

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
1.	General Comment	<p>The list of ARARs that the alternatives should be evaluated against should include the following.</p> <p>Safe Drinking Water Act 42 U.S.C. §§ 300f et seq. Protection of public water systems and underground sources of drinking water. These regulations are applicable to public drinking water systems and are relevant and appropriate to the provision of alternate water supplies and sources of drinking water. The regulations require that contaminant concentrations in drinking water fall below maximum contaminant levels (MCLs) and non-zero MCL goals (MCLGs). If more stringent than federal SDWA, then Alaska Drinking Water Standards are relevant and appropriate.</p> <p>National Primary Drinking Water Regulations 40 C.F.R. Part 141 Establishes health-based standards (MCLs) for public water systems.</p> <p>CWA 42 USC 402 - NPDES for any remedial alternative that disturbs more than one acre. The substantive requirements of the construction stormwater general permit likely will be applicable as well as any more stringent control requirements determined necessary for protection of human health and the environment.</p>	<p>The Safe Drinking Water Act MCLs are identified as an ARAR in Table 2-6. CWA 42 USC 402 will be added to the list of ARARs in Table 2-6 and the ARAR compliance tables in Chapter 4.</p>

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
2.	General Comment	<p>While it is recognized that the feasibility study is generally a conceptual document and it is not intended to represent a final design of alternatives, there should be some design details provided for the repository. Specifically some of the details that should be provided is an approximate dimensions of the repository, e.g. size of foot print, depth of the repository and approximate height of the waste and cover material. In Appendix B, one of the variable for the model states that the thickness of the tailings would be 44'. If this depth represent a projected thickness of the waste in the repository then it should be included in the discussion of the repository in Section 3. Also, the discussion of the design of the cover is confusing. It is not clear whether the geotextile underlies the geomembrane or not. Section 3 appears to indicate it does but Figure 3-2 indicates it overlies the geomembrane. Also, is the term "geo-fabric" used interchangeably with "geotextile" in Section 3?</p>	<p>The description for the repository will be revised to reflect the approximate dimensions. Additionally, the cover description will be revised to provide more clarity and, a global change to geotextile will be made. Figure 3-2 will be changed to show the geotextile overlying the geomembrane. A copy of the revised text and figure will be provided in advance of submitting the final FS.</p>

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
3.	General Comment	<p>It is not clear how the volume of leachate that would be generated by having a lined repository was calculated. If this volume was calculated based on the modeling in Appx B, it should be noted in the main text.</p> <p>Nor is it clear how it was determined that this leachate would be a hazardous waste requiring shipping to and disposal in the continental US. If this was based on a predicted chemical composition of the leachate based on the modeling that should be stated and explained. At this point, EPA’s position is that, when removed from the lined repository, the liquid would be subject to a waste designation and the analysis of the leachate would determine whether the leachate is hazardous waste. At that point, based on the analysis, it can be determined whether the liquid would require shipment to the continental US. Accordingly, to more accurately bind the cost of the alternatives that generate leachate, the cost estimate should include a cost that would include on-site treatment of the leachate to meet water quality standards for discharge into the creek or Kuskokwim River. Even if the leachate does designate as hazardous, the cost estimate should consider an option that includes treatment on-site vs bulk disposal in the continental US.</p>	<p>The volume of leachate generation is based upon the modeling presented in Appendix B, which is restated as such in Table 3-1. A reference to where the value originated will be added to the text.</p> <p>Based on the results of the hydrogeologic model (Appendix B), it was predicted that at the base of the repository (i.e., at the same position as the top of a liner), leachate would contain arsenic at a concentration of approximately 500 mg/L (TCLP limit: 5.0 mg/L). The predicted arsenic concentration would classify the leachate as a hazardous waste. Additional text will be added to clarify why the leachate is considered to be a hazardous waste and that the waste classification will be performed annually.</p> <p>Regarding treatment, given the remote nature of the RDM site and the volume of leachate that would be generated, it was determined establishing a treatment system would pose significant O & M issues with maintaining treatment equipment and supplies (e.g., resins). Therefore, it was determined that shipping off-site for disposal was a more reliable and certain method for the disposition of the leachate.</p>
4.	P. 1-3, Sect. 1.2.4	<p>The text discusses materials migrating into and within the Kuskokwim River. But the Kuskokwim R is not included as an area covered in the RI objective. There should some explanatory text as to why the Kuskokwim River is not included. For example, state wh7 the boundary ends at the Red Devil Creek delta.</p>	<p>Chapter 1 of the FS is an abridged summary of the RI report and presents important contaminant fate and transport processes affecting key resources, such as the Kuskokwim River. The explanatory text requested is presented in Section 2.0 on page 2-2 of the FS. No change to the text is proposed.</p>
5.	P. 1-12, Sect. 1.2.4.	<p>The first sentence of the second paragraph implies that most of the contaminants in surface water are in the dissolved form (i.e. the primary source is from leaching). Provide a citation to the field data supporting this conclusion.</p>	<p>The subject sentence will be replaced with the following text: “Leaching of inorganics from tailings/waste rock and other sources is one of the primary mechanisms of contamination of groundwater and surface water. Erosion and entrainment of particulates also is an important mechanism.”</p>

