APPENDIX I
RESPONSE TO USFS, ADEC AND EPA COMMENTS ON DRAFT SITE CHARACTERIZATION REPORT

REVIEW COMMENTS AND RESOLUTIONS

Technical Point of Contact: John Beller	Phone No.:	Return Comments To:	E-Mail: Jbeller@portageenv.com	Comments Due By:	Reviewer's Name/Discipline: Portage, Inc	Phone No.:

Comments resolved by:	Date:	Signature of reviewer accepting resolution of significant comments:	Date:

* Comments so marked are considered to be significant and must be resolved to the reviewer's satisfaction. Significant comment: A reviewer's written response that is derived from the reviewer's area of expertise or discipline or that addresses material assigning tasks to the reviewer's organization. Significant comments address issues of: (a) noncompliance with laws, regulations, permits, standards; (b) proper conduct of mission-critical operations; (c) creating unsafe conditions that could result in personal injury, death, damage to the environment; and (d) creating conditions that could result in significant nonessential costs to the company.

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1	Global		Criteria for sample selection not specified. SAP, QAPP, and SCR indicate that discrete sample locations were determined by gamma results, but never defines how gamma results were used to make that selection.	The locations of discrete soil samples were based on gamma exposure measurements to provide soil concentration data on soils associated with both mine features and adjacent non-affected (background) areas, as described in Section 6.3.1 of the Site Characterization Report (SCR). Preliminary maps of the gamma exposure data were developed in the field during the July sampling event. The preliminary gamma exposure mapping, combined with visual observations, was used to delineate the boundaries of the mine features. Based on the preliminary gamma mapping, discrete soil sampling locations were selected within the boundaries of the mine features and at the transition zones or margins surrounding the mine rock pile areas and ore storage area (OSA) to characterize the extent of the area influenced by the mine features. Background soil samples were also selected at locations adjacent to the mine features in areas with lower measured gamma exposure rates. However, the resolution of the preliminary gamma mapping resulted in more soil samples being collected within the mine-affected areas than in non-mineralized background areas. The soil metals and radionuclide concentration data provided by these discrete soil samples confirm the effectiveness of gamma to delineate boundaries and provide sufficient soil background data to address data gaps. The extensive gamma survey data and discrete soil sampling concentration data provide a

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				robust data set for characterization of the areas and provides sufficient data to delineate the mine areas and for evaluation of removal action alternatives in the EE/CA.
2	Global		A random probablility sampling scheme should be used to ensure that assumptions for computing the 95% UCL are met. The SAP, QAPP, and SCR do not indicate that randomness was incorporated in any way in selecting sample locations.	The sampling, as set out in the approved Sampling and Analysis Plan (SAP), was not designed or described to be a "random" scheme. Rather, the sampling plan was developed using the preliminary gamma survey results to provide the data necessary, incorporating data and information provided by previous investigations, to address data gaps and provide data necessary for Site characterization, risk assessment and EE/CA preparation. The data will also be evaluated in the Screening-Level Human Health Risk Assessment (SLHHRA) and the Screening-Level Ecological Risk Assessment (SLERA), including statistical analysis as necessary and appropriate according to applicable guidance.
3	Global		Background sample selection seems logical. However, neither the SCR nor supporting documentations indicate how background data are to be used or how they are to be compared to site data. With the exception of the 900- and 700-ft levels, insufficient data were collected to perform any type of statistical comparison.	The background reference data for air (radon), soils, surface water, stream sediment and marine sediment were compared to the Site media data to evaluate and define the extent of influence of the mine features, as described in Sections 6.2 and 6.3 of the SCR. The background data will also be used in the risk characterization to screen COPCs in the SLHHRA and SLERA. The maximum concentrations for parameters in air (radon), soils, surface water, stream sediment, and marine sediment will be compared with the local background concentrations for each exposure area and media, in addition to health based and ecological screening levels, to screen COPCs in the SLHHRA and the SLERA. Preliminary comparison of the maximum metal and radionuclide concentrations of background non-mineralized soils defined in the SCR to health-based screening benchmarks (ADEC and EPA Risk-Based Screening Levels) and ecological screening benchmarks (ADEC Ecological Risk Based Screening Concentrations [ERBSCs] and EPA

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				Ecological Soil Screening Levels [EcoSSLs]) indicates that background non-mineralized soil data will not drive the screening of COPCs for exposure units within the non-mineralized soil area, such as the 300-Foot Level mine rock pile and the OSA. Therefore, additional collection of non-mineralized soil samples to allow statistical comparison will not provide meaningful data for screening of COPCs in the risk assessments. Sufficient background mineralized soil samples are available to perform statistical comparison in the SLHHRA and SLERA of the 900-Foot and 700-Foot levels.
4	Global		Subunits, or risk exposure units are not identified in the SCR. Collected data, site history, and site geography indicate that the Ross Adams Mine and impacted areas should be divided into several exposure units. These units must be defined before it can be determined if sufficient data were collected for site characterization.	The data evaluation and presentation in the SCR divided the Site by identified mine features (300-Foot, 700-Foot, and 900-Foot levels, OSA and Ore Loading Docks, and Mine and Haul Roads. We concur that the Site should be subdivided into risk exposure units based on the collected data, Site geography, and the understanding of mining operations. However, the SCR was developed to present the results and conclusions of the Expanded Site Investigation (ESI) conducted to characterize the physical and environmental conditions of the Site, as required by the Administrative Settlement Agreement and Order on Consent (ASAOC). The risk assessments will define the exposure units. It is anticipated that the mine feature areas identified in the SCR, along with ecological features and human use characteristics of the Site, will be used to identify exposure units appropriate to the SLHHRA and SLERA. As defined by the ASAOC, the risk assessments are included as part of the EE/CA in the next phase of work.
5.1	Global		Data indicate that elevated levels of several COPCs were observed near the rockpile at the 300-ft level and at the OCA docking area. These areas should be characterized separately from the surrounding area so that contamination in those two areas is not averaged out by data collected	The SLERA and the SLHHRA will evaluate the 300 Level and the OSA/Shoreline Areas as separate exposure units. Only the samples associated with the 300 Level will be included in the dataset that will be used to estimate exposure and risk for the 300 Level; likewise for the

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			from surrounding less contaminated areas, and also so that the surrounding areas will not appear to be more contaminated than they actally are.	OSA/Shoreline Area. The datasets for these areas will not include background or other samples not associated with these exposure units.
5.2	Global		Neither the human health risk assessment work plan (Tetra Tech 2009b) nor the draft SCR describes the exposure unit(s) for the human health risk assessment. Therefore, the dataset was reviewed for human health, assuming that the entire site is one exposure area. The human health risk assessment consists of a screening of the maximum concentration (ADEC 2009b; Tetra Tech 2009b) against established benchmarks (ADEC 2008).For each media except surface water (see comment on section 6.3), the areas sampled represent the likely sources and, thus, the maximum value for the site over that time period is likely represented by the data collected.	Maximum detected concentrations for each exposure medium and unit will be compared to screening levels in the SLHHRA. The SLHHRA will use data collected in the ESI and by Kent and Sullivan (KSI) (2004), as these data had quality control information and locations available for review.
5.3	Global		Exposure units for ecological risk assesssment are not defined in the draft SCR.Whether the data is suffcient for ecological risk should be presented in the SCR separately for all four of the habitat types found on the site (subalpine zone, Western hemlock-Sitka spruce forest, intertidal zone, and marine zone).The review indicated spatial sampling of coverage for representing ecological exposure concentrations was adequate for 3 of the 4 habitats, but may not be adequate for the Western Hemlock-Sitka spruce forest	The SLERA will discuss the adequacy of the data available for each of the five exposure units evaluated in the SLERA, and will also discuss how these exposure units relate to the four main habitat types at the Site. The main potential exposure pathways in the Western Hemlock-Sitka Spruce forest are associated with the following sources: the surface water and sediments in the freshwater streams, the 300-Foot Level portal and mine rock pile, and the Roads traversing this habitat. Surface water and stream sediment samples were collected from the 300-Foot Level portal and at specific locations in Kendrick Creek from above the 300-Foot Level to its confluence with the West Arm of Kendrick Bay. Soil samples were collected from the 300-Foot Level mine rock pile, Haul Roads, and adjacent areas. These potential sources have been adequately sampled and provide adequate spatial coverage of the Western Hemlock-Sitka Spruce forest to perform the SLERA.

