

Marty Brewer - Comments on:  
 Red Devil Mine Feasibility Study

Comment No.	Page	Section	Comment / Recommendation	BLM Response
1.	1-3	1.2.1	Text should specify what was placed in the onsite monofills and that they were not approved of by ADEC Solid Waste.	The text will be revised to state the following: “There are three features on the Red Devil Mine site that have come to be known as Monofills 1-3. The contents of Monofills 1 and 2 are described in a report titled <i>Red Devil Mine 2002 Debris Consolidation and Disposal Project, Red Devil, Alaska</i> (March 17, 2003). The contents of what is now referred to as Monofill 3 are described in <i>Aboveground Storage Tanks /Ore Hopper Demolition and Petroleum Release Investigation, Red Devil Mine, Red Devil, Alaska</i> (June 11, 2004). In that report, the feature now referred to as Monofill 3 was called the AST Metal Disposal Area. The project administrative record contains no documentation verifying ADEC concurrence with the development of Monofills 1-3.”
2.		Table 2-5	Do the estimated depths of remedial exceedances listed for the monofills reach their total depths or below?	The estimated depths of RG exceedances for soil near the monofills generally extend below the depths of the associated monofills. The soil borings were drilled vertically outside of the footprints of the monofills. The estimated depths of exceedances of remedial goals summarized in Table 2-5 therefore apply to material located outside of the footprints of, but near the monofills. Table 2-5 will be revised in include information on the total depths drilled for each of the soil borings.
3.		Table 2-6	<p>Both state and Federal regulations are listed as ARARs, but it is unclear how they will be prioritized for site management decision making.</p> <p>Discrepancies in referencing 18 AAC 60 as Applicable or Relevant &amp; Appropriate in FS Tables.</p> <p>Alaska Solid Waste Regulations listed as ARARs:</p> <ul style="list-style-type: none"> <li>• Relevant &amp; Appropriate                             <ul style="list-style-type: none"> <li>○ 18 AAC 60.217 Separation from Groundwater</li> <li>○ 18 AAC 60.233(1) Controlling impacts outside facility boundaries</li> <li>○ 18 AAC 60.410 Location standards for monofills</li> <li>○ 18 AAC 60.007(b) Solid wastes used as fill (b) wastes that cannot be used as fill</li> <li>○ 18 AAC 60.010(a) Accumulation, storage, and treatment (a) A person may not store accumulated solid waste in a manner that causes: litter, attractive nuisance, health hazard, polluted run-off water</li> <li>○ 18 AAC 60.015 Transport</li> <li>○ 18 AAC 60.025 (b)(4) Polluted Soil</li> </ul> </li> </ul> <p>Resource Conservation and Recovery Act (RCRA) listed as ARARs:</p> <ul style="list-style-type: none"> <li>• Applicable                             <ul style="list-style-type: none"> <li>○ RCRA Hazardous Waste Management 40 CFR 260 (261?) and 42 USC 6921</li> <li>○ Criteria for Classification of Solid Waste Disposal Facilities and Practices 40</li> </ul> </li> </ul>	The manner in which ARARs inform risk management on a CERCLA site is defined in <i>CERCLA Compliance with Other Laws Manual: Interim Final</i> (EPA/540/G89/006. August 1988). In general, state regulations that are similar to Federal regulations are prioritized only where they are more stringent. The FS will be revised as appropriate to make the tables consistent with final Table 2-6, a copy of which is included with our responses for reference.

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			<p>CFR 257 and 42 USC 6944.</p> <ul style="list-style-type: none"> <li>o RCRA Hazardous Waste Management 40 CFR 257 &amp; 42 USC 6921</li> <li>o RCRA – Generator 40 CFR 262 &amp; 42 USC 6922</li> <li>o RCRA Treatment, Storage, and Disposal Facility Requirements 40 CFR 264 and 42 USC 6924;</li> <li>o RCRA Standards Applicable to Transporters of Hazardous Waste 40 CFR 263 &amp; 42 USC 6923</li> </ul> <ul style="list-style-type: none"> <li>• Relevant &amp; Appropriate <ul style="list-style-type: none"> <li>o RCRA Closure and Post Closure Requirements 40 CFR 264.110-120 as relevant and appropriate</li> </ul> </li> </ul>	
4.		Onsite Repository	<p>It is unclear how the cover on the onsite repository would provide adequate protection from water infiltration.</p> <p>The onsite repository is essentially an industrial waste monofill. ADEC Solid Waste would therefore recommend the onsite repository be lined in accordance with 18 AAC 60.485.</p> <p><b>18 AAC 60.485. Industrial solid waste.</b>  <i>(a) The requirements of this section apply to the owner or operator of a monofill that accepts industrial solid waste. (b) A new industrial solid waste landfill and a lateral expansion of an existing industrial solid waste landfill must be designed and constructed with a liner and leachate collection system that meet the standards in 18 AAC 60.330(b).</i></p>	<p>Please see BLM’s response to EPA General Comment #2.</p> <p>18 AAC 60.485 is neither applicable or relevant and appropriate.</p>
5.		Table 2-7; 2.5.1.6	<p>Please clarify that excavation and offsite removal (Alternative #4) does not reduce toxicity or volume of waste <i>to be managed</i>, but it is the only alternative that reduces toxicity and volume of waste on site.</p>	<p>The table and text will be revised per the comment.</p>
6.		3.1.3	<p>Text states that “<i>Contaminated material that has been identified as being too large to incorporate into the solidification treatment process, will be hauled and placed directly into the repository.</i>”</p> <p>How does the disposal of potentially hazardous waste directly into the repository meet Federal and State ARARs?</p>	<p>Material that is too large to undergo the solidification process would have gone through a mechanical screening process that removes the majority of the fine particulates that may cause the material to fail TCLP testing. Therefore, this material would likely not fail TCLP, and Federal and State ARARs would be met. Additionally, it has been assumed that there will be some material that is not suitable for placement in the repository, and that such material would be shipped off-site for disposal. TCLP analysis of the materials would be conducted as part of the large scale field start-up. Contingency costs for any off-site disposal will be incorporated into the cost estimate and identified in the cost estimate table in Appendix A as appropriate.</p>
7.		3.1.3	<p>A small scale treatability study has been performed, but a large scale field test would still need to be performed prior to site-wide remediation to determine effectiveness.</p> <p>What if the field test is not completely effective and some waste does have to be shipped offsite as hazardous?  A contingency plan should be developed for this event.</p>	<p>The BLM recognizes the advantages that solidification/stabilization provides for these tailings. However, the technical feasibility of onsite disposal is not contingent on successful demonstration of this treatment technology. If this alternative becomes the preferred alternative, field scale pilot testing may be necessary during remedial design in consultation with EPA and ADEC.</p>
8.		3.1.3	<p>Have any studies been conducted to demonstrate the permanence of the proposed</p>	<p>The bench scale pilot test did not evaluate the permanence of the proposed treatment</p>

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			<p>solidification/stabilization treatment for the long-term stability of contaminated tailings and soils?</p> <p>If the concrete cap has an estimated life expectancy of 25 years and cement is essentially the material used to solidify &amp; stabilize contaminated tailings and soil, then it seems that it might not be an entirely permanent treatment.</p>	<p>process. However, the solidified material would be placed in a repository that would reduce the exposure to the elements and processes that could cause degradation of the cement matrix.</p>
9.		3.1.3	<p>Why is a concrete cloth cap proposed for Monofill #2 for its ease in installation, but not considered practical for the repository due to cost and difficulty of installation?</p>	<p>A concrete cloth cap would be more difficult and costly to install over the large area of the repository (approximately 5 acres) versus the comparably small area of Monofill #2.</p>
10.		3.1.3	<p>A maximum life expectancy for the concrete cloth cap for Monofill #2 was estimated at 25 years.</p> <p>What is the maximum life expectancy of the geomembrane cover for the repository?</p>	<p>Provided the soil cover placed over the geomembrane is maintained, the geomembrane can have a life expectancy of greater than 25 years.</p>
11.		3.1.4	<p>Text from this section describes Monofill #2 contents as treated debris, but earlier text only mentions spent tailings and soils at the surface. The contents of Monofill #2 should be specified consistently throughout the document.</p>	<p>The earlier reference to Monofill #2 (in Section 3.1.3) will be revised to describe the contents of the Monofill #2 in a similar manner.</p>
12.		Table 4-1	<p>Discrepancies in referencing 18 AAC 60 as Applicable or Relevant &amp; Appropriate in FS Tables.</p> <p>Alaska Solid Waste Regulations listed as ARARs:</p> <ul style="list-style-type: none"> <li>• Applicable <ul style="list-style-type: none"> <li>○ 18 AAC 60.007(b) Solid wastes used as fill (b) wastes that cannot be used as fill</li> <li>○ 18 AAC 60.010(a) Accumulation, storage, and treatment (a) A person may not store accumulated solid waste in a manner that causes: litter, attractive nuisance, health hazard, polluted run-off water</li> <li>○ 18 AAC 60.015 Transport</li> <li>○ 18 AAC 60.025 (b)(4) Polluted Soil</li> </ul> </li> </ul>	<p>The FS tables will be reviewed and revised as appropriate to make the Chapter 4 tables consistent with Table 2-6. A copy of Table 2-6 is included with our response for reference.</p>