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
6.	P. 1-12, Sect. 1.2.4.	“Closely linked” implies a good correlation between MeHg concentrations and sulfate concentrations. Is this based on the R2 value associated with this correlation? Provide a reference to such an analysis in previous documents.	The subject statement is based on information presented in Section 5.6.2.4 of the final RI report. Text will be added to refer to the final RI report.
7.	P. 2-1, Sect 2, 3 rd parag.	Reference which Alaska surface water quality criterion for mercury is being used. Is it 12 ng/L or a different value? State whether the concentrations being referred to in Red Devil Creek Surface water are pre or post the 2014 removal action.	The FS will be revised to refer to final RI report Table 7-4, which summarizes RI surface water results for Red Devil Creek and the seep and comparison of surface water concentrations against water quality criteria. For example, the water quality criterion used for comparison to mercury concentration is 0.77 ug/L for aquatic life, fresh water, chronic (Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, as amended through December 12, 2008). The text will be modified to state the concentrations evaluated were from samples collected prior to the 2014 early action.
8.	P. 2-6, Table 2-3.	The Remedial Goals Table does not contain an RG for methyl mercury. But the text states that the extent of contamination of the sediments was, in part, based on the RG for methyl mercury (P. 2-13, Sect. 2.2.2, 1 st parag.) This discrepancy should be resolved and the document checked for other such discrepancies between the list of RGs in the table and the text discussing RGs.	The reference to methyl mercury (page 2-13, Section 2.2.2, 1 st paragraph) will be removed. The document will be reviewed for other such discrepancies. A copy of the revised Table 2-3 will be provided in advance of submitting the final FS.

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
9.	P. 2-7, Table 2-4	In this table the selected remedial goal for terrestrial materials is 3.92 mg/kg; while the goal for Red Devil Creek is an order of magnitude lower at 0.18 mg/kg....With such a large disparity in the concentration goals, does it seem feasible to maintain a concentration of 0.18 when newly eroding material into the creek contains a concentration of 3.92 mg/kg?	Erosion of soil containing background levels of Hg into Red Devil creek sediments is a natural and ongoing process and, as such, is consistent with site conditions prior to mine development. Although the FS has targeted the background value of 0.18 mg/kg Hg in sediment as a remedial goal (RG), ongoing migration of Hg from background soil may lead to changes in sediment concentrations that will, over time, more accurately reflect background soil Hg levels. It is not appropriate or feasible to attempt to maintain a sediment concentration in the creek that is below soil background levels. The primary objective behind the RGs is to achieve the Remedial Action Objectives (RAOs), which are to “prevent or reduce ... exposure ... to (various media) above RGs.” It is BLMs position that the strategy currently presented will fully achieve the project RAOs. A copy of the revised Table 2-4 will be provided in advance of submitting the final FS.
10.	P. 2-15, Table 2-6, ARARs.	The text notes that the Alaska Water Standards, 18 ACC-70 will be met if the contaminated water is encountered during the remedial action. This regulation should be added to the ARAR table.	This regulation will be added to the ARAR table.
11.	P. 2-28, Sect. 2.5.1.3, 2 nd parag.	It is recommended that the first sentence be rewritten to read “Surface water controls would . . . erosion processes thus reducing the transport of contaminants. However, this would not be effective . . .”	This change will be made.
12.	P. 2-28, Sect 2.5.1.3, 3 rd parag.	It is recommended the next to last sentence read, “. . . exposure to contamination and also the transport of contaminants. Thus reducing the mobility of the contaminants.”	This change to the text will be made.

