EPA Comments on the
Draft Final Remedial Investigation Report, Red Devil Mine, Alaska

General Comments:

1. Throughout the report, the use of EPA Method 9200.1-86 for determining the bioavailability of arsenic is noted, for example see Section 6 and Section 7. The text does state that this method is an in vitro bioavailability assay for lead in soil. But the text should also state that this method has not been approved by EPA for determining the bioavailability of arsenic. Such a statement should accompany any discussion of arsenic bioavailability results using this method throughout the report.

Response: The text will be modified to state the method is not an approved EPA method.

2. EPA is not in agreement with the discussion of background concentrations of inorganic compounds. The text states that the calculated values for background metals underestimate background concentrations of inorganics. The report, **Mercury in the Terrestrial Environment, Kuskokwim Mountains Region, Southwestern Alaska** By Elizabeth **A.** Bailey and John E. Gray, states that background concentration for mercury in the general area, which is the mercury producing area of Alaska, is 1.2 mg/kg which corresponds well with the calculated background value of 1.86 mg/kg for the Red Devil Mine. Also, a majority of the samples that were collected in 2012 from within the boundary of the mine to represent background are within this range. Further discussion with the Agencies on the issue of background concentrations and the implications of the background is recommended.

Response: The calculated background values presented in Chapter 4 are being used in the Feasibility Study to estimate extent and depth of soil contamination. BLM believes that the calculated soil background values presented in the Draft Final RI underestimate naturally mineralized soil concentrations for part of the RDM subject to remediation.

The final summary paragraph of the discussion of natural mineralization in Section 4.1.7 specifically states that the underestimation "is associated with natural mineralization that exists at part of the RDM that is likely subject to remediation" (emphasis added). The preceding discussion provides a detailed summary of available information on the nature of natural mineralization as well as information on the extent of such natural localized mineralization that is peripheral to the ore zones. Unfortunately, for reasons detailed in Section 4.1.7, it is not possible with available data to determine the ranges of inorganics concentrations or the extent of such naturally mineralized soils in part of the RDM because of mining-related disturbance. Therefore, BLM considers the calculated background concentrations, "particularly those for subsurface soil" (as stated in the summary paragraph of Section 4.1.7) to be conservative for at least part of the RDM, particularly for parts of the Main Processing Area and the area downstream. Subsequent references to such underestimation of inorganics concentrations in Chapters 4 and 6, although not as detailed, refer to the discussion in Section 4.1.7.

BLM will revise Section 4.1.7 to more clearly describe available information regarding natural mineralization at the RDM, including both area-wide enrichment that is apparent in the existing background samples, and the more localized mineralization peripheral to the ore zones.

3. When discussing the methylmercury concentrations it would be helpful to provide information on the percent methylmercury (methy/total ratio). This provides information on the methylation potential of different areas and helps in understanding the relative amount of inorganic Hg that is biologically available to the bacteria for methylation.

Response: The stretch of Red Devil Creek that flows through the mine area is a relatively high gradient stream and conditions are generally not conducive to methylation. No change to report.

4. The inclusion of irrelevant topographical features (e.g. surface photography of forests) makes the maps difficult to read. The maps should be redone without topo features when topo features don't provide relevant information. Also the Chapter 4 maps presenting contamination would be more informative if some color scheme was used to allow visualization of concentration gradients. Tables of concentrations associated with individual sampling locations are not helpful.

Response: The base maps used in the report are the most up-to-date aerial images of the site that are available (taken in 2010). It is not possible to modify the images to remove vegetative cover. Chapter 4 soil results figures will be revised to incorporate a color coding system to represent concentration ranges. .

<u>Specific Comments:</u>

1. P. 2, Executive Summary. The 6th bullet states that "Sediment sampling in the Kuskokwim River to determine the nature and extent of contamination that has migrated offsite into the river." While the reviewer agrees with sampling the Kuskokwim River sediment, this information does not allow for the determination of the "extent of contamination that has migrated offsite into the river." For example, mercury in the dissolved phase or associate with particles that can be entrained by the flow of the river would not be expected to deposit locally in the river. Therefore, information from the sediments is not an accurate measure of the extent of Hg that migrated offsite. Sediment measurements simply are a measure of the extent of Hg that migrated off site that was deposited locally; but not the full extent of Hg that migrated offsite.

Response: BLM agrees that dissolved phase or adsorbed contaminants have likely migrated offsite; however, the most effective method to characterize off-site migration in the Kuskokwim River was to sample bed load sediments. No change to report.

2. P. 1-4, Section 1.4. A map that shows the relative location of Red Devil Mine to the villages of Red Devil and Sleetmute at a greater resolution spatial scale than that of Fig. 1-1 should be included.

Response: An inset will be added to Figure 1-1 showing these locations.

3. P. 1-4, Section 1.4.2.1. The description of mining operations should include definition of mining terms to enhance clarity for readers without a background in mining.

Response: A list of mining terms will be added to the front matter of the report.

4. P. 1-17, Section 1.4.3.3. It is not clear if there is chemistry for spring water entering Red Devil Creek. If such data exists provide a reference to it either here or in the surface water discussion in Section 2.

Response: This information is presented in Section 4.5 and Table 4-31. A reference to these locations will be added to the report.

5. P. 1-18, 1.4.3.3 Hydrology: Are the analytical results for the drinking water well at the McCally Creek cabin available? If not can this well and the Red Devil Village wells be sampled by BLM to assist in developing background concentrations for the mine?

Response: The analytical results of the domestic well sample are not available. BLM has tried on two occasions to obtain the results. No change to report.

6. P. 1-20, Section1.4.4, 1st parg. Page 1-20. The text states “The upstream sample contained 1.7 µg/L mercury and 56 µg/L arsenic, and the downstream sample contained 1.0 µg/L mercury and 32 µg/L arsenic (EPA 1971).” There have been vast improvements in measuring Hg concentrations in water since the 1970s. It seems suspect that the upstream (or downstream) concentrations of Hg in the Kuskokwim were in the µg/L range. Before reporting values, did E&E look at the analytical approach and detection limits and determine that indeed these values from 1971 were valid, because at face value, these concentrations are surprisingly high. Looking at the April 21st 1971 document in the reference section, does not provide any information on the analytical approach or detection limits, but it does mention that values from the Kuskokwim River were “less than 1 microgram per liter”. Presumably 1 µg/L was their detection limit. Therefore the reporting of a concentration measured of 1.0 µg/L may not be correct. The value of 1.7 µg/L was from the 1979 EPA document (referencing the 1971 study) seems to contradict the <1 µg/L statement in the earlier memo.

Response: This section presents historical sampling information as reported in the original reports. Please refer to the final RI/FS Work Plan, Section 3.4 for an assessment of the usability of historical site data. No change to report.

7. P. 1-20, Section 1.4.4, 2nd parg. Like the previous comment on the 1971 study, this reviewer has a similar comment regarding concentrations reported in the 1979 study. These concentrations seem suspiciously high.

Response: See response to comment 6 above. No change to report.

8. P. 1-26, Section 1.4.4. The background levels referred to in HLA/Wilder 1999 as well as the details of background characterization should be provided. Is the data useful for incorporation into the background discussion later in the report?

Response: The 1999 soil background characterization consisted of a single surface soil sample analyzed for inorganic elements. While the samples from this investigation were deemed useable for RI purposes in the final RI/FS Work Plan, subsequent RI investigations indicate the 1999 background sample was collected in area of disturbed soils from mining activity. No change to report.