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5.4	Global		Neither the work plan nor the SCR provides the source of bioaccumulation factors that will be used in the modeling; these factors should be presented in the SCR to ensure they are representative of the organisms likely to be used from the site (such as sea cucumbers).	Bioaccumulation factors and other risk modeling elements will be documented in the SLHHRA and the SLERA. The bioaccumulation factors (BAFs) will be identified in the SLERA based on the sources recommended in ADEC's "Risk Assessment Procedures Manual", such as Bechtel Jacobs 1998a,b, Sample et al. 1998a,b, and Baes et al. 1984.
5.5	Global		Some identified COPECs (arsenic and lead) at the site are bioaccumulators (ADEC 2009a).The SCR discusses the food chain risk evaluation but does not present the methods to be used, the calculations, or the results.	The COPCs will be identified in the SLHHRA and the SLERA by comparing site-specific concentrations to background concentrations and to health based screening levels or to ecological benchmarks. The Work Plans for the Ecological Risk Assessment (Appendix A to the SAP) and the Work Plan for the Human Health Risk Assessment (Appendix B to the SAP) present the methods to be used for the SLHHRA and SLERA. The calculations and results will be presented in the SLHHRA and SLERA. The SLERA will include descriptions of the methods used to evaluate exposures to COPECs that are potential bioaccumulators. Bioaccumulation factors (BAFs) and bioconcentration factors (BCFs) will be identified for the COPECs in each media for the food-chain/bio-uptake pathways important for those media. These bio-uptake pathways will include soil to soil invertebrates, soil to terrestrial plants, sediments to aquatic invertebrates, and surface water to fish. As indicated in response to comment Item No. 5.4, BAFs will be identified based on sources recommended by ADEC's "Risk Assessment Procedures Manual".
6	Global		Data collected from the 900- and 700-ft areas does not appear to adequately cover the area. No samples were collected in, or near, the highest gamma readings in the 900-ft level and ony 1 sample was collected near the highest gamma readings observed in the 700-ft level.	The focus of the ESI was to define the limits of the mining related disturbances, which ultimately have a direct bearing on evaluation of removal action alternatives in the EE/CA. Sampling data collected during the ESI is augmented by data collected by Kent and Sullivan (2004). Samples from within and near the areas with the highest gamma readings at the 700-Foot and 900-Foot levels were collected by Kent and Sullivan (2004).

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				The extensive gamma survey data, correlated to discrete soil sampling concentration data, provides a robust data set for characterization of these areas. The lack of discrete soil samples in the areas of highest gamma readings does not affect characterization of the 900-Foot and 700-Foot levels and if needed, the gamma-radionuclide correlation can be used to estimate radionuclide concentrations. Gamma readings in conjunction with visual observation allow disturbed and undisturbed areas to be delineated.
7	Section 3.4, appendix A Deviations Section		The review confirmed that the "valid measurements obtained" aspect of completeness was evaluated appropriately during validation by confirming that analytical results were reported for all samples submitted, and that all results were usable as reported, with impacts based on qualification of data quality appropriately addressed. According to the project goals in the QAPP (Tetra Tech 2009b), the criteria set for completeness is 90%. While it is recognized that completeness typically is assessed per analysis result, the evaluation of completeness becomes more qualitative when the definition of planned events allows for conditions in the field. That is, not all planned samples were collected due to conditions in the field, and additional opportunistic samples were collected. The evaluation of completeness for each of the sampling events would benefit with more reference to the information presented in Tables A-8, A-9 and A-10.For example, the event totals presented for the June 2009 sampling event correspond to a 72% completeness for stream water samples (13 samples collected out of 18 planned) and 103% for radon (an additional radon station was installed over the air shaft at the 900-ft level). In doing so, it allows the project not only to assess the 90% completeness goal but also to expand the discussion to determination of whether a sufficient amount of data has been generated to adequately	Recognition of the practical aspects of sampling at a remote location such as Bokan Mountain is appreciated. While a large effort goes into planning, scheduling and logistics, weather and its direct influence on surface water availability is a variable outside our control. In the specific case referenced - 13 surface water samples collected out of 18 planned - there was no water present to sample at five locations due to dry conditions at the Site prior to and during the June 2009 sampling event. In planning for such circumstances, the completeness evaluation in the QAPP (Section 2.4.2.3) contained the following statement: *"Note that the number of measurements planned (P) will be adjusted to reflect the absence of media at the sample locations..."* The performance of each sampling event is described in SCR Appendix A, including a discussion of the deviations from the planned number of samples. Section 3.4, *Data Usability Assessment,* of the SCR will be revised to summarize the completeness information and reference the appropriate information provided in Appendix A.

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			characterize the site.	
8	Section 3.5, Table 3-1		During the review, it was noted that footnote 5 to Table 3-1 indicates "Analytical method differs from that proposed in SAP; see text for explanation;" however, additional text or explanation was not found. However, the review examined the differences noted and determined the analytical methods proposed in the SAP and those utilized and listed in table 3-1 to be comparable.	Footnote 5 will be revised as follows: "Analytical method differs from that proposed in SAP; however, the analytical methods utilized and listed in the table are comparable to the analytical methods proposed in the SAP and are considered an industry-accepted alternate."
9	Section 3.4, Appendix B, Appendix C, Appendix D		The review of the data evaluation identified that sample handling and analysis protocol such as chain of custody procedures, holding times, preservation techniques and temperature upon receipt, requested analysis and detection limits were appropriately considered during data validation. Water data for which both total/total recoverable and dissolved metals analyses were performed were also compared. Analytical data were validated using the ADEC data review form entitled "Laboratory Data Review Checklist." For the each of the metals, radiochemical, and inorganic analyses conducted for each sampling event, the SCR includes the completed checklists, the validator's overall summary of the data evaluation, and a qualified data table. The review confirmed that assigned data qualifiers were based on USEPA CLP (2004) and MARLAP (2004) guidance and that no data were rejected.	The comment confirms the data validation results presented in the SCR. As such, no response or revision to the SCR is required.
10	Section 3.4, Appendix B, Appendix C Appendix D		Method detection limits and sample quantitation limits have been reviewed and found to be below screening criteria specified in the Ecoscoping Guidance (ADEC 2009) for soil, freshwater and marine water samples and in the Screening Quick Reference Tables for freshwater and marine sediment samples (NOAA).	The comment confirms that the method detection limits and sample quantitation limits used for analysis of the samples are appropriate. As such, no response or revision to the SCR is necessary.

