminant levels, particle size. Action Item – acknowledge risk of spill in EIS, describe likely response to such a spill.

EPA – asked for an explanation of habitat conditioning with respect to water treatment.

AECOM – habitat conditioning typically involves the readjustment of salinity and pH and temperature of water discharged from water treatment plant. Action Item – clarify what PLP considers habitat conditioning through supplement to RFI 21e.

USACE – talked about mitigation, that there are many pathways by which mitigation may be incorporated into an EIS.

EPA – suggested that potential jurisdiction be evaluated in the EIS.

Agenda/Discussion:	
AECOM – explained difference between suggested mitigation measures (Appendix M) and voluntary mitigation (Table 5-2) that the applicant has committed to.	
Action Item – revisit potential jurisdiction and effectiveness in Table 5-2 of EIS, similar to what is done in Appendix M.	
EPA – reiterated the value of discussing mitigation as it influences agencies evaluation of impacts.	
Noted that out-of-kind compensatory mitigation does not reduce severity of impacts.	
ADEC – asked for an explanation as to how the LEDPA is determined.	
USACE – explained that avoidance and minimization is considered in determination of a LEDPA.	
USFWS – brought up worst case scenarios of dam failure, large marine spill, urged analysis of smaller, more probable spills in the spills section. Requested clear separation of probability vs consequence.	
USACE – is considering how to best deal with this issue. Worst case is not a requirement of NEPA.	
Using existing scenarios (i.e. the Lynker study) is not appropriate.	
AECOM – Action Item – ensure that we have addressed potential impacts of smaller spills where appropriate.	
EPA – brought up the example of Resolution Copper Mine (section 3.10), they used an empirical approach for dam release instead of models because they did not have the appropriate data inputs required for modeling.	
Listening session and close	

Action Items	
Topic	Actions
Groundwater Hydrology	ADEC to provide written information about their regulatory framework for large mine projects in Alaska.
Water Quality	SOC 654 and 697: Responses do not adequately address the original comment. Revisit SOC responses – may require further discussion with PLP/SRK on RFI 021f
Water Quality	SOC 698: revisit response and provide further support for assumption of Ph being a conservative approach.
Water Quality	Revisit Section 4.18 to verify that there is an adequate discussion of the relationship between soils and pH fluctuation with soil disturbance (e.g., overburden and dredging)
Water Quality	Revisit EIS discussion of how the NP/AP site-specific ratio was derived to make sure that it is clearly articulated.
Water Treatment	Clarify that residuals from water treatment will be combined with tailings, and the potential for those residuals to be released under dam failure scenario back into the environment.
Water Treatment	USACE to schedule a followup meeting/discussion with EPA and other interested cooperating agencies to discuss responses to SOC's (rows 705, 706, 708), regarding water treatment, and buildup of Selenium and salts, after review of RFI 021e. . Note: RFI 021e is now available on the project website.
Water Treatment	Consider sulfate released into system and how it would affect methyl mercury production.

Proposed Action/Alternatives	EPA and ADEC to collaborate on permitting of concentrate pipeline water discharge and concentrate container wash water (SOCs 379 and 380) and provided feedback to USACE regarding whether or not the discharge of process water would be permissible.
Proposed Action/Alternatives	SOC 380 (Concentrate Pipeline Water Discharge): AECOM to revise response to discuss option for a return pipeline; disclose issue/ disagreement in EIS; address increased truck traffic for trucking back process water if not permissible to discharge.
Spills	Section 4.27: revisit spill scenario for concentrate truck spills into flowing waters to make sure that the point source issues such as toxicity, plume, grain size, dissolution rates and potential effects are adequately addressed. Consider scale
Water Treatment	Followup RFI (021e) to PLP to request clarification of statement regarding Habitat Conditioning. Need clarification on specific habitat conditioning measures other than meeting discharge limits.
Mitigation	Revisit applicant's proposed mitigation in Table 5-2 to evaluate potential jurisdiction and effectiveness, similar to what is done for App M (Table M-1) measures. See SOC 326.
Spills	Verify that smaller more likely spills are evaluated in the EIS and that it are clearly linked in the spills section (Section 4.27)
Spills – Contaminants in System	USACE and AECOM to evaluate if contaminant loading and bioaccumulation is adequately addressed in the EIS.

Additional Notes	
Parking Lot Items:	
<ul style="list-style-type: none"> Discuss SOC Water and Sediment Quality (Row 682) with Richard Henry. Note: this was addressed later in the Day 3 meeting. Defer discussion of fish habitat simulation to Day 4 technical meeting with fish SMEs present (related to RFI 147) 	