9. P. 1-27, Section 1.4.4. The background levels referred to in paragraph 2 as well as the details of background characterization should be provided. Is the data useful for incorporation into the background discussion later in the report?

Response: Text will be revised to clarify the background levels referenced in this section are referring to the background sample results from the 1999 Limited Waste Removal Action.

10. P. 1-28, Section 1.4.4 Table 1-6. The soil and plant concentration ranges are very broad. It would be useful to see a more graphic presentation of the relationship between soil and plant tissue concentrations on a synoptic basis.

Response: .Plant uptake of soil contaminants is complex and is affected by soil conditions, plant species, and contaminant state. Graphic representation of the relationship between soil and plant tissue concentrations would likely over-simplify the relationship. No change to report.

11. P. 1-32, Section 1.4.5.2. Please provide the offsite location for the demolition debris.

Response: The material was disposed of in Anchorage; the receiving facility was not specified in the original report. No change to report.

12. P. 1-36, Section 1.5, Nature and Extent of Contamination. The fourth bullet states “Is mercury present in organic forms at the site?” The only organic form of Hg that was analyzed for was mono-methylmercury (i.e. di-methylmercury was not analyzed). Suggest changing “organic forms” to just “an organic form”.

Response: The suggested text modification will be made.

13. P. 2-2, Section 2.1. How was the bioaccumulation of metals addressed in the data objectives?

Response: The objective listed here is for bioavailability, not bioaccumulation. No change to report.

14. P. 2-2, Section 2.1.1. How was the accuracy of the XRF for Hg concentrations determined? Was there a comparison between laboratory analysis and XRF analysis for any of the samples? Some previous studies have shown that the XRF cannot give very reliable results for Hg, but this

may be dependent on mineralogy, etc. This document should provide sufficient information to allow the reader to have confidence in the validity of the XRF approach if it was being used to determine Hg concentrations.

Response: A correlation analysis of XRF data to laboratory data was provided in the 2010 LSE Report. This will be added to the text.

15. P. 2-31, Section 2.3, last parg. The impacts of monofill material contaminants, such as elemental mercury, down gradient of the monofills should be included in the bullets in this paragraph.

Response: A bullet addressing this objective will be added.

16. P. 2-40, Section 2.5. Provide the basis for the sampling depth of 3 inches. Changes in the flow of the creek could cause disturbance of sediments at a depth greater than 3”.

Response: The sampling depth was approved by EPA and ADEC in the final RI/FS Work Plan. The sample depth is appropriate to represent exposure media for benthic invertebrates. The creek is underlain by many feet of tailings/waste rock material; therefore sediment characteristics and contaminant concentrations are expected to be very similar at greater depths. No change to report.

17. P. 2-43, Section 2.5.3. The depth of sampled sediment should be noted in the report.

Response: The depth of sediment samples will be specified in the report.

18. P. 2-46, Section 2.6 4th parg. The discussion of vegetation sampling locations should be expanded to include considerations of contaminant concentrations. Figure 2-12 should include the major site features.

Response: Vegetation sample locations were largely driven by the presence of the target species. In paragraph 4 of Section 2.6, the report states that the vegetation samples were collocated with surface soil samples. The major site features are shown on Figure 2-12. No change to report.

19. P. 3-22, Section 3.3.1, Table 3-2. Because the monitoring locations names do not follow sequentially from upstream to downstream, it’s not clear from this table how the data is organized. It would help in the interpretation of the data in the table if a statement is included that each row is organized from upstream to downstream locations.

Response: The stations are listed sequentially from upstream to downstream in this table. Refer to Figure 2-8. This will be added to the title of the table.

20. P. 3-22 Section 3.3.1, 3rd parg. The text states “The May 2012 discharge was measured a short time after the beginning of breakup thus and likely approximates high flow conditions for the creek.” The amount of contaminants mobilized in stream water can be heavily dependent on flow conditions. Very limited temporal flow data is presented in Table 3-2—measurements were

conducted only at 3 dates. From this information it is not clear what happens to creek flows in response to rainfall runoff and/or how representative the spring snowmelt data from May 2012 is. Was this a year with a large snowpack? How do we know that the conditions measured approximate high flow? Might high flow occurred weeks before or after the sampling? The lack of hydrological information greatly reduces the ability to interpret the chemical measurements from the stream because they cannot be placed in the overall hydrological context. Additional discussion should be added to include the exact number of antecedent dry days before each discharge measurement, the amount of precipitation last received, and more information on the snowmelt conditions in May 2012, if possible. Such information would be helpful to identify how representative these conditions are.

Response: Additional information will be added to the report regarding snowpack conditions prior to the Spring 2012 monitoring event, and the breakup conditions observed immediately before the Spring 2012 monitoring event. There are insufficient temporal data/observations to make conclusive statements about the effect of individual precipitation events on groundwater elevations and flow.

21. P. 4-3, Section 4.1. Were EPCs computed using all site values, or only those in excess of “background?” Risks should be computed using all site data followed by identifying background and site related risks. Were background values set to the method detection limit used for any purpose in the analysis? Provide more detail on the ADEC 2008a guidance used to determine how NDs are treated.

Response: No compounds were eliminated based on comparison to background concentrations. All site samples were included in the HHRA exposure point concentration (EPC) calculations. Background risks were also calculated as a comparison to site related risk, as referenced in the comment. Background values were not set at method detection limits in this analysis. Non-detected values were treated consistent with ProUCL recommendations. EPA (2010) recommends avoiding the use of the one-half detection limit method to compute the summary statistics and various other limits (e.g., UCL, UPL) often used to estimate the EPC terms and BTVs. Kaplan-Meier (KM) and Regression on Order Statistics (ROS) methods available through ProUCL were used when non-detect results were present. This treatment of NDs will be discussed in more detail in this section. This approach is consistent with ADEC recommendation (2008) to use EPA sponsored software application and the ProUCL recommended method of evaluating NDs.

22. P. 4-3, Section 4.1.1. Provide a figure(s) or cite the appropriate figure(s) that provides the location of all background samples including soil, groundwater etc. Provide a discussion for the use of UPL as the basis for background and not the 95% UCL.

Response: An upper confidence limit with a 95% confidence limit (95% UCL) of the mean represents an estimate of the population mean (measure of the central tendency of a data distribution), whereas a upper prediction limit (UPL) represents estimates of a threshold value in the upper tail of the data distribution. UCLs of means are typically computed based upon the site data set and UPLs and UTLs are computed based upon background data sets (EPA 2010). Based on this, 95% UCL is not an appropriate background statistic and ProUCL does not *calculated 95% UCL values for background data sets because of this. The upper prediction limit (UPL) was used as the background value, consistent with the recommendations of the EPA Technical Guide (EPA 2010). Sampling location figures in Chapter 2 will be updated to more clearly identify which samples represent background. These revised figures will be referenced in Chapter 4.*

23. P. 4-3, Section 4.1.1, 2nd parg. If 6.6 mg/kg is considered an outlier, then there should be some mention of the 6.4 mg/kg, which also seems like it might be an outlier. In reviewing Table 4-2, it appears that the value of 6.4 was also removed from the dataset since the max reported concentration was 1.86 mg/kg.