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11	Section 3.4, Appendix B, C, D		The review confirmed that field duplicate samples were collected for each matrix. Analytical precision was assessed based on either the relative percent difference or duplicate error ratio (for radioanalytical results) between laboratory duplicate measurements, and the combined sampling and analytical precision was assessed based on field duplicate sample results.	The comment confirms that field duplicate samples were appropriately collected for each matrix and that analytical precision was appropriately assessed. As such, no response or revision to the SCR is necessary.
12	Section 3.4, Appendix B, C, D		The review confirmed that accuracy was appropriately assessed based on the percent recovery results from analysis of laboratory control samples and matrix spiked samples.	The comment confirms that accuracy was appropriately assessed based on the laboratory QC samples. As such, no response or revision to the SCR is necessary.
13	Section 3.4, Appendix B, C, D		Sample handling protocols (e.g., holding times, storage, preservation and transportation) have been developed to preserve the representativeness of the samples. The review confirmed that data qualification based on the sampling handling protocols was appropriately conservative.	The comment confirms that sampling handling procedures were appropriately developed and that data qualification was properly evaluated based on the sampling handling procedures. As such, no response or revision to the SCR is necessary.
14	Section 4.6.8 ,page 57		Volume of OSA waste pile is uncertain	The volume estimate for the OSA is described in Sections 4.6.4 and 4.6.8 and summarized in Table 4-4 of the SCR. The estimated volume was developed from site observations, topographic surveying, review of aerial photography, and knowledge of cleanup and demobilization activities performed after mining ceased. The volume of affected soil at the OSA was estimated assuming 18 inches of surficial organic matter (identified during ESI) overlaying two feet of affected soil. Although the exact volume of material within the OSA is uncertain, the estimate is sufficient for development and evaluation of removal action alternatives in the EE/CA.
15	Section 5.2		The biological surveys were adequate to determine the applicability of the ADEC default indicator species as appropriate assessment endpoints. Nocturnal species were not included in the surveys. Most of these species, except bats, could be evaluated through the indicator species modeled for the other species that were included in the	The SLERA will evaluate potential risks to mammalian insectivores by comparing sediment concentrations to the screening levels provided for bats developed by LANL (2009).

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			survey. Screening levels for bats were attached to the review of the SCR.	
16	Section 5.2.4		Modeling of risks through the food chain requires estimates of both uptake by organisms and levels of consumption by humans. The human health risk assessment work plan (Tetra Tech 2009b) indicates that site specific exposure information for subsistence collection will be obtained at public outreach meetings. However, the SCR indicates that only very limited and general information on hunting and resource collection is available. Will site-specific information be obtained, or will subsistence exposure parameters be based on literature values?	The Work Plan for Human Health Risk Assessment (attachment B to the SAP) indicated that information on potential exposure associated with potential subsistence Site uses would be determined using "…site-specific cultural factors based on local sources of information obtained from USFS Community Outreach Meetings." (page 4 HHRA Work Plan). This reference was to published information available from the USFS. This information has been used as well as subsistence exposure parameters from the Alaska Department of Fish and Game Subsistence Database, primarily using data from Hydaburg. However, public outreach meetings will be conducted as part of the EE/CA process.
17	Section 6		Summary statistic tables divide the data in a way that is a logical division for exposure units. However, the document does not state that the division used for summary statistic computation is the same intended division for identification of risk exposure units. This should be specified.	The SCR will be revised to clarify to what extent the summary data tables correspond to the exposure units that will be used in the risk assessments.
18	Section 6		Statistical analysis is sufficient for the SCR. However, it may be helpful to identify outliers in the data and to provide plots that demonstrate the statistical distribution of the data. This can be saved for the risk assessment phase.	Further statistical evaluation of the data, including identification of outliers and distribution plots, will be provided in the SLHHRA and SLERA. ProUCL software will be used for statistical evaluation.
19	Section 6.1.4		The analysis of laboratory analytical data and gamma survey data showed no statistically significant correlation between metal concentrations in soil and the gamma survey data. Therefore, the survey data delineates the extent of radionuclides at the site, but not the extent of other contaminants such as metals.	As discussed in Sections 6.1 and 6.3 of the SCR, measured gamma exposure rates and soil sampling data were compared to assess the relationships between gamma radiation and both radionuclide activities and non-radioactive metals (e.g. lead, arsenic and uranium). The comparison demonstrated that strong statistical relationships exist between gamma exposure and soil radionuclide activities at the Site (Section 6.1.4.1). In Section 6.1.4.2, the relationship between gamma exposure and lead and arsenic is discussed. While not statistically

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				significant, higher concentrations of lead and arsenic are associated with higher gamma exposure rates indicative of mine features/disturbance. In addition, examination of the soil metal concentration summary data presented in Tables 6-8, 6-9, 6-15, 6-16, 6-18 and 6-19, shows that the background soils (non-mineralized and mineralized) have a distinctly lower concentration range for these ore-related metals (lead and arsenic and uranium), than do the mine-affected soils sampled at the 900-Foot, 700-Foot, and 300-Foot levels and OSA. The concentration differences between background and mine-affected soils coincide with gamma exposure measurement changes at the visual boundaries of mine features and disturbance. Comparison of arsenic, lead, and uranium concentration data with the gamma exposure rates, as shown in Figures 6-9 and 6-11, demonstrates that the gamma exposure data effectively defines the extent of mine-influenced soils for both radionuclides and non-radioactive metals. These data sufficiently define the extent of mine-related radionuclides and metals for evaluation of removal action alternates in the EE/CA.
20	Section 6.2.4, page 144		No local new local background sample was collected near the 700 Level Creek	The SOW and SAP did not provide for collection of a surface water background sample for the 700-Foot Level Creek. Furthermore, the primary sources of water for the 700-Foot Level Creek are surface runoff from mine-affected areas of the 700-Foot and 900-Foot levels and any drainage from the 700-Foot Level portal. Because of these conditions, an un-impacted background water quality sample could not be collected for this creek. The nearest background surface water sample was collected on Kendrick Creek between the 700-foot and 800-foot contours (700L-SW-01-A).
21	Section 6.3		Surface water samples were collected during a dry period with low stream flows. Effect of precipitation runoff and	The three surface water sampling events performed for the ESI provide data to characterize surface water flow and

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			higher stream flows on contaminant levels is not known. This may underestimate concentrations of contaminants in surface water.	water quality for both the low-flow and high-low periods. As shown in Table A-1a of the SCR, measured stream flows during the June and July sampling events were relatively low and representative of the dry period. In contrast, measured stream flows during the September sampling event were significantly higher at all sampling locations and representative of the wet season. Precipitation records from Annette Island (attached Figure 1), the nearest meteorological station to the Site, indicate that precipitation during the first two sampling events (June and July) were representative of low precipitation. Precipitation immediately preceding the September sampling event (Sept 20-22) was significantly greater than the historical average and representative of precipitation during the wet season, resulting in stream flows representative of high flow conditions during the wet season. Stream flow records are also available for Old Tom Creek near Kasaan (USGS station 15085100), the nearest USGS stream gauging station to the Site. Daily mean discharge data for Old Tom Creek (attached Figure 2) indicate that stream flows during late September 2009 were representative of stream flows during the wet season. The higher stream flows measured at the Site coupled with the Annette Island precipitation and USGS stream gauging records demonstrate that the September sampling event was representative of high flow conditions at the Site during the wet season. Comparison of water quality data collected during the three sampling events at the Site allows the effects of higher precipitation and higher stream flows on water quality to be evaluated. Water quality generally improves with increased stream flow. The concentrations of key constituents