## REVIEW COMMENTS

**PROJECT:** Red Devil Mine  
**DATE:** 10/9/14      **REVIEWER:** Anne Marie Palmieri

**DOCUMENT:** Draft Final Feasibility Study Report, dated 9/14  
**EMAIL:** annemarie.palmieri@alaska.gov      **PHONE:** 907-766-3184

	Pg	Section	PARA	COMMENT	RESPONSE
1.	1-1	1		It would be clearer if there was discussion in the Introduction about the fact that this is an Interim FS for the soil and Red Devil Creek sediment only and there will be a final FS for the groundwater and Kuskokwim River sediment later. This information is currently provided in Section 2, but would be better suited in Section 1.	Section 1 will be revised to include a brief statement indicating that a supplemental FS will be prepared to address groundwater and Kuskokwim River sediment.
2.	1-12	1.2.4	3	It would be helpful to explain why it is important to know what proportion of the inorganic arsenic is arsenate.	The section will be revised to include a brief statement regarding fate and transport of arsenate and other forms of arsenic. The importance of arsenate in understanding arsenic fate and transport will be added to the text.
3.	1-12	1.2.5.1	1	It would be clearer to mention that both the adult and child receptor were evaluated.	The text will be revised to indicate that both adult and child receptors were evaluated.
4.	1-12	1.2.5.2		This information has been taken directly from the Risk Assessment, and is quite detailed for the purposes of the FS (especially given that the human health section is ¼ of this length). I suggest summarizing this information so that it is more appropriate for this document. Please note that in several of the bullets, it is stated that a number of contaminants were predicted to be COCs, but the names of those contaminants aren't listed.	The section will be revised to be more general.
5.	2-1	2	2	Overview – move this to Executive Summary and Section 1.	A statement similar to the Overview paragraph will be included in the Executive Summary and Section 1 to indicate that a supplemental FS will be prepared to address groundwater and Kuskokwim River sediment.
6.	2-2	2	3	2014 Early Action – move this section to Executive Summary and Section 1. It doesn't fit into 'Identification and Screening of Remedial Technologies'.	A statement similar to the 2014 Early Action paragraph will be included in the Executive Summary and Section 1.
7.	2-2	Table 2-1		Delete the <i>Kuskokwim River Sediment</i> column.	The FS will be revised to eliminate discussion of groundwater, and Kuskokwim River sediment beginning at Section 2.1 and Table 2-1.
8.	2-3	2.1	2	Last sentence, missing text: <i>specific to the are:</i>	The sentence will be revised to state: "Based on information provided in the RI Report detailing contaminant fate and transport at the site, the RAOs specific to the <i>site</i> are:
9.	2-4	Table 2-2		These values cannot be confirmed due to the lack of a final Remedial Investigation Report by which to check them. We will check them once the RI Report has been received.	The BLM acknowledges the comment.
10.	2-4	Table 2-2		The format that the cancer risks are shown in (1E-02) are different than the format used in Section 2.1, paragraph 2 (10 <sup>-5</sup> ). I suggest that the 1x10 <sup>-5</sup> format is used as this seems to be more readily understood by lay people.	The format of the cancer risks in the table will be revised to be consistent with the text.
11.	2-4	Table 2-2		Note 1: This note states that the values reference risks from the Main Processing Area. The FS also covers the Surface Mined Area. It should be clarified that the risks at the MPA are greater than the SMA which is why they are shown here.	The note will be revised per the comment.
12.	2-5	Table 2-3		Change ' <i>Petroleum Hydrocarbons</i> ' to ' <i>Diesel-Range Organics</i> '. (Also change in Table 2-4)	The tables will be revised per the comment.
13.	2-6	Table 2-3		Delete <i>Kuskokwim River Sediment</i> section, as we have previously agreed to. It is stated on page 2-2 that RGs will not be given for Kuskokwim sediments.	Please see response to comment #7.
14.	2-6	Table 2-3		Please add the cumulative risk footnote that we previously agreed to include with this table.	The table will be revised per the comment.

	<b>Pg</b>	<b>Section</b>	<b>PARA</b>	<b>COMMENT</b>	<b>RESPONSE</b>
15.	2-6	Table 2-3		Note 4: Aren't some of the background concentrations based on a 95% UPL and not the highest concentration detected?	The note will be revised as follows: "The background levels for Tailings/Waste Rock and Soil represent the higher of the values calculated for surface soil and subsurface soil."
16.	2-7	Table 2-4		<i>Red Devil Creek Sediments</i> , the Antimony RG should be 113, not 1128.	The table will be revised per the comment.
17.	2-11		5	Delete last sentence of paragraph which states, ' <i>Kuskokwim River sediment is discussed further in Section 2.2.2, below.</i> '	Please see response to comment #7.
18.	2-11	2.2.1		The preliminary baseline samples collected under the landsread area showed concentrations exceeding the RGs. This is part of the former housing area and it is possible/likely that tailings were used here to level out buildings. This area should be addressed in the FS and during the remedial action.	BLM provided ADEC with additional information on the sample results for soils beneath the landsread area and included a determination that the results represent naturally occurring metals levels.
19.	2-12	2.2.		There should be a section added which addresses the Surface Mined Area and details what will be addressed there.	A section will be added to address the Surface Mined Area.
20.	2-12	2.2.2		Delete this section as it pertains to the Kuskokwim River.	Please see response to comment #7.
21.	2-20	2.4		Delete the part of this section that pertains to the Kuskokwim River.	Please see response to comment #7.
22.	2-21	2.5	1	Delete reference to river sediment.	Please see response to comment #7.
23.	2-25	Table 2-7		Delete 'Dredging' in the last 2 rows of table as this references actions specific to the Kuskokwim River. (Also, sections 2.5.1.5 and 2.5.1.6)	Please see response to comment #7.
24.	3-3	3.1.3	Bullet 1	Define what specific ICs would be implemented and state that they will be in place in perpetuity – as long as the repository and monofill 2 exist.	Bullet 1 references back to the discussion of Alternative 2 for a description of the ICs, which states "Institutional Controls in the form of land use restrictions would be established at the site in order to restrict future human exposure by limiting activity, use and access to the property." Such ICs would remain in place for a duration determined by five-year reviews. The bullet will be changed to reflect this language.
25.	3-3	3.1.3	Bullet 2	Consistency - Previous discussions also include 'floatation tailings' in the list of materials, either add 'floatation tailings' here or remove it from Section 2.2.	The FS will be revised as follows. A statement will be added to the third paragraph of Section 2.2.1 indicating that, for the purposes of the FS, flotation tailings are subsequently grouped with tailings/waste rock. Subsequent references to "flotation tailings" in Chapter 2 will be eliminated.
26.	3-3	3.1.3	Bullet 3	Why is the explanation of Red Devil Creek different in Alt. 3 as in Alt. 4? It should be the same – the same volume of material should be excavated from the same locations and the creek should be restored.	The bullets describing excavation of Red Devil Creek sediment will be revised to be consistent between Alternatives 3 and 4.
27.	3-3	3.1.3		A CERCLA 5 year review would also be required under Alt. 3 as there would be contamination remaining above, in, and below Monofill 2, as well as in the repository.	As stated on page 3-10, "... five-year reviews will be prepared for the duration of the alternative." The text will be modified to state that 5-year reviews will be conducted until it is determined they are no longer necessary.
28.	3-5			Monofill 2 – how will the high levels of contamination under the burrito be removed with this alternative?	Any contamination that may underlie the Monofill #2 would be left in place and covered with the concrete cloth cover under Alternative 3. A new alternative 3B will be added to the FS to evaluate excavation and removal of Monofill #2.
29.	3-5			Monofill 2 – has the concrete cloth cover been tested or used in climates such as at Red Devil?	Based on conversations with material suppliers, it was determined that the concrete cloth cover can be used in cold climates. Performance specifications for the concrete cloth will be added as an appendix to the FS.