Response: Q-Q plots were used to determine potential outliers. The Q-Q plot for mercury showed two potential outliers, 6.6 mg/kg and 6.4 mg/kg. If these two data points were removed, the data set would show non-parametric distribution. The applicable ProUCL outlier test, the Dixon test for sample size less than 25, assumes normal distribution. Although the data shows non-parameteric distribution, the Dixon test did support identification of these two data points as outliers. Although there is limitation to the outlier tests available through ProUCL, the Q-Q plots provide enough justification to eliminate these two samples from the background data set. This is a health protective approach, since both potential outliers were on the high end of the distributed data. These two samples were removed from the background dataset based on the Q-Q plots and distribution of the sample results. Further information on the use of Q-Q plots and the limitations of the outlier tests available in ProUCL will be provided in this section.

24. P. 4-5, Section 4.1.5. An outlier analysis assumes that the underlying distribution is known. Be more specific as to how outliers were identified.

Response: Q-Q Plots and classical outlier tests (Dixon Test and Rosner Test), as available through ProUCL were used to identify potential outliers. For all compounds, Q-Q plots were used to identify potential outliers. The Dixon test was used to confirm the potential outliers. The Dixon test, and all outlier tests available through ProUCL, assumes normal distribution of the data set. Many of the compounds in the background data set for which statistics were used to determine a background threshold level did show normal distribution. In some instances, this assumption was not met. Although using the Dixon test to confirm the presence of outliers when the data set is not normally distributed does add a level of uncertainty, this most often occurred for compounds that are naturally occurring or not a risk-driver at the site. Further information on the use of Q-Q plots and the limitations of the outlier tests available in ProUCL will be provided in this section.

25. P. 4-7, Section 4.1.7, “Mineralized Zone”. The text states that “Historical site information indicates that naturally mineralized Kuskokwim group bedrock and soils derived from it occurred locally at the surface prior to mine development.” This statement needs further justification/citation. While there are early reports that cinnabar was observed at the incised valley of Red Devil Creek—this does not provide any evidence that there was any cinnabar present at the surfaces that were not eroded by the stream. The text mentions that “stopes approach the surface” but it’s not clear if “approach” means a foot or 10’s of feet, etc.

Response: This section will be revised to more clearly present available historical and RI information regarding occurrence of naturally mineralized soils in proximity to the ore zones.

26. P. 4-8, Section 4.1.7. The explanation of what criteria were not met and why this data is not considered is vague and should be described in more detail. While Appendix E provides more data, it does not have a summary describing what criteria were not met.

Response: A brief summary of why the criteria were not met will be provided.

27. P. 4-9, Section 4.1.7, 1st parg. The text states "As such, the background levels presented in this section, particularly those for subsurface soil, are considered to be conservative and likely underestimate pre-mining background concentrations of inorganic elements associated with natural mineralization that exists at part of the RDM that is likely subject to remediation." The values selected to represent background Hg concentrations are certainly geologically enriched (and/or contaminated). The values used are all >1 mg/kg, which on a global level is generally considered significantly "enriched". Furthermore, the fact that some of the background levels selected from the upland area are single values that are approximately an order of magnitude higher than other values measured in the area, suggests that these estimates may not be "conservative" and may in fact be representative of undisturbed mineralized soil.

Response: The text will be revised to more clearly differentiate between area-wide enrichment and the more localized mineralization that exists peripheral to the ore zones.

28. P. 4-24, Section 4.5. The data presented in Table 4-31 would be easier to interpret if instead of just giving sample numbers, that the measurements were contextualized with being either spring/high flow; summer base flow, etc. The season/flow characteristics would also help in the interpretation of the Figures 4-23 to 4-34. These figures present Hg data from wells that are unfiltered and filtered. Often the filtered values are several orders of magnitude lower than the unfiltered phase. This could be interpreted that the vast majority of Hg in groundwater is bound to particles. But given that flow is low and matrix is groundwater it doesn't seem likely that particulate bound Hg would be transported via groundwater. Is it possible that these high values in unfiltered water are an artifact of soil falling into the well? In general, one would expect that whole and filtered groundwater samples would be similar since almost all Hg in groundwater would be dissolved. But this is the exact opposite of what is shown in the figure. This should be discussed in the text.

Response: Information on sample collection dates will be added to Chapter 4 tables summarizing surface water and groundwater results.

Possible explanations for the differences between total and dissolved mercury concentrations will be evaluated and presented as appropriate.

29. P. 4-32, Table 4-2. The Hg concentrations in the background soil vary by over an order of magnitude—0.13 to 1.86 mg/kg. This high degree of heterogeneity suggests either that some of the soils were naturally geologically enriched or were contaminated. It is interesting that samples 16 and 17, which were only ~ 25m away, were so much lower (0.14 and 0.25 mg/kg). Is there

other ancillary data available that can help identify that there is a shift in soil type in this area (between 16/17 and 18/19). This is mentioned briefly on page 4-7, but should also be mentioned here.
The inclusion of data from other naturally geologically enriched areas (in Alaska or elsewhere) would be useful to help contextualize whether these values that are > 1mg/kg are reasonable to see on the surface soil--even in a geologically enriched area.

Response: BLM will evaluate lithological, topographic, and other information associated with the background samples for possible explanations for the range of mercury concentrations. Pertinent results of the evaluation will be presented.

BLM believes that information regarding other areas in Alaska and elsewhere that are naturally enriched could be useful for understanding area-wide enrichment of inorganics such as appears in the selected background areas. Available information regarding such area-wide enrichment will be provided to provide context for such enrichment at the RDM. In addition, available information regarding geologic heterogeneity and localization of mineralization will be presented in order to provide context for the more localized mineralization that exists peripheral to the ore zones at Red Devil.

30. P. 4-33, Table 4-3. Again, the range of Hg concentrations for the background seems highly variable….6 of the 7 values reported in the Table are <0.5 mg/kg with only one value of 3.92 mg/kg. Because this one value is so much higher, to define the background level as 3.92 mg/kg seems to be an overestimation. These results, along with the surface data, suggest that the majority of the background soil concentrations are relatively low (<1 mg/kg), but that there are a few spatially isolated areas of much higher concentrations (i.e. 3.92 mg/kg etc). This situation makes it complicated to determine what to consider “background”; since it appears that background can be up to 3.92 mg/kg; but is typically <0.5 mg/kg….spatially the majority of the natural background surface area would be in the <0.5 mg/kg range. In such a situation, it’s not clear what should be considered representative of background; therefore, there should be more discussion in the text of the spatial variability and justification of using the maximum values for representing background. That the background groundwater concentrations are relatively low (~1 ng/L) and are in the typical range of areas that are not Hg enriched, further supports the idea that majority of the background area has low Hg concentrations; and that the few high values detected are spatially anomalous. While an argument could be made that those isolated areas of elevated concentrations were more representative of what had existed at the mine site prior to exploration, this case would need to be made/justified in the text. This topic is discussed to some extent in section 4.1.7, but should be specifically mentioned with regard to the surface and subsurface soil measurements.

Response: Available information describing geological conditions in the area, including heterogeneity of mineralization, will be presented to assist with interpretation of the variability of background sample results.

31. P. 5-9, Section 5.1.5.1, Contaminant Loading. The loads in August are more likely representative of lower end base flow conditions. The loads from the sampling in May 2012

should also be presented to help contextualize the Hg loading under low flow and higher flow conditions.

Response: Stream discharge and contaminant concentration data for the May 2012 baseline monitoring are presented in Appendix A. Appendix A will be revised to include contaminant loading calculations for the May and September 2012 baseline monitoring.