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				sampled at stations in Kendrick Creek downstream of mine features decrease or are similar during the higher stream flows in September compared to the June and July sampling events. As shown on Figures 6-34 and 6-35 of the SCR, uranium, zinc, and radium concentrations in Kendrick Creek downstream of the 300-Foot Level mine rock pile at 300L-SW-01-A decrease during the higher stream flows in September compared to the lower stream flows in either the June and July sampling events. Uranium and radium concentrations of the drainage from the 300-Foot Level portal also decreased due to the significantly higher flow observed from the 300-Foot Level portal in response to the precipitation in September. The mineralogy of the ore body and the results of water quality sampling demonstrate that the mine rock is not acid generating, as may be observed in many other mineralized mining districts that contain sulfide minerals. Where abundant sulfide mineral content is present, the weathering and oxidation of the sulfides results in acid generation that increases metal solubility and transport upon contact with water. Under these conditions, metal concentrations may increase with increasing flow. Such is not the case at the Ross-Adams Mine. Due to low sulfide mineral content, metal concentrations are controlled by the rate of weathering, with metals concentrations in storm water runoff being affected by dilution during higher precipitation periods. As evidenced by increased flows during the late September sampling event, metals and radionuclides did not exhibit an increase in concentrations that was indicative of acid rock drainage. Sulfate concentrations, a key indicator of acid rock generation, are negligible, even in drainage from the 300-Foot Level portal, and decrease at the surface water sampling stations downstream of the mine features

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				in September. The data collected by the ESI provide sufficient data to evaluate surface water conditions during the low-flow and high-flow periods. Section 6.3.2.1 of the SCR will be revised to incorporate the above information regarding the high-flow conditions during the September sampling event and the effect of the higher precipitation on surface water quality.
22	Section 6.3.2.1, page 122		Effects of ephemeral drainage from 700-ft level adit was not assessed.	No flow was observed from the 700-Foot Level adit during any of the three sampling events. The mine mapping (BLM, 1998) and a cross section of the mine (Figure 4, KSI 2004) shows that the 700-Foot Level adit extends a distance of approximately 300 feet inward from the portal to the intersection of the near-vertical shaft connecting the 300-Foot Level. The mine mapping illustrates that the 700-Foot Level adit is a cross-cut tunnel extending through the undivided granite that does not intersect the ore body until near the intersection with the near-vertical shaft. Based on the mine geometry, flow reporting to the 700-Foot Level adit is due only to bedrock fracture inflow through the overlying granite that is intercepted along the 300-foot length of the 700-Foot Level adit. The 300-Foot Level adit effectively captures and drains water that enters the mine workings. The flow characteristics of the 700-Foot Level adit are confirmed by the absence of flow during the September sampling event, which was performed immediately following a period of above average precipitation. Flow from the 300-Foot Level portal increased significantly (from 0.04 cfs (18 gpm) during the July sampling event to 0.2 cfs (90 gpm) during the September sampling event) in response to precipitation, yet no flow was observed from

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				the 700-Foot Level portal in September. Based on the mine geometry and absence of flow observed during the ESI sampling events and other investigations, drainage from the 700-Foot Level portal is expected to be minimal and occur only intermittently during periods of high precipitation. As such ponding of water in the adit and minor drainage from the 700-Foot Level portal does not represent a significant potential for impact to surface water, and is a very localized impact that can be effectively analyzed with removal action alternatives in the EE/CA. The SCR will be revised to provide a more detailed evaluation/discussion of the potential for drainage from the 700-Foot Level portal and the potential effect on surface water.
23	Appendix A		In the ecological risk work plan, aluminum, which is associated with the mineralized rock, is discussed as a potential COPEC if pH is below 5.5 in the media. The pH values in the SCR indicate that soil pH is generally lower than 5.5 at the site. Aluminum was initially analyzed for in the soil samples, but was not included in some of the later soil samples targeted to soil COPECs. Aluminum should be retained as a soil COPEC; the 19 samples with results for aluminum should still be adequate for the screening level risk assessment.The same is true for manganese, which is also a new soil COPEC	In the SLERA, aluminum and manganese will be retained as COPECs in those exposure units where the ecological screening criteria and background concentrations are exceeded.
24	p. ES-4		The dose assessment will be performed using RESRAD for human health and RESRAD-BIOTA for ecological risk. Both RESRAD and RESRAD-BIOTA use soil concentrations of individual radionuclides as inputs. Is the assumption correct that the soil data and not the gamma survey data will be used for the dose assessments?	Site-specific soil data will be used in the RESRAD and RESRAD-BIOTA dose assessment. Actual gamma exposure rates, where available, may be compared to the direct gamma dose pathway in dose assessments performed using either RESRAD or other computer codes.

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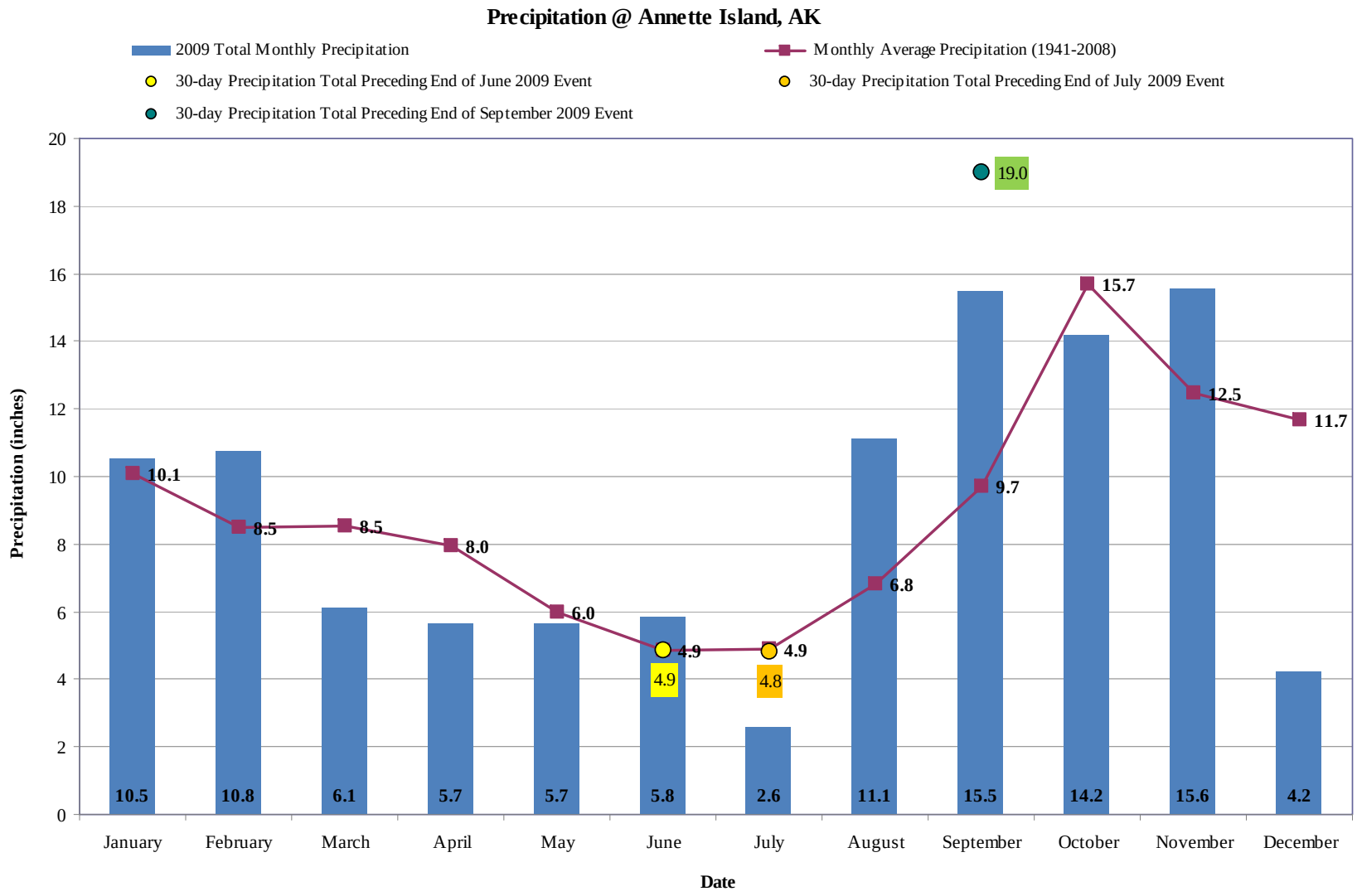