	<b>Pg</b>	<b>Section</b>	<b>PARA</b>	<b>COMMENT</b>	<b>RESPONSE</b>
30.	3-5			Monofill 2 – how will the material which failed TCLP for arsenic which is present above, around, and under the burrito be treated under this alternative.	A variation on alternative 3, that evaluates moving the contents of Monofill 2 into the onsite repository will be evaluated in the next draft of the FS.
31.	3-6			RDC Sediment Excavation, paragraph 1: The early action occurred. Revise this paragraph to be consistent with that action.	The paragraph will be revised per the comment.
32.	3-6			RDC Sediment Excavation, paragraph 2: It is unclear exactly what material in the creek will actually be removed. This section states ‘ <i>downstream of the Main Processing Area</i> ’, however there is contamination that was not addressed during the early action <b>within</b> the MPA. Also, it needs to be understood that the early action was not based on chemical DQOs, and no analytical samples were collected. Additional sediment/tailings may need to be removed in the area of the early action in order to meet the RGs.	The section will be revised to indicate that contaminated Red Devil Creek sediment that may remain the Main Processing Area following the 2014 Early Action would be excavated under this alternative.
33.	3-6			RDC Sediment Excavation, paragraph 3: Alaska Water Quality Standard regulations (18 AAC 70) require that water which is discharged to surface water or the land surface meet AWQS.	The BLM acknowledges the comment. This will be added to the text.
34.	3-8			Solidification: Where did the size determination of 2” diameter come from as a limitation for effective treatment? Provide a citation.	The 2” size estimate was developed to indicate that there would be a size limitation associated with the solidification process. During the field testing, the final size limitation would be determined. The FS text will be revised to refer to “oversize” material.
35.	3-8			Solidification: How will you ensure that the material larger than 2” diameter is not hazardous waste? All material that fails TCLP needs to be treated prior to placing it in the repository.	Material that is too large to undergo the solidification process would have gone through a mechanical screening process that removes the majority of the fine particulates that may cause the material to fail TCLP testing. Therefore, this material would likely not fail TCLP. TCLP analysis of the materials would be conducted as part of the large scale field start-up.
36.	3-8		1	Repository: Statements about concrete cloth here seem to be contradictory to those made in the Monofill 2 section where the concrete cloth is proposed for use.	Use of a concrete cloth cover for Monofill #2 would be different than for the repository. A concrete cloth cap would be more difficult and costly to install over the large area of the repository (approximately 5 acres) versus the comparably small area of Monofill #2.
37.	3-8		1	Repository: How will water that infiltrates upgradient of the repository be prevented from migrating through the repository material?	Please see BLM’s response to EPA General Comment #2.
38.	3-10		3	The last sentence states: ‘...five-year reviews will be prepared for the duration of the alternative.’ The fact that the repository is supposed to be a final remedy in place in perpetuity should be stated.	The text will be revised to state that the repository is expected to be the final remedy under this alternative.
39.	4-3	4.1.9		Add period to sentence at end of paragraph.	The typo will be corrected.
40.	4-4	4.2.2	3	The Compliance with ARARs section only addresses the action-specific ARARs. The location-specific and chemical-specific ARARs also need to be considered. Alt 2 would not comply with chemical-specific ARARs. It is confusing that there are ARARs listed in Table 4-1 which are not met (and it is stated as such), but this section says there is compliance.	The text will be revised to state that compliance with chemical-specific ARARs would not be achieved.
41.	4-6	Table 4-1	Row 1	ARAR Compliance – should be “would not <b>comply</b> ”, not “would not <b>apply</b> ”.	Under RCRA, contaminated material that is left in place is not considered a solid or hazardous waste until excavated. Under this alternative, no material would be moved. Therefore, it is not a hazardous waste and “would not apply” is appropriate.

	<b>Pg</b>	<b>Section</b>	<b>PARA</b>	<b>COMMENT</b>	<b>RESPONSE</b>
42.	4-13	Table 4-1	Row 2	Monofill 2 does not currently comply with 18 AAC 60 requirements, thus this ARAR would not be complied with.	The text in the last column will be revised to state that the regulations would not apply. Contaminated material that is left in place is not considered a solid or hazardous waste until excavated. Under this alternative Monofill 2 would not be moved. Moreover, the prior movement of contaminated material associated with the establishment of Monofill 2 within the area of contamination was not considered generation or management of hazardous waste. Therefore, 18 AAC 60 would not apply.
43.	4-14	Table 4-2		A Five-Year Review will need to be conducted every 5 years in perpetuity. For the purposes of cost estimating, this cost should be carried out for 30 years. Thus, there should be 6 Five-Year Reviews, not 1.	The costs associated with the 5-year review are incorporated into the annual O&M costs. The annual O&M cost was then adjusted for being implemented for a 30 year period. Therefore, funds necessary for performing a 5-year review every 5 years would be accrued on a yearly basis for the entire 30 year period.
44.	4-15	4.2.3		The activities that will be conducted in the Surface Mined Area should also be included in the evaluation.	The section will be revised to include discussion of the Surface Mined Area.
45.	4-15	4.2.3	1	First sentence is unclear. Also, the early action was not based on chemical DQOs, and no analytical samples were collected. Additional sediment/tailings may need to be removed in the area of the early action in order to meet the RGs.	The paragraph will be revised to indicate that Red Devil Creek sediment exceeding RGs may remain the Main Processing Area following the 2014 Early Action, and that such materials would be excavated.
46.	4-15	4.2.3	2	Last sentence – it is confusing how the cover systems would provide protection for aquatic life.	The sentence will be revised as follows: “Additionally, the cover systems for both the repository and Monofill #2 would reduce the likelihood of erosion of contaminated materials into Red Devil Creek and of animals coming into contact with such materials, thus providing environmental protection for terrestrial and aquatic life.”
47.	4-15	4.2.3	3	Compliance with ARARs – again, this section only discusses action-specific ARARs. Alt 3 does not meet location-specific or chemical-specific ARARs due to leaving monofill 2 in place. Monofill 2 does not meet 18 AAC 60 ARARs nor would leaving high levels of contaminated soil in place below the monofill meet chemical-specific ARARs. This section also needs to evaluate if ARARs are met after the action. Alt 3 does not meet ARARs.	The text correctly states that the alternative could meet all ARARs. Contaminated material that is left in place is not considered a solid or hazardous waste until excavated. Under this alternative, Monofill 2 would not be moved. Moreover, the prior movement of contaminated material associated with the establishment of Monofill 2 within the area of contamination was not considered generation or management of hazardous waste. Therefore, 18 AAC 60 would not apply.
48.	4-16	Table 4-3	Row 1	ARAR Compliance – should be “would not <b>comply</b> ”, not “would not <b>apply</b> ”.	“Would not apply” is appropriate. Under this alternative all excavation and movement of contaminated material would be within a single area of contamination, thus the handling of contaminated materials <i>in-situ</i> is not considered generation or management of solid or hazardous waste. Moreover, the prior movement of contaminated material associated with the establishment of Monofill 2 within the area of contamination was not considered generation or management of hazardous waste.
49.	4-17	Table 4-3	Row 2	ARAR Compliance – this ARAR would not be met as there would be soil/tailings exceeding the cleanup levels left untreated and in place below Monofill 2.	Compliance with these regulations would be achieved because contaminated soils overlying the monofill would be excavated and placed in the repository, a new impermeable cover with uncontaminated material would be installed, and any contaminated soils that may be under the Monofill 2 liner would also be contained within the impermeable cover, effectively engineering a redesigned repository at that location.
50.	4-23	Table 4-3	Row 3	Monofill 2 does not comply with 18 AAC 60. The actions in Alt 3 would not result in compliance.	See responses to Items 47 and 48.