32. P. 5-9, Section 5.1.5.1, Antimony, Arsenic, Mercury and Methylmercury. Is Hg bound to organic carbon or is the Hg bound to thiol groups on organic matter (which results in a good correlation between organic carbon and Hg, but does not indicate that Hg is bound to carbon)? This reviewer has a similar question with the discussion of sediment in the creek on page 5-11.

Also, in many natural streams during non-storm flow conditions Hg is transported bound to dissolved organic matter (<0.45 micron filters). It seems that the Hg associated with particles >0.45 micron may have less organic content. Is there any data available to support the statements regarding the Hg binding; either from this study or others?

Response: Pertinent information regarding binding of mercury will be presented, as available.

33. P. 5-10, Section 5.1.5.1, 1st parg. The text states "Red Devil Creek RI surface water samples, methylmercury concentrations are generally positively correlated with both total and dissolved mercury concentrations and with sulfate concentrations in all surface water samples collected during the RI." The regressions between total and dissolved Hg and sulfate with methylmercury should be calculated. Such a figure(s) should be added to the report and/or more information on the correlation provided.

Since methylation results from sulfate reducing bacteria activity, it may make more sense to see a negative correlation between methylmercury and sulfate (indicating the presence of sulfate reduction).

Response: Information regarding the relationship between concentrations of total and dissolved mercury, methylmercury, and sulfate will be provided.

34. P. 5-10, Section 5.1.5.1, 1st parg. Include a plot of sulfate and methyl mercury concentrations by station.

Response: See response to comment #33.

35. P. 5-14, Section 5.2.3. The distinction between toxicities of As III and As V should not be emphasized for the following reasons as cited in the ATSDR Tox Profile for Arsenic:

> A number of studies have noted differences in the relative toxicity of these compounds, with trivalent arsenites tending to be somewhat more toxic than pentavalent arsenates (Byron et al. 1967; Gaines 1960; Maitani et al. 1987a; Sardana et al. 1981; Willhite 1981). However, these distinctions have not been emphasized in this profile, for several reasons: (1) in most cases, the differences in the relative potency are reasonably small (about 2– 3-fold), often within the bounds of uncertainty regarding NOAEL or LOAEL

> levels; (2) different forms of arsenic may be interconverted, both in the environment (see Section 6.3) and the body (see Section 3.4); and (3) in many cases of human exposure (especially those involving intake from water or soil, which are of greatest concern to residents near wastes sites), the precise chemical speciation is not known.

Response: Information regarding relative toxicity of As III and As V cited in the ATSDR Tox Profile for Arsenic will be added to the section.

36. P. 6-3, Section 6.1.3. A more complete discussion of how ProUCL was used to handle non-detects should be included in this section.

Response: Additional information will be provided in this section on how non-detects were handled through ProUCL. Specifically, non-detected values were treated consistent with ProUCL recommendations. EPA (2010) recommends avoiding the use of the one-half detection limit method to compute the summary statistics and various other limits (e.g., UCL, UPL) often used to estimate the EPC terms and BTVs. Kaplan-Meier (KM) and Regression on Order Statistics (ROS) methods available through ProUCL were used when non-detect results were present. This treatment of NDs will be discussed in more detail in this section. This approach is consistent with ADEC recommendation (2008) to use EPA sponsored software application and the ProUCL recommended method of evaluating NDs.

37. P. 6-3, Section 6.1.4.1. Provide reference to the location where RSBCs are compared with detection limits.

Response: Additional discussion is included in 6.2.2.3. In addition, the QAPP (June 2011) included a table (Table 1-2) of methods, detection limits and risk-based criteria to ensure appropriate methods were used in sampling and analysis. This table includes risk-based criteria for metals, including methylmercury, and BTEX for soil, sediment, groundwater, surface water and tissue. Since this table addresses the risk-drivers, metals, a reference to Table 1-2 will be added to Section 6.1.4.1.

38. P. 6-12, Section 6.2.3.1.3. Is there any possibility mine workers would live on site? If so, then the mine worker scenario should be revised to account for this.

Response: This is possible but the current industrial/mine worker receptor is defined as someone who would work at the site but live in the nearby Red Devil Village. If the mine worker lived on-site, they would be covered under the more conservative residential scenario. The residential scenario is defined as someone who lives and works on the site. The following additional text was included in this section to make sure this issue is clear to the reader, "If the mine worker lives at the site, as well, this would be covered under the residential scenario which assumes that the adult residents would live and work at the site." No change to report.

39. P. 6-11, Figure 6-1. Why wouldn't an industrial or mine worker have potential inhalation exposure to ground water? Presumably they would be showering on site.

Response: Showering on-site under the industrial scenario is not assumed. It is assumed that workers would live in Red Devil Village, off-site. If they do reside on-site that would be covered under the more conservative residential scenario (see response to Comment #38). Figure 6-1 will be moved to follow the Industrial/Mine Worker discussion so that this distinction is described in the text prior to coming to the graphical CSM.

40. P. 6-13, Section 6.2.3.2. Provide a reference to maps showing sample locations used for exposure assessment. There should be some discussion of concentrations of surface and subsurface samples. Surface soils are more likely to be encountered by receptors.

Response: A reference to appropriate RI maps will be included. Consistent with DEC and EPA, all soil samples up to 15 ft bgs were used for exposure units EPC calculations. Additional discussion of the surface and subsurface soil sample concentration of the risk drivers, specifically arsenic, antimony and mercury, will be provided. Calculated 95% UCLs for arsenic, antimony and mercury for surface and subsurface soil will be provided for comparison to the combined soil EPC that was used in the HHRA.

41. P. 6-19, Section 6.2.3.4.3. The choice of an exposure duration of 30 years needs further evaluation. General guidance for selecting exposure duration is to use an upper percentile value. David Koster with ADFG has analyzed residence duration for Upper Kuskokwim Villages and has provided the following values:

90th percentile Length of residency in years for sampled Kuskokwim area communities, 2009.

Community	**Population**	**Adults**	**Household Heads**
Aniak	46	50	52
Chuathbaluk	46	52	53
Crooked Creek	53	60	65
Lower Kalskag	56	58	64
Red Devil	54	54	58
Sleetmute	64	67	68
Stony River	49	68	49
Upper Kalskag	53	60	64

Source ADF&G Division of Subsistence household surveys, 2010.

Response: 30 years has been presented in the RAWP and draft HHRA based on standard default values. Lon Kissinger made the data available to Stephanie Pingree Buss April 2, 2013. The exposure duration value of 58 years is based on a small sample set (n=54). It is unclear if this data is based on 54 responses or was based off of household surveys. With a small sample set, the 90th percentile can be easily skewed by individual points on the tails of the data set. Additional statistical information (sample number, range, variance, etc.) is needed to assess the *appropriateness of this data and for potential use in the HHRA. In addition, a full reference is needed for this data. Increasing the exposure duration (ED) from 30 years to 60 years will have the greatest impact on the carcinogenic risk calculated at the site. The carcinogenic risk at the site is driven by arsenic. The risk-based cleanup level (RBCL) for arsenic is lower than the background concentration at the site. Increasing the ED by a factor of two (from 30 years to approximately 60 years) will reduce the arsenic RBCL in half, still below the background concentration. The remedial action objective for arsenic proposed in the Feasibility Study is not based on the RBCL because of the background concentration of arsenic and other compounds of concern. The impact of using an ED of 60 years versus 30 years will be discussed in the uncertainty analysis.*

42. P. 6-20, Section 6.2.3.4.5. Clarify that the industrial worker exposure area is based on the surface area of the head, forearms, and hands.