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Figure 1
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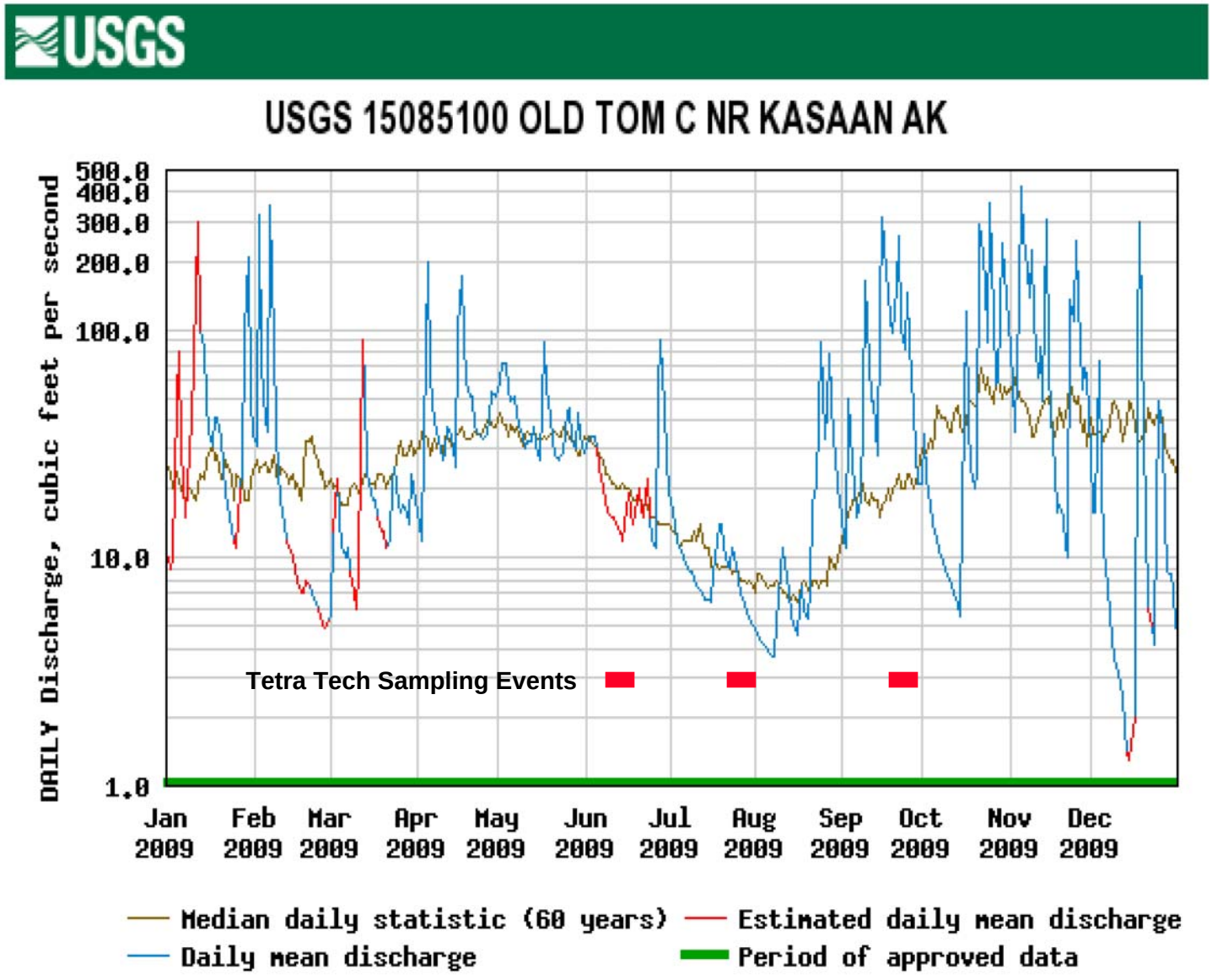

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Figure 2
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1.	General	While environmental media were included in the additional characterization activities, no biota samples were collected. A variety of biota was analyzed in 1970, which predates much of the mining activity at the site. Given that 1970 results indicated (1) up to 2,400 mg/kg uranium in lodgepole pine from the site, and (2) lack of collocated soil and plant samples, additional biota investigation appears warranted to evaluate if current conditions are similar to or different from historical conditions. This is essential to any risk assessment to be conducted at the site, which evaluates anticipated future conditions. ORNL lists a uranium soil concentration for protective plants as 5 mg/kg, so toxicity to ecological organisms is definitively of concern and should be fully evaluated.	The Site Characterization Report (SCR) summarizes the activities conducted and data generated as part of the 2009 Expanded Site Investigation (ESI) that was conducted pursuant to the approved Sampling and Analysis Plan (SAP). In accordance with the Administrative Settlement Agreement and Order on Consent (ASAOC) and Statement of Work (SOW), a Screening-Level Ecological Risk Assessment (SLERA) and Screening-Level Human Health Risk Assessment (SLHHRA) will be prepared and included as part of the EE/CA. The SLERA will evaluate potential exposures and risks to a range of ecological receptors including terrestrial plants and invertebrates, marine and freshwater aquatic organisms, and wildlife indicator species. This will include estimates of exposure and comparison to toxicity reference values and ecological screening benchmarks, including the ORNL soil benchmark for uranium of 5 mg/Kg for plants as appropriate. The results of the risk assessment will confirm whether additional site-specific data are needed to characterize potential risks at the Site and evaluate removal action alternatives. The 1970 data related to uranium uptake in Lodgepole pines and other media were reported by Eakins (1970) in an investigation that evaluated bio-geochemical prospecting methods for uranium exploration, but does not provide a basis for risk assessment or risk characterization of current Site conditions. The data provided by the ESI and other recent investigations will be the basis for risk assessment. Potential food chain transfer and receptor exposure of metal and radionuclide constituents will be evaluated in the SLERA using current Site data and established risk assessment methodology as described in the SLERA Work Plan (Attachment A to the SAP).