	<b>Pg</b>	<b>Section</b>	<b>PARA</b>	<b>COMMENT</b>	<b>RESPONSE</b>
51.	4-24	4.2.3	1	The concrete cloth cover is only tested to last 25 years (unknown about in Alaska's climactic conditions), need to discuss this element under this criteria. Another action will have to be conducted when the cloth cover fails.	The section will be revised to address long-term effectiveness of Monofill #2. BLM will evaluate whether cap replacement costs should be incorporated into the cost estimate.
52.	4-24	4.2.3	3	This criterion is supposed to address CERCLA's statutory preference for treatment. All of the text after lines 1-4 should be deleted.	Consistent with the BLM's response to EPA's comment on this paragraph, the text will be revised to clarify that containment of non-treated materials in the repository, although not involving treatment, would nonetheless reduce the mobility of contaminants.
53.	4-24	4.2.3	4	Lines 7-8: Again, it has not been confirmed through sampling that the early action achieved the RGs. This sentence should be revised to state that all of the creek where RGs are not met will be addressed.	The paragraph will be revised to indicate that Red Devil Creek sediment exceeding RGs may remain the Main Processing Area following the 2014 Early Action, and that such materials would be excavated.
54.	4-25	4.2.3	3	Specify where the material will come from for the cover for the liner. Who owns this material? Also, add a period at the end of the sentence.	An offsite source of earthen material for the liner cover would be identified during the design phase, if necessary. The typo will be corrected.
55.	4-25	4.2.3	5	These costs are not the same as those listed in Table 4-7. Also, the Five-Year Reviews need to be added.	The text and table will be reviewed and any discrepancies will be rectified.
56.	4-26	Table 4-4		A Five-Year Review will need to be conducted every 5 years in perpetuity. For the purposes of cost estimating, this cost should be carried out for 30 years. Thus, there should be 6 Five-Year Reviews. Add to Table.	The costs associated with the 5-year review are incorporated into the annual O&M costs. The annual O&M cost was then adjusted for being implemented for a 30 year period. Therefore, funds necessary for performing a 5-year review every 5 years would be accrued on a yearly basis for the entire 30 year period.
57.	4-26	Table 4-4	O&M	It is confusing that the OM2 component in Table 4-4 is 23,100, but the OM2 cost in Appendix A is 38,100.	The text and appendix will be reviewed and any discrepancies will be rectified.
58.	4-27	4.2.4	1	First sentence is unclear. See previous comments regarding early action and RGs.	The paragraph will be revised to indicate that Red Devil Creek sediment exceeding RGs may remain the Main Processing Area following the 2014 Early Action, and that such materials would be excavated.
59.	4-27	4.2.4	2	Add period to end of last sentence.	The typo will be corrected.
60.	4-27	4.2.4	3	All ARARs (action-specific, chemical-specific, and location-specific) need to be evaluated to determine if the alternative can be conducted in accordance with ARARs as well as if all ARARs will be met after the action has been completed. ARARs need to be identified and evaluated in the FS, not in the design.	The FS has identified the ARARs and an evaluation has been performed to the extent practical for each alternative and provided in the tables. The FS is not a design document and pertinent design elements may differ from what was proposed in the FS. Therefore, ARARs need to be continuously evaluated, and the design, which proposes what is going to be implemented, will ultimately dictate ARARs and their compliance. The text will be revised to reflect how each alternative meets each group of ARARs, essentially summarizing the Chapter 4 ARAR tables.
61.	4-31	Table 4-5	Row 5	18 AAC 60 is not relevant and appropriate to Alt 4. Remove.	Agree. The text will be revised in the ARAR Compliance column to state that the regulations would not apply (i.e., since there is no landfill/repository under Alternative 4).
62.	4-32	Table 4-5	Row 3	CWA, Section 404, is not applicable. Remove.	Although a 404 permit would not be required, since there would be excavation in or near waters of the U.S. with potential for fallback of material, BLM would intend to apply standard BMPs for excavation activities commonly found in 404 permits.



	<b>Pg</b>	<b>Section</b>	<b>PARA</b>	<b>COMMENT</b>	<b>RESPONSE</b>
63.	4-34	Table 4-5	Row 6	18 AAC 60 is not applicable. Remove.	Since contaminated material would be moved off-site and thus outside the area of contamination, solid and hazardous waste would be generated and managed. Thus, certain aspects of the state's solid waste management regulations pertaining to generation and management of hazardous waste would apply, notwithstanding that the waste material would be transported out of state for disposal.
64.	4-36	4.2.4	1	This criterion is supposed to address CERCLA's statutory preference for treatment. All of the text after line 1 should be deleted.	Consistent with the BLM's response to EPA's comment on similar text pertaining to Alternative 3 (p. 4-24, Sect. 4.2.3), the text will be revised to clarify that placing non-treated materials in a secured permitted landfill, although not involving treatment, would nonetheless reduce the mobility of contaminants. The existing text regarding possible solidification prior to placement into the landfill will be retained.
65.	4-37	4.2.4	3	Cost needs to be consistent with Table 4-7.	The text and table will be reviewed and any discrepancies will be rectified.
66.	4-38	4.3.1	1	Line 4 – Alt 3 leaves Monofill 2 in place and thus provides less OP to HH&E as there is contamination in place which could mobilize, the cover will fail, etc. Revise.	The BLM will evaluate the feasibility of moving the contents of Monofill 2 into the onsite repository described in alternative 3. The potential mobility of material currently in Monofill 2, whether left in place or moved to the repository, would be reduced by installing a cap, covering the tailings that presently lie at the surface..
67.	4-39	4.3.1	1	Line 3 – 'transverse'? suggest 'traverse' or 'access'. Alt 2 does not address all eco receptors or migration of contamination.	The sentence will be revised by replacing "transverse" with "access." A sentence will be added stating that Alternative 2 does not address all ecological receptors or contaminant migration.
68.	4-39	4.3.2	1	Evaluate all ARARs, not just action-specific ones.	Please see response to comment 60.
69.	4-39	4.3.3	2	Monofill 2 is not addressed for the long-term or permanently. This component should be added to the comparison for Alt 3.	The paragraph will be revised to address Monofill #2.
70.	4-39	4.3.4	1-2	Only Alt 3 includes treatment. This section should be revised in line with previous comments.	Please see responses to comments 52 and 64.
71.				--end--	

**Alaska Department of Environmental Conservation**  
**Comments on the Draft Feasibility Study Red Devil Mine September 2014**

**Commenter: (ADEC - Wu)      Comments Developed**

Cmt. No.	Page	Section	Comment/Recommendation	Response
1.	1-13	1.2.5.1	<p><b>1.2.5.1 Human Health Risk Assessment</b></p> <p>Please list or reference where to locate other “COCs” for the reader in the following sentence, “RBCLs were also developed for the other COCs at RDM for the media of concern” as they are not listed. Also there doesn’t seem to be other RBCL developed based on Table 2-3 besides antimony, arsenic and mercury for human health as stated in the sentence.</p>	<p>The text will be revised to clarify that proposed RBCLs were developed for a number of media as part of the HHRA and BERA, and will refer to the pertinent sections of the RI report (Sections 6.4.1 and 6.4.2, respectively) for detailed information. The RBCLs identified in Table 2-3 are for tailings/waste rock and soil and sediment are limited to antimony, arsenic, and mercury (see RI report Sections 6.4.1 and 6.4.2).</p>
2.	1-13	1.2.5.2	<p><b>Terrestrial plant community</b></p> <p>Please list the seven COC or refer the reader to the appropriate report location.</p> <p>Discussion should be more focus on why the other 4 exceedances are being dismiss from a risk management perspective. These uncertainty associated with the bias high assessment should have been discussed in the RI and used in the FS from a risk management perspective for the RBCL associated with the terrestrial plant community.</p>	<p>The text will be revised to list the seven COCs identified for the terrestrial plant community (antimony, arsenic, cobalt, manganese, mercury, nickel, and vanadium), consistent with the RI report. The text also will be revised to state, as indicated in the RI report, that it appears that antimony, arsenic, and mercury are the analytes with the greatest potential to adversely affect the terrestrial plant community at the site. The RI report discusses uncertainty.</p>
3.	1-15		<p><b>Terrestrial avian invertivore</b></p> <p>For the American robin, up to five contaminants (antimony, arsenic, beryllium, lead, and thallium) were identified as COCs doesn’t reflect what is presented in table 6-64 of the RI report where only 2 metal are lists with HQ&gt;1. However no data was presented for 3 of the metals (antimony, beryllium and thallium). Please clarify why the 3 compound are also considered COC in the report (e.g. no available toxicity reference value).</p>	<p>The text will be revised to indicate the correct list of COCs for the American robin, which, as the RI indicates, is arsenic and lead.</p>
4.	1-15		<p><b>Terrestrial mammalian invertivore</b></p> <p>For the terrestrial mammalian invertivore assessment endpoint, represented by the masked shrew, nine instead of eight COCs were identified according to Table 6-65 of the RI report. .</p>	<p>The text will be revised to indicate the correct list of COCs for the masked shrew, which, as the RI indicates, is: antimony, arsenic, cadmium, copper, lead, nickel, selenium, thallium, and zinc.</p>
5.	2-1		<p><b>Red Devil Creek Surface Water</b></p> <p>There is an exceedance in the surface water pathway for ingestion from recreational/subsistence user for excess lifetime cancer risk as noted in the RI report from Table 6-29. Ecological exceedances are also noted on table 6-48 from the RI report. These exceedances for the exposure pathway should be addressed.</p> <p>Please referred to <a href="http://dec.alaska.gov/spar/csp/guidance/gw_sw.pdf">http://dec.alaska.gov/spar/csp/guidance/gw_sw.pdf</a> For point of compliance regarding seep into surface water.</p>	<p>As indicated in RI Section 6.2.5.3.2, Red Devil Creek surface water contributed to an exceedance of excess lifetime cancer risk for the recreational/subsistence user. Of the media contributing significantly to risk, surface water contributed only 4 percent of the total risk, based on the assumption that the recreational/subsistence user ingests surface water as a drinking water source while at the site. The calculated exposure point concentration for arsenic is influenced by inclusion of arsenic results for the seep samples (RD05), which are considerably higher than arsenic concentrations for ambient Red Devil Creek surface water. Similarly, for ecological</p>