Response: Text will be added to include this clarification.

43. P. 6-20, Section 6.2.3.4.5. The values chosen for exposure assessment as noted in Exhibit 3-2 of RAGS E don't represent an RME, but rather a central tendency estimate of exposure duration. RME estimates are 0.58 for adults and 1.0 for children. The risk assessment should be modified to incorporate these revised values.

Response: Values will be adjusted consistent with RME values.

44. P. 6-20, Section 6.2.3.4.5. Presumably adults would not be wearing shoes when wading. Consequently, the adult surface area should be modified to include the surface area associated with feet. Exhibit C-1 for RAGS E notes the surface area of adult feet as being 1310 cm^2. The surface area used for risk assessment should be increased by this amount. The reference for this information, EPA 2009c, addresses inhalation exposure and does not seem to be appropriate. Likely the reference should be EPA 2004.

Response: These values represent default surface areas presented by EPA and DEC and were presented in the RAWP. They represent exposure to head, hands, lower legs and forearms. If event-specific values were used then it would make sense to include hands, lower-legs, forearms and feet. The net result would be adding feet and subtracting head. Based on the EFH (2011), the average adult head is 0.136 m^2 *and feet are 0.137* m^2*. These values are almost the same and would result in no impact on overall risk. For children (3-6 years of age, the larger SA for children in the 1-6 year category), the head is 0.060* m^2 *and feet are 0.049* m^2*. Therefore, using the adjusted event-specific would be less conservative. Based on this assessment, the default surface areas used in the HHRA are health-protective. Additional discussion will be added to report.*

45. P. 6-20 Section 6.2.3.4.5, 3rd parg. Please include a discussion of the rationale for choice of different soil to skin adherence factors. RAGS E suggests that the choice of adherence factor be based on considerations of the activity in question relative to the exposure pathway of concern as well as the adherence factor statistic (i.e. median or 95th percentile). EPA needs to review the

BLM's rationale for selection of how particular activities for which AFs have been developed compare with site activities before approving giving final approval to the AFs selected.

Response: These are default values from EPA and DEC and are the values presented in the RAWP. Based on EPA (2004), the residential setting is based on residential activities such as landscaping and gardening and a child playing in soil. The residential default values were chosen for the recreational/subsistence user. The mine worker scenario used the default commercial/industrial value which includes construction and utility work. These are appropriate assumptions of activities that would occur on-site. Additional discussion will be added to report.

46. P. 6-25, Last paragraph. A map showing where the communities of interest are located should be referenced. Figure 1-1 from Brown et al. 2012 would be useful.

Response: A map will be referenced.

47. P. 6-25. The subtitle "Potential Suppression Effect" should be in bold font. In addition the risks associated with subsistence consumption of fish, game, and plants were developed using two pieces of information:

1) The 95th percentile harvest rates for various categories surveyed by ADF&G.
2) Contaminant concentrations for indicator species included within each of these categories

Table 6-23 clearly delineates these choices. Such information should be included in Table 6-19j. It is recognized that 95th percentile moose harvest data were not available at the time the draft final risk assessment was prepared. Risks for large mammal consumption should be based on the 95th percentile harvest of large game for Red Devil consistent with the approach taken for other subsistence food categories.

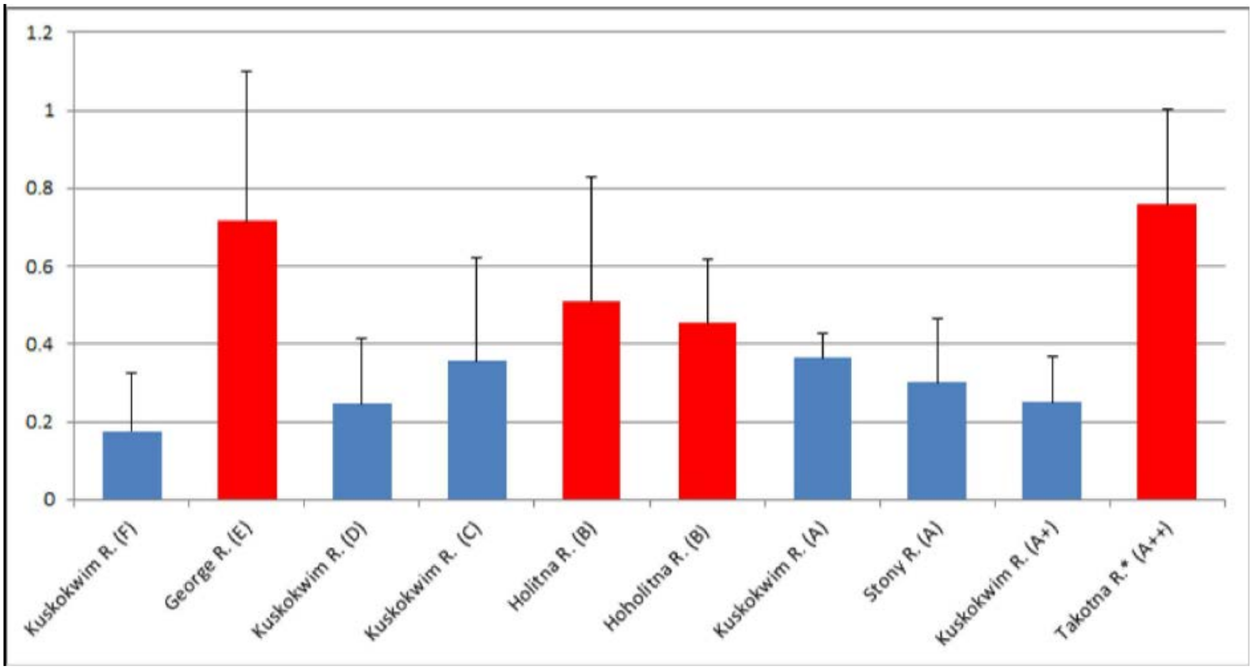
Response: The subtitle will be bolded and Table 6-19j will provide additional information. The reference (study and year) for the value proposed by EPA for BLM to use in the HHRA should be provided to BLM. The recommended value of 48.5 g/d is lower than the 76 g/d used in the Draft Final HHRA. The value used in the Draft Final HHRA represents the mean harvest rate from the 2003 large game survey, which was determined to be the most representative survey to obtain large game harvest data that is not potentially impacted by suppression. In absence of the reference for the 95th percentile moose harvest data, the mean harvest rate from the 2003 large game survey will be used, as this is a health protective approach compared to the proposed value of 48.5 g/d.