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
13.	P. 2-29, Sect. 2.5.1.3, 1 st parag.	This paragraph discusses cap design for the contaminated material. A soil/rock cover and a synthetic cover are discussed, but not an evapotranspiration cover. Given the discussion during the resolution of comments it is not clear why an E/T cover isn't considered. Please explain.	An E/T cover system would be expected to require a high level of maintenance, and maintaining an E/T cover system at the remote RDM site would be problematic. Therefore it was not further considered. No change to the text is proposed.
14.	P. 2-31, Sect. 2.5.1.5.	As well as discussing a possible cover, a discussion of a liner for the repository should be included as well.	Text will be added that a repository could be lined also and will include the basic design concepts that would be involved in a bottom liner.
15.	P. 2-32, Sect. 2.5.1.6.	This section discusses the off-site disposal of contaminated material from the site. The text should include a discussion of the potential health and safety issues of the workers involved in transporting numerous barge-loads of material over such long distances.	Health and Safety concern and potential hazards are discussed in the alternative analysis. No change to the text is proposed.
16.	P. 3-1, Sect. 3	In general, many of the remediation options rely on reducing the permeability of the Red Devil Creek catchment. This reduction in permeability will have consequences on the timing and magnitude of the discharge in Red Devil Creek during stormflow periods. This change to the catchment permeability could increase erosion of the bed sediment and banks of the Creek. The hydrological impacts of the remediation options on Red Devil Creek discharge should be considered.	Backfill of the excavated areas will be obtained locally. This backfill should have a permeability similar to what is currently in place or at minimum similar to the material below waste tailing piles. Once the remedial action is complete, the hydraulic and hydrologic functionality of Red Devil Creek will be restored such that it is consistent with local geomorphology. The longitudinal gradient, appropriate bank height and restored riparian vegetation will be key features of the effort to restore Red Devil Creek. No change to the text is proposed.
17.	P. 3-4, Sect. 3.1.3.1, 3 rd bullet	Since no confirmation sampling was done following the removal action one should assume material left behind exceeds the cleanup objectives.	As stated for each of the action alternatives, addition removal for sediments not meeting the cleanup objectives will be performed. The following statement will be added to the appropriate sections for clarification: "The NTCRA was undertaken to address the active erosion of tailings/waste rock along Red Devil Creek and transport of those materials to the Kuskokwim River. No post-NTCRA sampling was performed to determine if all tailings/waste rock material in the NTCRA area was removed.

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
18.	P. 3-4, Sect. 3.1.3.1, Alternative Summary	The discussion should note the need for a field scale treatability study to determine the ratio of stabilizer to waste material. Also, there should be some text discussing how the effectiveness of the stabilization will be determined.	Reference to a field scale test is provided in the subsection “Onsite Consolidation and Solidification.” A reference to testing solidified material need to pass TCLP arsenic so as to allow the material to be placed in the repository will be added to the text.
19.	P. 3-6, Excav, 1 st parg.	At other sites EPA has found issues in using field portable XRF machines to analyze for mercury. Split samples have shown a low bias between the XRF (ppm) vs the lab (mg/kg) values with a sensitivity of about 11 ppm. Since the cleanup levels are in mg/kg then a regression equation needs to be established and used as a means of correcting (in near real time) the XRF ppm readings to mg/kg. Also, how accurate has the XRF shown to be in identifying concentrations as low as 3.9 mg/kg? Presumably it cannot be used to identify concentrations in the range of 0.18 mg/kg in the stream sediment. If correct, how does BLM propose to field screening of stream sediment?	A correlation and regression would be performed to evaluate and correct near real time for possible bias between XRF and laboratory COC concentrations. For mercury in soil/sediment present at the comparatively low concentrations of the RGs, a more sensitive mercury field analyzer such as the Lumex RA-915M Mercury Analyzer with pyrolyzer PYRO-915+ (Lumex) would be considered. The Lumex is expected to achieve detection limits near or below the proposed RGs. If the Lumex is used, a correlation and regression would also be performed as described above the XRF.
20.	P. 3-10, Repstry, 1 st full parg.	This paragraph should be reviewed for clarity and for consistency with Fig. 3-2. For example are the terms geo-fabric and geo-textile be used interchangeably and does this material overlie or underlie the geo-membrane.	See response to Comment 2.