Cmt. No.	Page	Section	Comment/Recommendation	Response
				<p>receptors, as indicated in RI Section 6.3.7.5, the three surface water COCs - arsenic, iron, and manganese - are not identified as COCs when the seep samples are omitted from consideration.</p> <p>Surface water conditions at the seep reflect localized groundwater conditions. As stated in FS Section 2, active remediation of tailings/waste rock in the Main Processing Area is anticipated to reduce contaminant loading to groundwater in the future. Such remediation also is expected to reduce contaminant loading to the seep water. In addition, BLM intends to further characterize the nature and extent of groundwater contamination before remedial decision-making is completed. Active remedies for groundwater (including the seep) would be most effectively evaluated following source control actions and further site characterization.</p>
6.	2-2		<p><b>Kuskokwim River Sediment</b></p> <p>“Therefore, active remedies for Kuskokwim River sediments would be most effectively evaluated following source control actions and further site characterization, and RAOs, RGs, and GRAs for these sediments are not presented in this FS.”</p> <p>The sentence contradicts what is presented in the report as clean up values are discussed in later sections. The ROA for the sediments in the Kuskokwim need to be removed from the report as it will be address after the sources removals with the groundwater.</p>	<p>The FS will be revised to eliminate discussion of Kuskokwim River sediment beginning at Section 2.1 and Table 2-1.</p>
7.	2-2	Table 2-1	<p>Methyl mercury should also be listed as a COC in the sediment.</p>	<p>Methylmercury will be added to Table 2-1 as a COC based on comparison of sediment chemical concentrations with sediment screening levels (see RI report Section 6.3.7.4). However, it will be noted that the highest methylmercury concentration in the sediment was detected at the seep (station RD05) rather than from within Red Devil Creek, and that the next highest methylmercury concentration was detected at location RD02, located near the reservoir dam, well upgradient of the Main Processing Area. Methylmercury in the remaining Red Devil Creek sediment samples was detected at concentrations one to two orders of magnitude lower. It also will be noted that a benthic macroinvertebrate survey conducted in Red Devil Creek identified no adverse impacts to abundance and diversity of benthic macroinvertebrates in Red Devil Creek compared with nearby reference creeks (see RI report Section 6.3.7.4). The site-specific survey is considered to be a more reliable assessment method and suggests no impacts to the benthic community from site-related contaminants. Potential risks to benthic macroinvertebrates also were assessed by comparing contaminant levels in benthic macroinvertebrate tissues with critical tissue concentrations. This assessment method identified methylmercury as a COC for the benthic macroinvertebrate</p>

Cmt. No.	Page	Section	Comment/Recommendation	Response
				community, with a HQ of 1.3.
8.	2-4	Table 2-2	Table 2-2 should also include the child risk as they are a more sensitive receptor base of the RI results or justification to exclude them should be provided.	Table 2-2 will be modified to hazard index values for a child receptor (see RI report Table 6-30).
9.	2-5		“For biotic exposure media to humans, RGs developed for tailings/waste rock and soil, and creek sediment are expected to remedy this exposure pathway.” The statement would only be true if the RG for the media incorporates percentage uptake into the tissue and ultimately human, which isn’t the case. Further thought is require for setting RG for sediment based on calculated human health pathways.	The RGs presented in the FS were developed as agreed to and described in Section 6.4 of the RI report. The text in the second bullet will be revised to reflect that the RGs for tailings/waste rock and soil are based on background levels and are not based on calculated risk based concentrations addressing biotic exposure media to humans.
10.	2-5	Table 2-3	The “Calculated Human Health RCBL for Future Resident (mg/kg)” needs to be footnoted as there are different scenarios for the calculation (child vs adults). If the values is a back calculation based off Table 2-2 please note. Also, comments for child and media (two prior comment above) needs to somehow be addressed in the soil and sediment RG for the future resident. While, it would not change the selected RG of background the information should be presented correctly or properly documented for transparency.	A footnote will be added to the table indicating that the RBCLs were developed using the exposure equations and parameters identified in the HHRA (RI Report Chapter 6) and back-calculating a target concentration in each individual medium, and that RBCLs for non-carcinogens were calculated based on child exposure for the resident and recreational/subsistence user since that represents the most highly potentially exposed receptor.
11.	2-5	Table 2-3	<ul style="list-style-type: none"> <li>a) Methyl mercury should be incorporated into the sediment for table 2-3.</li> <li>b) It is not understood why the calculated RCBL for future resident is different for the two sediment values for arsenic as one sediment RBCL is presented in Table 6-83 of the RI report.</li> <li>c) For transparency please provide the receptors the RCBL is based on for ecological values.</li> <li>d) For human health related RCBL cumulative risk footnote as discussed in the past should be included.</li> <li>e) For transparency and consistency with the other metals calculated RCBL for human and ecological receptors should be provided in all the columns if there are exceedance from the RI report.</li> <li>f) The Table is not consistent with what was presented in Table 2.1 where selenium was also noted as a COC in the contaminated soil.</li> <li>g) See comment 9 regarding sediment human RCBL and ensuring fish pathway is somehow incorporated and not dismissed in the sediment RG. The exposure parameters for sediment do not include potential uptake into the fish tissue. The calculated RBCL from table 6-83 of the RI report suggest fish tissue at 0.0032 mg/kg wet weight for arsenic and further thoughts on how the 130/ 190 mg/kg is protective of the pathway should be discussed for the selected RG. Can a predicted partition to water from the sediment and a bioconcentration factor for arsenic to tissue be used to assess the RG is protective.</li> </ul>	<ul style="list-style-type: none"> <li>a) Please see response to comment #7.</li> <li>b) Table 2-3 will be revised to eliminate RGs for Kuskokwim River sediment.</li> <li>c) Details regarding which receptors the ecological RBCLs are based on are presented in RI report Section 6.4.2. A footnote will be added to Table 2-3 directing the reader to the RI report for details.</li> <li>d) The table will be revised per the comment.</li> <li>e) The text will be revised to clarify that proposed RBCLs were developed for a number of media as part of the HHRA and BERA, and will refer to the pertinent sections of the RI report (Sections 6.4.1 and 6.4.2, respectively) for detailed information. The RBCLs identified in Table 2-3 are for tailings/waste rock and soil and sediment are limited to antimony, arsenic, and mercury (see RI report Sections 6.4.1 and 6.4.2).</li> <li>f) Please see response to item e) above.</li> <li>g) Please see response to comment 9 above.</li> </ul>

State of Alaska Department of Health and Social Services, Division of Public Health

Comments on the

Draft Final Feasibility Study Red Devil Mine, Alaska

1. Page 1-13 First Paragraph and Bullets: If hazards and cancer risks exceed ADEC and EPA Criteria, shouldn't they be termed "COCs" instead of "COPCs"?

*BLM Response: The use of the terms "COC" and "COPC" in the FS is consistent with their use in the RI report. "COC" will be used in the FS. Report.*

2. Page 2-3. Under 2.1 "...the site, the RAOs specific to the are:" may have a typo or missing word

*BLM Response: The sentence will be revised to state: "Based on information provided in the RI Report detailing contaminant fate and transport at the site, the RAOs specific to the site are:"*

3. Table 2-4: "Tailings/Waste Rock and Soil (Cont.)" heading is not needed in that table

*BLM Response: The table formatting will be fixed per the comment.*

4. Page 3-5: "Once installed, the concrete cloth cover lifespan is approximately 25 years, assuming minimal operation and maintenance (O&M). The cover also has the ability to withstand freeze thaw cycles." Under what conditions was this cloth tested? How was the freeze-thaw testing done? Same question for the geomembrane. Has it been tested under cold conditions that occur at the mine site?