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2.	General	No radon sampling has been conducted at the Dotson residence; a vapor intrusion assessment should be conducted at this location. Additional soil samples in the immediate vicinity of the residence would also enable a more site-specific evaluation of potential exposures and risks to individuals frequenting this structure. This is a potential issues since the indoor inhalation background concentration for radon listed by ATSDR is 1.25 pCi/L, while outdoor concentrations near the OSA (close to the Dotson residence) ranged up to 92.9 pCi/L.	The Dotson cabin was historically constructed as a base for uranium exploration. Future residential use is not an appropriate risk scenario for USFS land in this area. The ESI included radon sampling in the vicinity of the cabin. While a number of the radon detectors were damaged or malfunctioned, the causal link between mined materials as defined by the gamma radiation and radon generation has been defined. The radon and soil data provided by the ESI and the previous investigations by Kent & Sullivan (KSI) (2004) provide the data necessary for Site characterization, risk assessment and EE/CA development.
3.	General	With the exception of background analyses of the ESI, collection of conventional QA/QC samples including duplicate, equipment blanks, and trip blank appeared to be light or non-existent from what is presented in the report. Appendix A goes into some detail on QA/QC and comments to Appendix A are included in this review. Please provide a new section and summary of the QA/QC procedures, results, and evaluation in the main body of the report.	Section 3.4 of the draft SCR currently provides a brief summary of the QA/QC results, with a detailed discussion of each sampling event provided in Appendices B-3, C-3 and D-3. Section 3.4 will be revised to include a discussion of the methods used to evaluate the data quality. The discussion for each event will be expanded to summarize the results of the data review. After the existing introductory paragraph, a discussion will be added describing how the precision, accuracy and completeness of the data sets were assessed, referencing the applicable sections in the QAPP. Numbered subsections will be created for each sampling event (i.e., 3.4.1, 3.4.2 and 3.4.3), in which the results that are now presented in the appendices will be summarized. A comprehensive list of qualifiers assigned will be added (combined Tables 1 from Appendices B-3, C-3 and D-3). The QAPP required that field QC samples be collected at a frequency of 1 per 20 samples (5%) per media type. At this frequency, a total of 11 field duplicates and 4 equipment rinsate blanks were identified for general sampling. Additional equipment rinsate blanks were identified for mercury, DRO, GRO and TOC analyses. Eight of the 11 field duplicates were collected and 1 of the 4 field rinsate blanks was collected. Disposable sampling

			equipment was used for surface water sample collection, so no equipment rinsate blanks were necessary. No evidence of a systematic bias associated with field sampling or laboratory analysis was indicated by the QC data provided by the 8 duplicate samples. Concentrations of the primary and duplicate samples were within precision control limits stated in the QAPP, indicating low sampling variability and acceptable sample quality. The equipment rinsate blank sample results for the marine sediment sample (sample ID VV-rinsate) were reported as a surface water field QC sample on Tables A-1b and A-1c. Equipment rinsate blanks were collected for the mercury analysis, but not for DRO, GRO or TOC. Review of the data indicates that a "J" qualifier may be appropriate for the DRO, GRO and TOC results; however, none of the data will be rejected. The requirements for decontamination of sampling equipment between samples were stringently followed, and we do not feel that the omission of the QC samples impact the quality or validity of the data set.
4.	Page ES-3, last paragraph	Quantity of data points in a radiation survey is a largely meaningless metric in the absence of scanning frequency/density. It is understood that this is meant to demonstrate that the surveys were extensive. Suggest considering provision of additional summary details, e.g., "Over 182,000 discrete data points representing "XX" lateral acres were generated during the gamma radiation surveys."	This sentence will be revised as follows: "Over 182,000 discrete data points representing approximately 185 acres were generated during the gamma radiation surveys."
5.	Page ES-4, 2nd full paragraph	It is noteworthy that surface water sampling was performed outside of the wettest season when the PA/SI identified the potential effect of higher stream flows as a data gap. This did not appear to be addressed further in the document body text.	The surface water sampling event performed in late September 2009 provides data to characterize surface water quality during higher stream flows representative of the wet season. As shown in Table A-1a of the SCR, measured stream flows during the sampling event in late September (Sept 20-22) were significantly higher at all sampling locations than in the June and July sampling events. Evidence that surface water samples collected during the September event are representative of wet season precipitation and runoff is discussed below.

			Precipitation records from Annette Island, the nearest meteorological station to the Site, indicate that precipitation (attached Figure 1) immediately preceding the September sampling event was significantly greater than the historical average and representative of precipitation during the wet season, resulting in stream flows representative of high flow conditions during the wet season. Stream flow records for Old Tom Creek near Kasaan (USGS station 15085100), the nearest USGS stream gauging station to the Site show that daily mean discharge data for Old Tom Creek (attached Figure 2) during late September 2009 were representative of stream flows during the wet season. The higher stream flows measured at the Site coupled with the Annette Island precipitation and USGS stream gauging records demonstrate that the September sampling event was representative of higher stream flow conditions at the Site during the wet season. Comparison of water quality data collected during the three sampling events at the Site allows the effects of higher precipitation and higher stream flows on water quality to be evaluated. Water quality generally improves with increased stream flow. Concentrations of key constituents sampled at stations in Kendrick Creek downstream of mine features decrease or are similar during the higher stream flows in September compared to the June and July sampling events. As shown on Figures 6-34 and 6-35 of the SCR, uranium, zinc, and radium concentrations in Kendrick Creek downstream of the 300-Foot Level mine rock pile at 300L-SW-01-A decrease during the higher stream flows in September compared to the lower stream flows in either the June and July sampling events. Uranium and radium concentrations of the drainage from the 300-Foot Level portal also decreased due to the significantly higher flow observed from the 300-Foot Level portal in response to the precipitation in September.

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			The mineralogy of the ore body and the results of water quality sampling demonstrate that the mine rock is not acid generating, as may be observed in many other mineralized mining districts that contain sulfide minerals. Where abundant sulfide mineral content is present, the weathering and oxidation of the sulfides results in acid generation that increases metal solubility and transport upon contact with water. Under these conditions, metal concentrations may increase with increasing flow. Such is not the case at the Ross-Adams Mine. Due to low sulfide mineral content, metal concentrations are controlled by the rate of weathering, with metals concentrations in storm water runoff being affected by dilution during higher precipitation periods. As evidenced by increased flows during the late September sampling event, metals and radionuclides did not exhibit an increase in concentrations that was indicative of acid rock drainage. Sulfate concentrations, a key indicator of acid rock generation, are negligible, even in drainage from the 300-Foot Level portal, and decrease at the surface water sampling stations downstream of the mine features in September. In addition, pH values at the surface water sampling stations remained relatively stable during the three sampling events. In summary, the data collected by the ESI provide sufficient data to evaluate surface water conditions during the low-flow and high-flow periods. Section 6.3.2.1 of the SCR will be revised to incorporate the above information regarding the higher flow conditions during the September sampling event and the effect of the higher precipitation on surface water quality.