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
21.	P.3-10, Repstry, 1 st full parg.	One of the design criteria for the cover should be that the effective permeability of the cover should be less than that of the underlying liner. The point is to ensure that the liner does not create a “bathtub” that accumulates liquids. The text should state this and this requirement should be established as an ARAR from the RCRA hazardous waste landfill design criteria.	The description of the repository for this alternative (3a) does not include a bottom liner. The intent of the repository concept is to design the cover system so it is less permeable than underlying native soils, thus eliminating the “bathtub” effect within or immediately underneath the repository. Soils data collected from borings in the SMA suggest that the native underlying soils are sufficiently permeable so that a “bathtub” effect would not occur. Regarding the RCRA hazardous waste landfill design criteria, the specific citations in RCRA addressing long term monitoring, maintenance, and cover design will be identified as relevant and appropriate requirements.
22.	P. 3-19, Trans. 1 st parg.	The text should note whether the water from the sediment on the dewatering pad is expected to require treatment or not.	A reference will be added stating that the water will undergo waste classification and be disposed of in accordance with the appropriate regulations. However, it will also be stated that it has been assumed that the water will not need treatment.
23.	P. 4-28, Sect. 4.2.4.	Alternative 3b includes capping Monofill 2 in place. Correct? If so, that should be included in the title of the alternative and discussed in the text.	On page 3-12, the Monofill #2 cover is stated as a component of Alternative 3b, and the description is referred back to Alternative 3a. No change to the text is proposed.
24.	P. 4-78, 2 nd parg.	Has the short term risk to worker involved in the transport of the contaminated material over such long distances been considered? For example, what is the fatality rate for barging material X numbers of miles?	Risks associated with spills are presented. However, worker safety has not been addressed. It is believed that work hazards would be the same as what is typically expected for this industry. The text will be modified to reflect this.
25.			
26.		Editorial Comments	
27.	P. 2-13, Sect 2.2.2, 2 nd parg.	There is a reference to Figure 2-3, but this is not included in the document. Either add the figure or delete the reference.	The reference will be deleted and the text corrected.

REVIEW COMMENTS

PROJECT: BLM Red Devil Mine

DOCUMENT: Revised Feasibility Study

DATE:

REVIEWER: R. Matthew Wilkening

PHONE: 208/378-5760

	Location (Page, par., section)	COMMENTS	Contractor Response
28.	P. 3-3, 1 st full parg.	In the middle of the paragraph the text should read “minimum of 12 inches bgs, “ not “inches bags”	The change will be made.
29.	P. 3-6, Excav. Last parg.	Include a citation to Table 2-3 after “with concentrations above RGs.	The change will be made.
30.	P. 3-7, 1 st parg.	Last sentence should read “. . . been assumed that <i>water</i> will be taken . . . “	The change will be made.
31.	P3-9, Onsite Consol & Solid. Last parg.	The last sentence should read “site wide remedial action.”	The change will be made.
32.	P 4-26, Implmt, 3 rd parg.	The first sentence should be reviewed for clarity.	The sentence will be re-written for clarity.
33.	P 4-29, Cmplnc w ARARs	The next to last sentence should be revised to read, “In short, Alternative 3b provides for compliance with ARARs.”	The change will be made.
34.	P. 4-40, Cost	There is a typo in the second sentence. It should read “. . . to be \$1,374,000, and . . .”	The change will be made.
35.	P. 3, Errata Sheet Cost	There is a typo in the first sentence. Based on Table 4-13, the capital costs is \$187,130,000 not \$188,010,000.	The table and text will be corrected.