*BLM Response: Based on conversations with material suppliers, it was determined that both the concrete cover and geomembrane can be used effectively in cold climates.*

5. Do alternatives factor in human and ecological cost of emissions from equipment and machinery?

*BLM Response: As part of the alternative evaluation process, short term effectiveness, which looks at adverse impacts, was evaluated and discussed.*

EPA Comments on the

Draft Final Feasibility Study Red Devil Mine, Alaska

Previous Comments Not Addressed:

Section 1.2.4. EPA concurred in with the response to comments that stated the FS Fate and Transport section did not need to provide all of the details present in the much longer RI. However, EPA replied it should provide useful summary statements that help describe what is known or not known about the fate and transport at the site and suggested some ways to do so.

For example, a summary statement such as: "On an annual basis, most contaminants leave RDM site via surface water transport during storm events. Leaching of dissolved phase contaminants into groundwater also occurs, but is considered to be a smaller flux compared to the surface pathway" (just an example...not suggesting this information is accurate portrayal of site contaminant dynamics). In two short sentences a lot of information could be conveyed that would help the reader understand the fate and transport of contaminants at the site. Alternatively, if the contaminant dynamics are too complex for this sort of summarization then a different sort of sentence could be written such as: "Due to the heterogeneous nature of the RDM contamination, generalizations regarding the flux mechanisms cannot be made; however two of the main site contaminants (Hg and As) have been shown to leave the site predominantly through surface water entrainment of particles during storm events". Or if such information does not exist for the site, then this would also be important to state, such as: "The relative importance of surface versus subsurface pathways of contaminant transport at the site is not known. It is not clear if most of the contamination leaves the site in the dissolved phase or associated with particles." Short summary statements such as these would be helpful to include in the FS.

The text of the final FS does not provide the type of summary information on the fate and fate and transport that was requested above. For example, there is not any information on the relative importance of the surface and groundwater transport pathways, the importance of storm events on Hg transport, or the form (i.e. dissolved vs particulate) of Hg being transported.

*BLM Response: The FS Fate and Transport section will be revised to include a brief summary statement about the important transport pathways at the site.*

P. 1-11, Sect. 1.2.4, 4<sup>th</sup> parg. The earlier comment was that the sentence "Tailings and waste rock are leachable and make up the primary source of contaminants to groundwater and surface water." implied that the mercury in the surface water is primarily from leaching and as such would be in the dissolved phase. This is the opposite of what is shown in Table 4-31 in the RI Report, where the vast majority of the mercury can often be transported in the particulate phase. EPA questioned if annual export loads from the surface water had been calculated and it has been determined that on an annual basis, the dissolved phase is actually more important than particulate transport.

After reviewing the response to the comment EPA agreed that annual loading calculations may not be critical to evaluate the feasibility of the alternatives. However without this information, EPA questioned whether statements indicating that the dissolved phase is the "primary source of contaminants" can be made because the relative importance of the dissolved versus particulate transport on an annual basis has not been measured or estimated. Because there are large difference of dissolved versus particulate bound Hg to become methylated and accumulate in aquatic/terrestrial biota; this understanding would help highlight the benefits of different remediation scenarios.

**BLM Response:** *The final RI report Fate and Transport chapter has been extensively expanded to more fully discuss the transport of mercury in groundwater and surface water at the site. The newly revised RI chapter includes detailed discussion regarding colloidal transport of mercury in groundwater and surface water. The final FS will be revised to include a brief summary of these transport mechanisms.*

The text of section 1.2.4. Contaminant Fate and Transport was not revised to indicate that mercury transport occurs as both in the dissolved and particulate phase. In addition, the text of the final draft continues to indicate that the “primary” source of Hg is in the dissolved phase, without providing any information that has shown the dissolved phase to be more important than particulate transport. This text should be revised.

**BLM Response:** *See response to comment above.*

#### General Comments:

This Feasibility Study should include an alternative that consolidates all the large areas of contamination in one on-site repository. Specifically such an alternative should include moving Monofill 2 to the on-site alternative. Currently, Alternative 3 is the on-site remedy but leaves Monofill 2 in place. Alternative 4 removes most all the contamination, including Monofill 2, to an off-site location. There should be an alternative that evaluates the consolidation of Monofill 2 with the rest of the material into the on-site repository. This reduces the foot print of contamination of the entire site and reduces the mobility of the contaminated material associated with Monofill since it would be in a better engineered structure.

**BLM Response:** *The BLM will incorporate an alternative in a new draft of the FS that evaluates the feasibility of moving the contents of Monofill 2 into the onsite repository described under alternative 3.*

In regards to the engineered repository, the design of this repository should include a bottom liner as well as a geomembrane cover. Adding a bottom liner will increase the protectiveness of any alternatives employing on-site repository by preventing downward migration of contamination should the cover be breached and also protect against migration of contaminants from lateral flow due to near surface ground water.

**BLM Response:** *The BLM will develop a new draft of the FS that includes evaluating the feasibility of adding a low permeability liner to the repository described in Alternative 3. Part of that assessment will be a hydrologic analysis of potential leachate generation resulting from introduction of natural water into the repository.*

It is difficult to estimate the additional cost of moving Monofill 2 with the Alt 3 proposal based on my preliminary review of the cost tables. A quick check of these tables showed the excavation and transportation costs of Alt 3 combined. Those costs are considerably greater than the excavation costs for Alt 4 that includes excavating the Monofill. So one can assume that transportation costs are very large for Alt 3. Right? Could those be broken out as sub-values; one for excavation and one for transportation? I’m thinking it is not that much more to excavate the Monofill vs covering it w/ concrete cloth and having to monitor just the repository vs monitoring two locations. Having the excavation and transportation costs broken out would help assess that.

**BLM Response:** *The BLM will develop a new draft of the FS that includes evaluating the feasibility of moving the contents of Monofill #2 into the repository described under Alternative 3.*

The F/S should be reviewed to insure that either all contaminated media at the site is discussed in Section 2 or just the media that is being addressed in the F/S is discussed. In this section some of the tables have just the tailing, soil and creek sediment mentioned. (Shouldn’t surface water also be included since surface water ARARs are discussed later in the report?) Then other tables and text include Kuskokwim River sediment.

**BLM Response:** *The FS will be revised to eliminate discussion of Red Devil Creek surface water, groundwater, and Kuskokwim River sediment beginning at Section 2.1 and Table 2-1.*

Has the potential for the long term collection of fines in the sediment basin downstream of the processing area to become a source of mercury methylation been considered? If so, how will this be addressed? If not, it should be since this may result in some additional long term costs for monitoring and/or possible periodic dredging.

**BLM Response:** *When sediments are removed from the sediment basin, they would be combined with tailings. Once the remedial construction has been completed, accumulation of mercury contaminated material should not be an issue under Alternatives 3 and 4 considering the volume of tailings removal that will have been completed. BLM will confirm that costs for removal of sediments from the basin on a periodic basis are included in the cost estimates.*

#### Specific Comments:

P. 2-2 Section 2, Contaminants of Concern. Were all the COCs included in calculating risks at the site?

**BLM Response:** *Yes. Calculation of risks at the site was performed as documented in the RI. A statement will be included in the revised FS acknowledging this.*

P. 2-2 Table 2-1. This table includes several media, three of which will be addressed by this F/S and Kuskokwim sediment that will not be addressed. It is recommended that only media that will be addressed by the F/S, tailings, waste rock, creek sediment and surface water be in the table or that the table include all media which would add groundwater as well as river sediment to the table.

**BLM Response:** *The table will be revised to eliminate Kuskokwim River sediment.*

P, 2-3, Sect., 2.1, 2<sup>nd</sup> parg. The text regarding excess cancer risk should use the CERCLA risk range of  $10^{-6}$  and  $10^{-4}$  and not split the difference. Is phrase for ecological risk “hazard index” of hazard quotient”?

**BLM Response:** *The RAOs presented in the FS were developed following the approach specified in the RI report for human health: “cumulative risk and hazard at the site do not exceed a target excess cancer risk of 1 in 100,000 ( $10^{-5}$ ) or an HI of 1.0.” No revision of the text.*

*For ecological risk the correct term is “hazard quotient.” The text will be revised accordingly.*

P. 2-5, Sect. 2.1, 2<sup>nd</sup> parag., 3<sup>rd</sup> bullet. The reader questions if there is a typo in this bullet. Shouldn't the greater value whether it is an ARAR or a site-specific RBCL be selected as the RG, not background?