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6.	Page ES-4, 2nd full paragraph	The stream sediment sampling summary accounts for 10 samples, but 12 are listed in Table 3-6. Samples KBD-SS-01-A and KBD-SS-01-B are the most likely source of the discrepancy due to being from a transitional zone, but the document body text does not clarify this, and 2 additional sediment sampling locations have not been included in accounting for intertidal samples.	A total of 12 stream sediment samples were collected, not 10 as reported on page ES-4, on Page 30, and on Page 4 of Appendix A. Two additional sediment samples were collected from the stream within the intertidal zone (KBD-MS-01-R and KBD-MS-01-S); these two samples were included in the marine sediment samples as described on Page 4 of Appendix A, but were inadvertently displayed on Figure 3-1 as stream sediments. Pages ES-4, Page 30, and Page 4 of Appendix A of the SCR will be revised to report 12 stream sediment samples and 22 intertidal sediment samples, and the two intertidal sample locations referenced herein will be moved from Figure 3-1 to Figure 3-4.
7.	Page ES-4, 2nd full paragraph	The summary accounting for 20 intertidal sampling locations appears to omit sampling locations KBD-MS-01-R and KBD-MS-01-S, likely due to these samples being from a transitional zone, as described in the document body text. These 2 sampling locations have not been included in other summary accounting (resulting, cumulatively with the previous comment for samples KBD-SS-01-A and KBD-SS-01-B, in 4 sampling locations apparently unaccounted for in summary statistics).	This discrepancy is acknowledged. The SCR will be revised as discussed in the Response to Item No. 6.
8.	Page ES-4, 4th full paragraph and Subsection 3.3.10	Suggest adding brief clarification/justification for performing PCB analysis on one sample. E.g., "...with one sample from the vicinity of the former generator shack analyzed for polychlorinated biphenyls (PCBs)."	Pages ES-4 and Page 31 of the SCR will be revised as follows: "Soil samples were collected at four of the waste locations and analyzed for gasoline and diesel range organics, with one sample from the vicinity of the former generator shack analyzed for polychlorinated biphenyls (PCBs)." The SAP identified one soil sample from the former generator shack location for PCB analysis. The soil sample from the generator shack was analyzed for PCBs due to the potential for electrical transformers containing PCBs to have previously been located at this shack. The soil sample location was selected in the field to represent the highest likelihood of detecting potential PCB contamination. No evidence of electrical equipment use was determined at other locations.

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9.	Page ES-5, top of page	Suggest deleting the sentence regarding wildlife observations during sampling. While this was a good additional data opportunity to recognize during field sampling, it ultimately appears to be incidental data collection that doesn't match the higher caliber of systematic data collection summarized in the rest of this executive summary paragraph. The existing mention of this survey in the more detailed context of the later biological assessment summary and within the document body seems more appropriate.	The SCR will be revised to delete the sentence at the top of Page ES-5 regarding wildlife observations during sampling.
10.	Page ES-5, "Mine Portals" bullet	While appropriate as an observation under the ESI, a more detailed evaluation/discussion of drainage from the 700-foot level portal may be appropriate, depending on the conclusions of the risk assessment. The presence of standing water but with no visible drainage outside of the wettest season ultimately seems inconclusive if this drainage represents a credible potential impact. Quantification and characterization of this drainage should be considered.	The SCR will be revised to provide a more detailed evaluation/discussion of the potential for drainage from the 700-Foot Level portal, and will be summarized in the Executive Summary. The mine mapping (BLM, 1998) and a cross section of the mine (Figure 4, KSI 2004) shows that 700-Foot Level adit extends a distance of approximately 300 feet inward from the portal to the intersection of the near-vertical shaft connecting the 300-Foot Level. The 300-Foot Level adit effectively captures and drains water that enters the mine workings. Based on the mine geometry, flow reporting to the 700-Foot Level adit is due only to bedrock fracture inflow intercepted along the 300-foot length of the 700-Foot Level adit. In addition, the mine mapping illustrates that the 700-Foot Level adit is a cross-cut tunnel extending through the undivided granite that does not intersect the ore body until near the intersection with the near-vertical shaft. Bedrock fracture flow intercepted by the 700-Foot Level adit occurs from the overlying granite, rather than flow from the ore body. The drainage characteristics of the 700-Foot Level adit are confirmed by the absence of flow during any of the three sampling

			events, even during the higher precipitation that preceded the late September sampling event. In contrast, drainage from the 300-Foot Level portal increased significantly (from 0.04 cfs (18 gpm) during the July sampling event to 0.2 cfs (90 gpm) during the September sampling event) in response to precipitation, yet no flow was observed from the 700-Foot Level portal in September. Based on the mine geometry and absence of flow observed during the ESI sampling events and other investigations, drainage from the 700-Foot Level portal is expected to be minimal and occurring only intermittently during periods of high precipitation. As such ponding water in the adit and minor drainage from the 700-Foot Level portal does not represent a significant potential for impact to surface water, and is a very localized impact that can be effectively analyzed with removal action alternatives in the EE/CA.
11.	Page ES-6, 1st bullet	Intertidal and Marine Zones are not “terrestrial” as stated in the bullet.	Revision will be made to Page ES-6 by deleting the word “terrestrial.”
12.	Page ES-6, first bullet under "Biological Assessment"	Suggest deleting "terrestrial" or otherwise rephrasing--by definition, a marine zone could not be considered a terrestrial habitat.	Revision will be made to Page ES-6 by deleting the word “terrestrial.”

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13.	Page ES-7, 1st paragraph after bullets	Given subsistence use habits and patterns elsewhere in Alaska, proximity to larger population centers is not necessarily a desirable factor in determining likelihood of hunting/gathering.	The paragraph referred to is intended to acknowledge that subsistence use of land and marine resources at the Site is a possibility. The statement about the Site's remote location is only included to put this potential future use in perspective. The SLHHRA will include subsistence use exposure pathways. Subsistence use for hunting, fishing and gathering will be considered for the Site in the SLHHRA using Alaska-specific data for the nearest populated areas (i.e., Hydaburg) from the Alaska Department of Fish and Game database and other relevant information and described in the SLHHRA. The paragraph in the SCR will be modified to state that risk due to Site subsistence use and assumptions will be evaluated in the SLHHRA.
14.	Page ES-8, "I&L Zone" bullet and Page ES-9, penultimate paragraph	"Exceeding 2,123 uR/hr" seems to be an ambiguous upper-end generalization considering the stated precision of the measurement. Suggest "up to 2,124 uR/hr" (presumably) as an alternative to match usage in the other summary bullets.	Comment is acknowledged. Pages ES-8, ES-9, and 103 of the SCR will be revised to indicate that 2,124 uR/hr is the upper limit of measured gamma exposure readings in this area.
15.	Page ES-11, top of page, 1st complete sentence ("The State of Alaska has established...")	It appears that zinc has been omitted from the general listing of available state freshwater chronic criteria based on the subsequent sentence. The phrasing of the subsequent sentence is also slightly odd ("Except for zinc, the maximum arsenic, etc....concentrations...were below criteria" implies that zinc is a subset of the other metals listed.)	Zinc was inadvertently omitted from the general listing of freshwater chronic criteria. The listing will be revised to include zinc. The subsequent sentence will be clarified by deleting "Except for zinc."
16.	Page ES-11, 1st paragraph	Something is missing in this paragraph. It is stated that the State of Alaska has criteria for arsenic, cadmium, copper, and lead, yet the next sentence discusses criteria for zinc. Please revise the paragraph to correctly reflect which metals have chronic freshwater criteria developed by the State of Alaska.	As discussed above in the Response to ADEC Item No. 15, zinc was inadvertently omitted from the general listing of freshwater chronic criteria. The paragraph will be revised to include the metals for which chronic freshwater criteria have been established by the State of Alaska.
17.	Page ES-12, "Groundwater"	Suggest revision on end of line 2: add 'likely to be' in "…groundwater is [likely to be] very minimal and…"	The sentence will be revised as indicated.