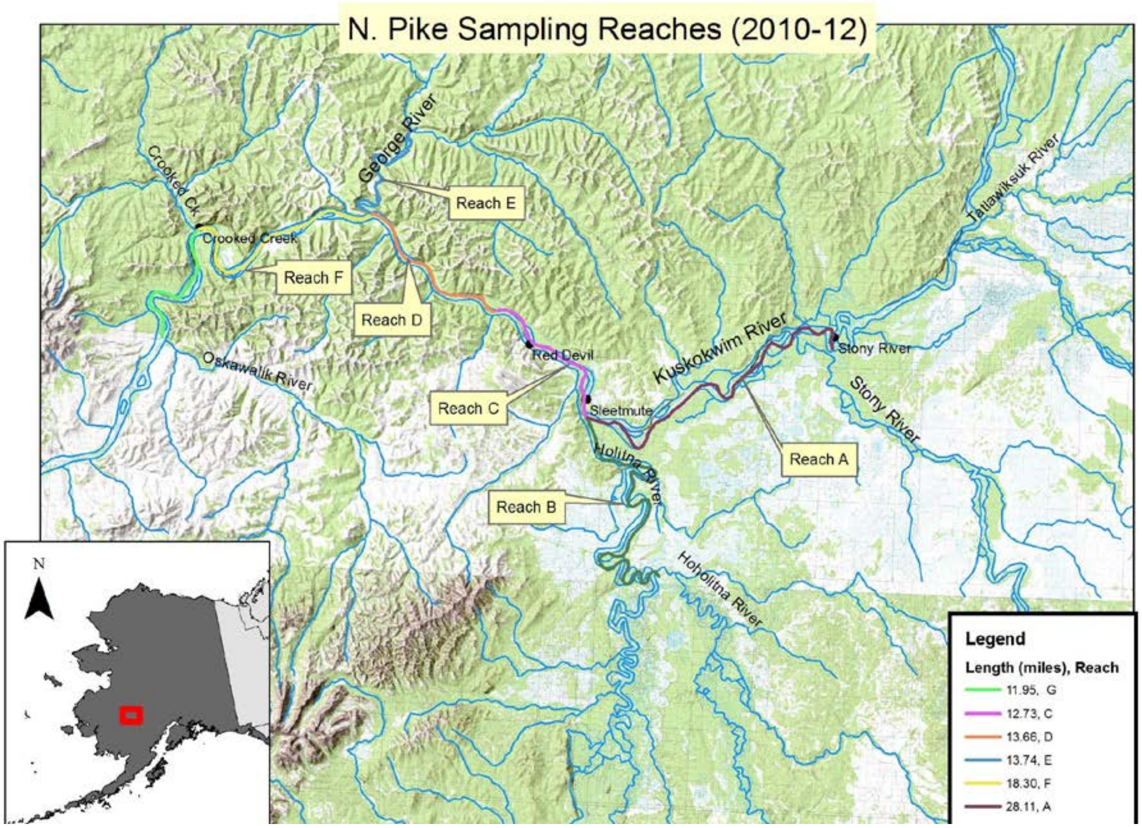
48. P. 6-32, 2nd parg. Were total arsenic results available as well? The fraction of arsenic that is inorganic would be a useful statistic to have along with organic arsenic results.

Response: This data will be presented in a table.

49. P. 6-32, 3rd parg. The reaches over which Kuskokwim fish mercury concentrations were derived were not well suited to assessing the impact of Red Devil Creek on Kuskokwim fish mercury concentrations. Sample locations in close proximity to the downstream confluence of Red Devil and the Kuskokwim should be evaluated relative to other areas. A map should be included showing sample locations. Are there any factors associated with the George River contributing to higher mercury concentrations for these fish?

Response: The comparison is trying to show the fish concentration used in the risk assessment (sculpin from Red Devil Creek) versus the fish concentration of fish that would be caught in the Kuskokwim River near Red Devil for consumption, in areas people have indicated they fish (Brown et al 2012). Reach C is the sampling location on the Kuskokwim River closest to Red Devil Mine, as shown on the attached map. The interim draft fish tissue report, which summarized 2010 and 2011 sampling results, found the greatest concentrations of mercury in pike from the George and Holitna Rivers and lower concentrations in Reach C. Both the George and Holitna are well outside the influence of Red Devil Mine and have numerous known cinnabar deposits, many of which have been mined in the past. Preliminary fish tracking data indicates that adult pike within these two rivers seldom move into the Kuskokwim River, therefore their mercury levels appear to be a direct result of mercury exposure in those watersheds and not from other sources in the Kuskokwim Basin. The preliminary tracking data also indicate that in general pike utilize the middle Kuskokwim River as a dispersal corridor rather than 'core' habitat, which is defined as habitat that provides the conditions necessary for pike to rest, hide, feed, and spawn. Some pike appear to utilize the Kuskokwim upstream of the Holitna seasonally, but year-round use appears limited. The paucity of pike in the mainstem Kuskokwim near Red Devil Mine coupled with the seasonal movement patterns of the species, makes correlations to inputs from Red Devil Mine difficult if not impossible





50. P. 6-39, 2nd parg. The numerator in the final term of the age adjusted intake should not have a “3” in the numerator, as there is no adjustment for exposure after age 16. Risks computed for Cr VI should be examined to determine whether or not they were properly calculated.

Response: The final term in this equation will be changed. This was an editorial error. Risks from hexavalent chromium were calculated correctly with no adjustment for exposure at greater than 16 years of age.

51. P. 6-40, Section 6.2.4.2. The discussion of the relationship between total and inorganic arsenic needs to be clarified. The inorganic arsenic 95% UCL concentration is indicated as being 19.23 mg/kg ww while the total arsenic 95% UCL concentration is indicated as being 12.98 mg/kg ww. This would suggest that over 100% of available arsenic is inorganic. Discuss the percentage of arsenic that is inorganic more explicitly. The location of the raw data for this analysis should also be provided. A better reference for the percent inorganic arsenic in fish and shellfish is: Chappell LL and Colman J. 2004. Toxicity and Exposure Concerns Related to Arsenic in Seafood: An Arsenic Literature Review for Risk Assessments. The final section suggests that although the percent inorganic arsenic in seafood is generally less than 7%, but that there are exceptions to this generalization that make selection of a default value difficult.

Response: The inorganic and total arsenic data is correct. This is primarily a function of the calculation of the 95% UCL. There are 45 results for total arsenic that went into the calculation *and only 12 results for inorganic arsenic. When looking at samples which had both total and inorganic arsenic, the percent inorganic arsenic ranges from 24% to 115%, with two paired results greater than 100%. A table of paired total and inorganic arsenic data will be added. Inorganic arsenic was used in the calculations so no default or site-specific percentage was used.*

52. P. 6-41 Section 6.2.4.3. What were the bases for the lead water, soil and fish/game concentrations selected for the IEUBK model run? Sources for all data inputs into the model should be provided.

Response: Lead concentrations used in the IEUBK model will be included in the appendix.

53. P. 6-42, Section 6.2.5. There should be some discussion of how exposure scenarios (e.g. soil, air, and dietary exposures) are combined.
The elements providing the majority of hazard and risk should be more explicitly identified. Almost all cancer risk is exclusively associated with arsenic. For non-cancer hazard indices, arsenic seems to be the primary contributor for most exposure pathways with the exception of seafood consumption, where antimony seems to be a significant contributor as well.

Response: Additional text will be added to make this clear.

54. P. 6-42, Section 6.2.5.1, 2nd parg. Revise the third sentence to read ". . . from animal **or human** studies **data** to estimate . . ."

Response: The requested change will be made.

55. P. 6-44, 1st full parg. The BMD uses all of the data in the dose response curve as opposed to LOAEL or NOAEL approaches that rely on one dose value to develop dose response metrics.

Response: This additional information will be added to the paragraph.

56. P. 6-48, Figure 6-2 and P. 6-50, Figure 6-3. A discussion regarding the basis for the difference in groundwater and biota consumption risks for residents in the SMA relative to the MPA and DA should be included in the text.

Response: The difference in the assumptions used to develop these risks will be reiterated.