**BLM Response:** Yes, The bullet will be revised as follows: "If either the ARAR concentration or site-specific RBCL was greater than the background level, the greater value of the ARAR or site-specific RBCL was selected as the RG."

P. 2-6, Table 2-4. It is not clear what the selected remedial goal for antimony and arsenic in the tailings is based on. Is it a background concentration?

**BLM Response:** Yes. The basis for selection of remedial goals is summarized in Table 2-3.

P. 2-10, Table 2-5. This table would be enhanced if another column was added that provided the depth of the boring. This would allow a quick comparison of the estimated depth of remedial goal with the boring depth which would inform the reader as to the "accuracy" of the estimated depth. One could have more "faith" in the depth of remediation if the depth of the boring was greater than the estimated depth of remedial goal.

**BLM Response:** Table 2-5 will be revised to include information on borehole total depths.

P. 2-13, Section 2.3, 2<sup>nd</sup> parag. Per an earlier comment, the definition of applicable or relevant and appropriate should more closely track the definitions in the NCP. The text should be revised to read; ". . . or other circumstances found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and are more stringent than federal requirements may be applicable. . . . promulgated under either federal or state laws, while not applicable to a hazardous substance address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by a state in a timely manner and are more stringent than federal requirements may be relevant and appropriated."

**BLM Response:** The definitions of "applicable requirements" and "relevant and appropriate requirements" will be revised to mirror the definitions in the NCP at 40 CFR 300.5.

P. 2-20, Sect. 2.4, last sentence. If this action will not address river sediment, why are GRAs for addressing such sediment included? If these GRAs remain in the text, it is recommended that capping be included as a GRA.

**BLM Response:** The FS will be revised to eliminate discussion of Kuskokwim River sediment beginning at Section 2.1 and Table 2-1.

P. 3-3 Sect. 3.1.3, 2<sup>nd</sup> bullet. This bullet notes that exposed delta material would be excavated. Is this distinct from Kuskokwim River sediment? 3<sup>rd</sup> Bullet – All contaminated Red Devil Creek sediment should be excavated. This could include the creek sediment in the Main Processing Area.

**BLM Response:** The "exposed Delta material" (2<sup>nd</sup> bullet) consists of the delta materials lying above the level of the Kuskokwim River, which is assumed for the FS to be at an elevation of 164 feet during low river stage. Although this material may contain sediment deposited by the Kuskokwim River at stages above 164 feet, the "exposed Delta material" is distinct from Kuskokwim River sediment.

Contaminated Red Devil Creek sediment that may remain in the Main Processing Area following the 2014 Early Action will be excavated under Alternative 3.

P. 3-4, Sect 3.1.3, Excavation. The text notes that the assumption is that groundwater encountered during the excavation will not require treatment. If there is data from the monitoring wells to support or dispute this assumption that should be stated in the text and considered in making this assumption. Since treatment of contaminated groundwater can greatly add to the cost of an action it would be good to support this assumption with as much data as is available.

**BLM Response:** Multiple factors that are not possible to accurately predict at this time would determine whether groundwater may be encountered during excavation and require treatment. Costs and supporting assumptions for treating groundwater during excavation activities will be included in the revised FS.

P. 3-5, Section 3.1.3, Monofill #2. As noted in the General Comments, an alternative to include the consolidation of the monofill with other material on-site should be developed.

**BLM Response:** Please see the BLM's response to General Comment #1.

P. 3-6, Sect. 3.1.3, Sediment Excavation. Since sampling was not performed during the removal action to determine if RAO's were met, there may still be sediment in the portion of the creek that transects the Main Processing Area. Thus that area should be included in the discussion of the sediment that needs to be excavated.

**BLM Response:** The section will be revised to indicate that contaminated Red Devil Creek sediment that may remain in the Main Processing Area following the 2014 Early Action will be excavated.

P. 3-7, Sect. 3.1.3, Sediment, 1<sup>st</sup> parag., last sentence. The text discusses the use of a temporary diversion structure for Red Devil Creek. It would be useful to provide more information about such structure. Is it anticipated to be a culvert, a pipe or? It is assumed that some type of structure was anticipated in calculating the cost of the action. That information should be provided here.

**BLM Response:** The method for redirecting flow would be selected by the contractor implementing the removal action.

P. 3-8, Sect. 3.1.3, Repository. This reviewer disagrees with the selection of a repository that does not have a bottom liner. The assumptions that several engineering controls must not fail for the life of the repository in order for the remedy to remain protective in order to not have a bottom liner included is the design seems overly optimistic. Also it would be good to reference Figure 3-2 earlier in the text to better inform the reader of design of the repository, for example provide a reference in the first paragraph.

**BLM Response:** Please see BLM's response to General Comment #2.

P. 4-4, Section 4.2.1, Compliance with ARARs. Replace the text in the first paragraph with "Because no action is being taken, this Alternative would not meet any ARARs. Since this alternative provides no controls, all current and potential site risks would remain."

**BLM Response:** The text will be revised per the comment.

P. 4-15, Sect. 4.2.3, 1<sup>st</sup> parag. This section should include text about the necessity to address the contamination in the surface mined area and the use of institution controls.

**BLM Response:** The text will be revised to address the Surface Mined Area.

P. 4-24, Sect. 4.2.3, Reduction of TMV Through Treatment. It is suggested that the third paragraph be rewritten to read, "While not treatment, moving all the contaminated material to the repository . . ." Such language recognizes that containment in a repository is not treatment but does reduce the mobility of the contamination by placing it in within an engineered repository.

**BLM Response:** *The text will be revised to clarify that containment of non-treated materials in the repository, although not involving treatment, would nonetheless reduce the mobility of contaminants.*

P. 4-27, Sect. 4.2.4, 1<sup>st</sup> parag. As noted in an earlier comment, there was no conformational sampling of the portion of Red Devil Creek that was excavated during the removal action. Thus, it is not known if RAOs were met for that reach of the creek. Thus, this area as well as the area of the creek below the Main Processing Area should be excavated until RAOs are met.

**BLM Response:** *Contaminated Red Devil Creek sediment that may remain the Main Processing Area following the 2014 Early Action will be excavated under Alternative 3.*

P. 4-37, Sect. 4.2.4, Cost. Since material above RAO's is left in place in the Surface Mined Area, annual O&M will be necessary to insure the cover remains protective. Thus there are some O&M costs associated with this remedy.

**BLM Response:** *Yes, the Surface Mined Area would be inspected as part of the repository work.*

P. 4-38, Sect. 4.3. It is recommended that some text be added to this section to effect that "Alternatives 1 and 2 are not protective of the environment and/or do not meet ARARs. Therefore they are not carried forward for evaluation."

**BLM Response:** *The text will be revised consistent with the comment.*

P. 4-38, Sect. 4.3.1. The text is not clear but it appears there is no discussion of how Alternatives 3 and 4 address the Surface Mined Area. If such discussion should be included if indeed it is absent in this section.

**BLM Response:** *The section will be revised to include discussion of how the Surface Mined Area will be addressed.*

P. 4-39, Sect. 4.3.3. While it is recommended that Alternative 2, the institutional control alternative is not included in the comparative analysis, there is a need for institutional controls to insure Alternatives 3 and 4 remain protective.

**BLM Response:** *The section will be revised to include a statement that institutional controls are necessary for the long-term protectiveness of Alternatives 3 and 4.*

#### Editorial Comments and Typos:

P. 2-5, Sect. 2.1. There is a typo here and possibly elsewhere. "RCBLs" should be "RBCLs".

**BLM Response:** *The typos will be corrected.*

P. 2-13, Section 2.2.2, 1<sup>st</sup> line. The referenced figure, Figure 2-3, is missing from my copy of the F/S. Is this a typo or is there a missing figure?

**BLM Response:** *The FS will be revised to eliminate discussion of Kuskokwim River sediment beginning at Section 2.1 and Table 2-1. Therefore, Figure 2-3 will not be necessary.*

P. 2-20, Sect 2.4, 1<sup>st</sup> parag. Should the phrase be "media-specific" instead of "medium-specific"?

**BLM Response:** *The text will be revised to "media-specific."*

### **State of Alaska Department of Law Comments on the Draft Final Feasibility Study Red Devil Mine, Alaska**

Page: 34; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:23:49 PM.

Page 2-3, Sec 2.1, paragraph 2: "area"

**BLM Response:** *The sentence will be revised as follow: "Based on information provided in the RI Report detailing contaminant fate and transport at the site, the RAOs specific to the site are:"*

Page: 37; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:24:44 PM; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:24:07 PM.

Table 2-4: I don't understand what this means ("RAO Conformity: Cleanup impracticability limits protectiveness to groundwater.")

**BLM Response:** *The FS will be revised to eliminate discussion of groundwater (and Kuskokwim River sediment) beginning at Section 2.1 and Table 2-1. The statement will be deleted.*

Page: 56; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:31:09 PM; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:30:14 PM.

Table 2-7: Not a valid reason to retain under CERCLA. If this is the only reason for retaining it, you would only have 1 alternative that meets the threshold criteria and that isn't acceptable under CERCLA. ("Retained to demonstrate high-end cost")

**BLM Response:** *The statement that the alternative is retained to demonstrate high-end costs will be deleted and replaced with a statement that the alternative is retained based on low O&M requirements.*

Page: 58; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:32:21 PM.

Page 2-27, Sec 2.5.1.1, Institutional Controls, Administrative and/or Legal Controls: How does the regulatory authority of a government entity result in land use restrictions or special permits as described here? I need examples. I get zoning but not the other two.

**BLM Response:** *The BLM employs multiple mechanisms for restricting land use. The actual mechanism used depends on multiple factors, including land use and physical conditions.*

Page: 58; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:32:53 PM.

Page 2-27, Sec 2.5.1.1, Institutional Controls, Administrative and/or Legal Controls:

Would not address eco risk

**BLM Response:** *The BLM acknowledges the comment. BLM will add that this alternative would not address ecological risk.*

Page: 59; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:33:41 PM.



Page 2-28, Sec 2.5.1.1, Institutional Controls, Public Awareness: One problem is that bc deed notices aren't property interests they are not routinely picked up in title searches. This is an administrative problem that would affect implementability

**BLM Response:** The BLM does not use deed notices, and therefore this text will be revised. The BLM employs multiple mechanisms for restricting land use. The actual mechanism used depends on multiple factors, including land use and physical conditions

Page: 59; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:34:24 PM. Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:33:45 PM.

Page 2-28, Sec 2.5.1.2, Access Controls: These are not technologies they are access controls

**BLM Response:** The sentence will be revised to refer to "access controls" rather than "technologies."

Page: 61; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:34:32 PM; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:34:57 PM.

Page 2-30, Sec 2.5.1.4, Treatment: Don't they go on to identify treatment options of the physical variety?

**BLM Response:** Yes, physical treatment methods were identified and discussed in the FS. The sentence will be deleted.

Page: 64; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:35:47 PM; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:35:12 PM.

Page 2-33, Sec 2.5.1.6, Excavation/Dredging and Offsite Disposal: See prior comment

**BLM Response:** The statement that the alternative is retained to demonstrate high-end costs will be deleted and replaced with a statement that the alternative is retained based on low O&M requirements.

Page: 74; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:36:05 PM; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:36:34 PM.

Page 3-8, Section 3.1.3, Alternative 3 – Excavation of Soils and Sediments, Solidification, Onsite Consolidation, and Capping, Onsite Consolidation and Solidification: If we don't know if it will work how can it be retained as a viable alternative?

**BLM Response:** The treatability study was performed to determine whether the RDM tailings could be treated such that it would pass TCLP analysis, which it did. The purpose of the field trial would be to further refine, improve, and/or modify the process to handle a larger volume of material. The treatability study demonstrated that the proposed process is viable, but may still need field modifications, which are to be expected, to process the design volume.

Page: 82; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:37:10 PM

Page 4-2, Section 4.1.6, Implementability: This isn't a description of the criteria, it is an analysis of the criteria under "no action"

**BLM Response:** The text will be revised to describe the criterion.

Page: 84; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:37:55 PM.

Page 4-4, Section 4.2.1 Alternative 1 – No Action, Compliance with ARARs: This is incorrect. The chemical specific ARARs are still applicable and this alternative does not meet the ARARs.

**BLM Response:** The text has been revised as suggested by EPA to read: "Because no action is being taken, this Alternative would not meet any ARARs. Since this alternative provides no controls, all current and potential site risks would remain."

Page: 84; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:38:17 PM.

Page 4-4, Section 4.2.2 Alternative 2 – Institutional and Access Controls, Compliance with ARARs: Does not meet ARARs as to eco-risk

**BLM Response:** Per comment from Anne Marie Palmieri, the text will be revised to state that compliance with chemical-specific ARARs would not be achieved.

Page: 87 Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:41:51 PM.

Page 4-7, Table 4-1, Archaeological and Historic Preservation Act of 1974, Archaeological Resources Protection Act of 1979, Native American Graves Protection and Reparation Act: What about fencing - that is ground disturbing if it's going five feet down (for the next few entries)

**BLM Response:** If resources subject to the acts were identified during excavation of fence posts the acts would impose certain procedures and responsibilities on BLM, but would not prohibit the fence construction outright. Thus, the fence could still be constructed in compliance with the acts.

Page: 89; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:42:19 PM.

Page 4-9, Table 4-1, Alaska Solid Waste Regulations: Applicable

**BLM Response:** Although the regulations are not triggered by Alternatives 2 or 4 because they do not involve the establishment of a repository or landfill, the regulations are listed as "relevant and appropriate" because under Alternative 3 a repository would be established. The regulations are not "applicable" to Alternative 3 because under that alternative all contaminated material would be excavated and managed within a single area of contamination (AOC), and thus the material would not constitute solid or hazardous waste and the repository would not meet the definition of a landfill.

Page: 99; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:42:56 PM.

Page 4-19, Table 4-3, Alaska Solid Waste Regulations: Applicable

**BLM Response:** See last response above.

Page: 104; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:43:12 PM; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:44:54 PM.

Page 4-24, Section 4.2.3 Alternative 3 – Excavation of Soils and Sediments, Solidification, Onsite Consolidation, and Capping, Reduction of Toxicity, Mobility, and Volume through Treatment: Delete. This is not THROUGH TREATMENT therefore it is not relevant to this inquiry

**BLM Response:** Consistent with the BLM's response to EPA's comment on this paragraph, the text will be revised to clarify that containment of non-treated materials in the repository, although not involving treatment, would nonetheless reduce the mobility of

contaminants. The language will be revised to reflect that reduction of mobility through treatment for a portion of the tailings (not all) will be achieved.

Page: 111; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:45:17 PM.

Page 4-31, Table 4-5, Alaska Solid Waste Regulations: Applicable

**BLM Response:** See response to comment on page 89 above.

Page: 116; Author: jacurrie; Subject: Highlight; Date: 9/22/2014 6:45:30 PM; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:45:48 PM.

Page 4-36, Section 4.2.4 Alternative 4 – Excavation of Soils and Sediments and Offsite Disposal, Reduction of Toxicity, Mobility, and Volume through Treatment: Delete. See prior comment

**BLM Response:** Consistent with the BLM's response to EPA's comment on similar text pertaining to Alternative 3 (p. 4-24, Sect. 4.2.3), the text will be revised to clarify that placing non-treated materials in a secured permitted landfill, although not involving treatment, would nonetheless reduce the mobility of contaminants. The existing text regarding possible solidification prior to placement into the landfill will be retained.

Page: 119; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:46:20 PM.

Page 4-39, Section 4.3.2 Compliance with ARARs: No. Cannot meet ARARs related to eco risk

**BLM Response:** The text will be revised to state: "While Alternative 2 could be implemented in a manner that complies with location- and action-specific ARARs, compliance with chemical-specific ARARs would not be achieved. Under Alternative 2 the tailings and contaminated soil would continue to leach metals into the groundwater and Red Devil Creek sediments."

Page: 119; Author: jacurrie; Subject: Sticky Note Date: 9/22/2014 6:46:45 PM; Author: jacurrie; Subject: Highlight; Date: 9/22/2014.

Page 4-39, Section 4.3.4 Reduction of Toxicity, Mobility, and Volume through Treatment: Delete. See prior comment

**BLM Response:** Consistent with the BLM's response to EPA's comment on similar text pertaining to Alternative 3 (p. 4-24, Sect. 4.2.3), the text will be revised to clarify that placing non-treated materials in a repository or a secured permitted landfill, although not involving treatment, would nonetheless reduce the mobility of contaminants. The existing text regarding possible will be retained.

**ADDITIONAL COMMENT AND RESPONSE:** The commentor submitted a list of additional proposed State ARARs to be added to the FS. BLM's response to this comment is reflected in the attached table listing the ARARs determined to be appropriate for the FS.