57. P. 6-49, 1st two parg. It is not clear if the non-cancer hazard posed by antimony via fish consumption is included in the discussion of scenarios for the HI. Some text discussing this hazard should be included in this section.

Response: The HI for fish consumption includes antimony. This will be added to the text.

58. P. 6-53, 6.2.5.5. As noted previously, data sources for all inputs need to be identified, in particular soil values. Modification of Appendix K is acceptable.

Response: Lead concentrations used in the IEUBK model will be included in the appendix.

59. P. 6-58, 2nd parg. The text "However, use of central tendency exposure estimates to assess risks and develop risk based cleanup levels would result in unacceptable risk for a substantial portion of the population." should be added at the end of the paragraph.

Response: The sentence will be added to the end of the second paragraph.

60. P. 6-58, Section 6.2.6.3, last parg. There should be disclaimer in this paragraph that EPA Method 9200.1-86 has not been approved for the determination of arsenic bioavailability.

Response: This declaimer will be added for references to the bioavailability method.

61. P. 6-60, 1st text block on the page. Edit the text to read; ". . .site. However, in developing reasonable estimates of maximum exposure, media contact rates are assigned upper percentile values while other exposure parameters (e.g. body weight) are assigned central tendency values."

Response: The requested change will be made.

62. P. 6-61, 6.2.6.5, 1st parg. At end of paragraph add the following sentence; "However, use of central tendency exposure estimates to assess risks and develop risk based cleanup levels would result in unacceptable risk for a substantial portion of the population."

Response: The sentence will be added. Please note the central tendency was not calculated in this assessment.

63. P.6-62, 1st parg. Additional discussion between the parties regarding the comparison of modeled and measured mercury concentrations in Kuskokwim River fish is necessary. Part of the discussion should focus on a direct comparison of sample results near the confluence of Red Devil Creek and the Kuskokwim rather than the reach based approach.

Response: See response to comment #49.

64. P. 6-63, Section 6.2.6.5, 4th parg. This paragraph states that the contribution of background is likely underestimated. As noted in earlier comments, EPA believes this is not a completely accurate statement and further discussion is necessary.

Response: Please see response to general comment #2.

65. P. 6-72, Section 6.3.4.2, COPC refinement. EPA's earlier comment was generally addressed. However, the wording of the draft final BERA still needs to be revised to eliminate a risk management implication. The last sentence of the first paragraph of Section 6.3.4.2 should be reworded to read as follows: "All metals identified as COPCs in the SLERA were carried forward into the BERA."

Response: The sentence in question will be modified as requested.

66. P. 6-72, Section 6.3.4.2 and P. 6-159, Table 6-39. Although the new Table 6-39 is an improvement on the previous draft of the BERA, there are still several contaminants for which screening benchmarks are available in the literature which were not used. A low molecular weight PAH benchmark of 1100 µg/kg in soil for mammals is available in the NOAA SQUIRT tables which, if assumed to be applicable to birds as well, would give a more quantitative basis for not identifying LPAH as a BERA COPC.

Response: The suggested substitution will be made.

The NOAA SQUIRT tables also have a sediment LPAH benchmark of 76 µg/kg, higher than the highest measured LPAH in sediment concentration, and which also could be used to eliminate LPAH as a BERA COPC.

Response: The suggested substitution will be made

4-methylphenol is also known as p-cresol, which has a soil screening benchmark of 163,000 µg/kg, resulting in 4-methylphenol not being a BERA COPC.

Response: The p-cresol soil screening benchmark will be used as suggested

We also are unable to find a soil benchmark for benzoic acid, and agree that it should be forwarded to the BERA as a COPC. Because benzoic acid risks cannot be quantified due to the absence of screening benchmarks or baseline TRVs, benzoic acid should be identified as a contaminant of concern (COC) at the conclusion of the BERA. Its potential ecological risks are unknown and unquantifiable. It would be acceptable to EPA for the BERA to have a separate table listing benzoic acid and any other contaminants without screening benchmarks or baseline TRVs, with appropriate modifications to the BERA text as needed to briefly discuss such chemicals. Chemicals whose risks cannot be quantified must be discussed in the uncertainty section as a factor that may underestimate site risks to ecological receptors.

Final Response: Benzoic acid and other chemicals without baseline TRVs will be identified in the uncertainty section as a factor that may underestimate risk.

EPA concurs with the benzyl alcohol discussion in Table 6-39.

Final Response: Noted.

bis(2-ethylhexyl)phthalate has a soil benchmark in the NOAA SQUIRT tables as low as 100 µg/kg, lower than the highest detected BEHP concentration in soil. BEHP must be identified as a COPC and evaluated in the BERA. The rationale for not further evaluating BEHP risks in the BERA (i.e. contamination from surgical gloves) given in Section 6.3.4.2 is not acceptable to EPA, is speculative, and must be removed from the BERA text.

Final Response: BEHP was detected in eight of 12 surface soil samples analyzed for SVOCs. The eight detects for this chemical were 11, 12, 12, 13, 13, 13, 17, and 220 µg/kg. One detect *exceeded the Dutch soil screening level of 100 µg/kg included in the NOAA Screening Quick Reference Tables (SQuiRTs). Hence, BEHP may present a localized risk to some receptor groups exposed to soil, such as plants and soil invertebrates. BERA Section 6.3.4.2 (COPCs and Refinement of COPC List) and Section 6.3.9 (Risk Summary) will be revised to acknowledge this possibility. Also, the speculation that BEHP in site soil samples may be from surgical gloves will be deleted from Section 6.3.4.2.*

The treatment of and conclusions for dibenzofuran in Table 6-39 are acceptable to EPA.

Final Response: Noted.

Diethylphthalate should be evaluated in the BERA, it does not screen out as a COPC because the maximum detected soil concentration is lower than a 100 µg/kg soil screening benchmark from the NOAA SQUIRT tables.

Final Response: Diethylphthalate was detected in two of 12 surface soil samples analyzed for SVOCs. The two detects for this chemical were 8 and 140 µg/kg. One detect exceeded the Dutch soil screening level of 100 µg/kg included in the NOAA SQuiRTs. Hence, diethylphthalate may present a localized risk to some receptor groups exposed to soil, such as plants and soil invertebrates. BERA Section 6.3.4.2 (COPCs and Refinement of COPC List) and Section 6.3.9 (Risk Summary) will be revised to acknowledge this possibility. Also, the speculation that diethylphthalate in site samples may be from surgical gloves will be deleted from Section 6.3.4.2.

EPA agrees that the maximum 1.7 µg/kg diethylphthalate concentration in sediment is unlikely to pose unacceptable risks to snipe and kingfisher, and can be screened out as a sediment COPC for these two avian species.

Final Response: Noted.

Dimethylphthalate and hexachlorobenzene can both screen out as soil COPCs; although Table 6-39 should be amended to point out that the maximum detected soil hexachlorobenzene concentration of 1.3 µg/kg is well below the lowest soil screening benchmark of 199 µg/kg for mammals.

Response: Table 6-39 will be amended as suggested.

67. P. 6-72, Section 6.3.4.3 and Figure 6-5. The updated ecological conceptual site model (Figure 6-5) should be revised to show that contaminant ingestion by aquatic plants is an incomplete exposure pathway, not a complete exposure pathway as currently shown.

Response: The CSM figure will be revised as suggested

68. P. 6-77, Section 6.3.7.2. The response to EPA’s previous comment the terrestrial vegetation exposure assessment does not accurately describe the tissue screening concentrations in Dyer et al. (2000). The screening benchmarks were designed to be applicable to all fully aquatic species (plants, invertebrates, fish, larval amphibians), not just to fish.

Response: Clarification is requested. Section 6.3.7.2 presents the exposure assessment and risk characterization for terrestrial plants. It is unclear why EPA is referring to a paper (Dyer et al. 2000) that presents tissue screening concentrations for aquatic species.

69. P. 6-78, Section 6.3.7.4. This reviewer has a similar concern with the use of Dyer et al. (2000) in this section. The screening benchmarks were designed to be applicable to all fully aquatic species (plants, invertebrates, fish, and larval amphibians) not just to fish.

Response: One of the approaches used to develop tissue screening concentrations in Dyer et al (2000) was used in this section, but with site-specific bioconcentration factors and recent chronic water quality criteria, as agreed to in previous responses to comments. No change to report.

70. P. 6-79, Section 6.3.7.4, 3rd parg. There appears to be additional discussion of the benthic survey results, as well as several new figures in the BERA using information from the benthic survey, in response to EPA's comment on the draft BERA. However, EPA still has not seen the draft or final benthic survey report. Thus, it is not possible to provide a meaningful evaluation of the information from the report. Without being able to review the report, the information and conclusions from the benthic survey should not be included in the final BERA.

Response: E & E received from BLM, and cited in the draft final BERA, the following two reports regarding the benthic survey work done by BLM in Red Devil Creek and other tributaries to the middle Kuskokwim River:

> *Bureau of Land Management (BLM). 2011. Aquatic Invertebrate Report for Samples Collected by the BLM, AK, Anchorage Field Office. Prepared by BLM, National Aquatic Monitoring Center, Logan, Utah for BLM, Alaska Field Office, Anchorage, Alaska.*
>
> *______. 2012. Quantification of Fish and Aquatic Insect Tissue Contaminants in the Middle Kuskokwim River, Alaska: Supplemental Information on Study Design, Watershed Characteristics, Benthic Macroinvertebrate Analysis, and Sediment/Water Sampling Within the Project Area. Prepared by BLM, Alaska State Office, Anchorage, Alaska.*

BLM made these two reports available to EPA for review to help with EPA's evaluation of the benthic survey data presented in the draft final BERA

71. P. 6-82, Section 6.3.7.5. EPA's reviewers were unable to find the discussion of uncertainties with the barium in surface water hazard quotient, unless it is the last sentence of Section 6.3.8.10 on page 6-92. Clarify if this is the revised discussion section on barium. If it is not then such a discussion should be included in the report.

Response: Section 6.3.7.5 will be augmented with a discussion of the uncertainty regarding the barium in surface water screening value and hazard quotient.

72. P. 6-89, Section 6.3.8.1. While this section of the text is much improved, there is another possible reason why BSAFs for several contaminants may be lower in the contaminated portions of the site than the BSAFs measured in background locations. It is well known that BSAFs (or BCFs if the exposure medium is water) are not constant and unchanging with changes in media

contaminant concentrations. At higher contaminant concentrations in soil or sediment, the numeric value of the BSAF often is smaller than the BSAF at lower exposure concentrations, despite the tissue contaminant concentration being higher at higher exposure concentrations. This non-linear relationship between exposure concentration and tissue concentration, particularly at higher exposure media concentrations, may also be the reason why BSAFs were observed to be lower in the contaminated portions of the site than at background sites. This alternative possibility should also be discussed in Section 6.3.8.1.

Response: This alternate explanation will be added to the BERA as requested

73. P. 6-92, Section 6.3.8.12. Just as a note, it is an interesting observation that the methylmercury proportion in sculpin tissue is lower than the usually encountered 95+% methylmercury proportion of total mercury. EPA has observed a similarly low methylmercury proportion in fish collected near a chlor alkali plant, so the discussion of why the methylmercury proportion may be lower than expected at RDM is reasonable speculation.

Response: Noted. No change to report.

74. P. 6-93, Section 6.3.9. In several sections of the risk summary it is noted if HQ values were to account for solubility of site contaminants the magnitude of HQ values would be significantly lower. Would the list of contaminants and/or the calculated HQ change to the extent that there would not be a risk to the various biota?

Response: Yes, for some contaminants. No change to report.

75. P. 6-97, Section 6.4.2. The preliminary ecological risk based cleanup levels have been updated to reflect cleanup based on risks from several contaminants without TRVs in the previous draft of the BERA. The utility of the proposed cleanup levels must be evaluated via discussions with the Agencies, and cannot be determined at this time.

Response: The preliminary ecological risk based cleanup levels are preliminary. The FS will propose use of any site specific cleanup risk based cleanup levels if appropriate.

76. P. 6-113 Table 6-3. Modify the table to note chemicals that were included on the basis of their ability to bioaccumulate (e.g. methyl mercury)

Response: This information is provided in Table 6-6. Based on the steps in COPC screening, this is the appropriate location of that notice. No change to report.

77. P. 6-215, Table 6-83. The risk based cleanup level table should also acknowledge that the appropriate MCLs for those contaminants that have MCLs.

Response: MCLs will be included in the table, as appropriate.

78. P. 7-28, Point 23. This section should be struck or needs to be extensively qualified, recognizing that EPA has not approved any in vitro tests for arsenic bioavailability.

Response: the language will be qualified to indicate the analytical method used is not an approved EPA method.

Appendices:

79. The list of Appendices in the Table of Contents is incomplete.

Response: This error will be corrected.

80. Appendices E, F - Soils Tables: clarify the wet or dry basis for the reporting units: (mg/kg dry). This was done for the tissue data but not the soils. Alternatively, this could be annotated in the footnotes in order to save space in the table column headings.

Response: The tables will be revised to provide information on wet vs. dry weight basis.

81. Appendix E, Table E1. It's not clear what analytical method produced this data. Is this from XRF or from a laboratory? Also, instead of just providing the sample ID, it would be helpful to provide more information; such as depth increment, soil type, etc (similar to Table E-2). This would greatly help in the interpretation of the data presented.

Response: The analytical method used is presented in the second column of the table. The column heading will be revised to make this clearer. Information on the depth interval and interpreted soil type will be added to Table E-1.

82. Appendix E, Table E-1, P. 447. A column indicating what the analyte is should be added to the table.

Response: The table will be formatted to correct this.

83. Appendix H. The data for the Green Alder Bark and White Spruce were reported on a dry weight basis in the lab data sheets (example: see sample 11MP34GA, page 985 of Appendix C).

Response: This will be noted.

84. Appendix J, Table J-6. Please explain why groundwater ingestion hazards are not included in this table.

Response: Hazards for ingestion of groundwater are included in this table. The information is presented after the Sediment-Dermal rows in the table. The row heading was hidden in the .pfd format. This will be corrected in all applicable tables (Table J-6 through J-10).

85. Appendix P - Table P-1, for the reporting units, change: "(ug/ wet g)" to "(ug/g wet)" and for methylmercury "(ng/ wet g)" to "(ng/g wet)".

Response: The requested revision will be made.

86. Data Validation Reports - A spot check of the DVRs verified the qualification of data against the data tables in the Report Appendices. Some mislabeling of sample matrix was noted; see Pages 673 and 781 where soil samples were identified as sediments. Some data validation

reports did not contain copies of the data summary sheets (i.e., Proj. # 001096.OX70, page 972). The completeness of the attached data should be reviewed for verification.

Response: A completeness check of the attached data will be conducted.