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18.	Page ES-13, "Air Media (Radon)" Section	1) It is unclear whether some of the reported radon concentration values are maximum values, mean values, or one-time (short-term) measurements. Suggest clarifying this for the 136 pCi/L, 76.3 pCi/L, 64.1 pCi/L, and 92.9 pCi/L values. 2) for those stations which were damaged, defective, saturated, or missing – suggest re-establishing these locations and conducting the sampling again this summer in order to obtain this data.	The reported radon concentrations are the concentrations averaged over the exposure periods, generally over three months for long-term exposure, and are calculated based on the vendor's calibration factors. As shown in Table 3-4 of the SCR, the radon detectors for long-term exposure measurements were deployed on June 8 or June 9, 2009 and retrieved on September 23, 2009. The radon detectors for short-term exposure measurements were deployed for a six-day period during the July sampling event. Page ES-13 will be revised to clarify that the radon concentrations are the average over the exposure periods. As stated in Response to ADEC Item No. 2, re-establishing the sampling locations would not result in the acquisition of data needed for risk assessment or removal action decision making.
19.	Page ES-17, 1st full paragraph	The statement that leaching of metals from mine rock is expected to be a minimal release mechanism required further support. Given that the background pH in non-mineralized soils is approximately 4.5, acid mine drainage may be a potential issue at the site. In such situations, leaching and bioavailability of heavy metals can increase relative to more neutral pH conditions. Please provide additional support that leaching does not represent a significant release mechanism. This statement is inconsistent with uptake of over 2,000 mg/kg uranium in lodgepole pines from the site, which can only occur if the uranium has leached to and dissolved in water.	All data collected at the Site to date indicate that acid mine drainage is not an issue (also see Response to ADEC Item No. 5). Water quality data does not indicate increased leaching of metals and radionuclides as would be expected if mine materials were acid generating. Sulfate concentrations, a key indicator of acid rock generation, are negligible in surface water samples downstream of mine features, even during periods of higher precipitation, as experienced during the late September sampling event. In addition, pH values at the surface water sampling stations remained relatively stable during the three sampling events. Analysis and observation of mine material data do not indicate increased leaching and bioavailability of heavy metals due to acid mine drainage. Soils developed from granite parent material in regions that experience high levels of rainfall typical at the Site are commonly acidic due to a low buffering capacity. A native soil pH of 4.5 is, therefore, not unusual for the Site and is not an indication that acid mine drainage is occurring. The lodgepole pine sample that the reviewer mentions is a historic

			sample that was analyzed as part of a study (Eakins, 1970) whose objective was to demonstrate that uranium concentrations in plant material can be used for prospecting of an ore body. The uranium concentration reported by Eakins (1970) of 2,396 mg/Kg in the lodgepole pine sample was collected within the open cut at the 900-Foot Level. It is not unexpected that a plant growing directly into a uranium ore body would have elevated uranium concentrations; however, this does not indicate acid mine drainage from site materials, only that the tree that comprised that particular sample is/was growing in an area of very high uranium concentrations (i.e. the ore body). Considering the data available for the Site, it is reasonable to state that leaching of metals from mine rock is expected to be a minimal release mechanism.
20.	Figures ES-6 through ES-9	The inclusion of a larger-scale unkriged plot combined with more focused kriged figures (coupled with the availability of unkriged versions in Appendix E) is a noteworthy positive method to present the gamma survey data for a range of readers.	No response is necessary.
21.	Figure ES-6 and 6-1	Suggest including labels for site features (e.g., as used in Figure ES-5) to assist with spatial correlations.	Figures ES-6 and 6-1 will be revised to include labels for major site features.
22.	Figure 1-4	Clarify which soil samples are from the KSI report.	Figure 1-4 will be revised to indicate which soil samples are from KSI (2004).
23.	Section 2.0	If you could provide copies of the MacKevett, Eakins and Staatz studies, that would be appreciated.	Electronic copies of these documents will be provided on a CD to the Forest Service.
24.	Page 20, bullet 1 and 2	Please clarify which parts of the plants were sampled – leaves, roots, stem, berries…	Page 18 of Eakins (1970) reports that "Plant samples were taken by cutting 6 to 10 inches of the branch tips, including leaves, needles and cones…" No specific reference is provided for berries.

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25.	Subsection 3.3.11	Suggest providing a reference to Section 6.3.1.5 to match the general style used for other 3.3 subsections.	Subsection 3.3.11 will be revised to include a reference to Subsection 6.3.1.5.
26.	Section 3.4	Suggest adding similar summary discussion for data usability of the gamma surveys. Given the relative importance of the gamma surveys in the overall ESI and subsequent future determinations, the absence of any data usability statement here was noticeable. At a minimum, reference to Appendix E, Section 3.4 would suffice.	Section 3.4 will be revised to summarize the usability of the gamma survey data, consistent with the QA/QC evaluation provided in Appendix E, Section 3.4. All gamma survey data presented in the SCR met the QAPP performance criteria and are useable for characterization, risk assessment, and the EE/CA.
27.	Table 3-2	Analysis for petroleum range hydrocarbons (GRO & DRO) on certain soil samples, as described in Section 3.3.10 appears to have been omitted.	Table 3-2 will be revised to include the analytical methods used for analysis of petroleum range hydrocarbons (GRO and DRO). Method SW8015B was used for GRO analysis and Method SW8015MB was used for DRO analysis.
28.	Figure 4-6, and subsequent figures	"Mine Rock Piles" have been called "Waste Rock Piles" on previous figures – consistency.	The term 'mine rock pile' is used throughout the text body of the SCR. The report figures will be revised to ensure consistent use of this term when referring to these features.
29.	Page 89, Section 5.2.3	Are only the six listed default wildlife indicator species to be further addressed in the ecological risk assessment? Other feeding guilds are also needed, such as mammalian herbivores. Appendix F states that some of the indicator species to be addressed are consistent with the ADEC default species, but does not imply that only the set of six default species listed here will be further considered.	The SLERA will evaluate eight wildlife indicator species, including dark-eyed junco, American robin, belted kingfisher, mew gull, masked shrew, long-tailed vole, sea otter, and harbor seal. The long-tailed vole is a mammalian herbivore and is also an ADEC default indicator species. In addition, the SLERA will evaluate the following "community receptors": terrestrial plants and invertebrates, freshwater invertebrates and fish, and marine invertebrates, plants, and fish.
30.	Table 5-1	Several threatened and endangered species, as well as sensitive habitats (e.g., eelgrass beds), are present at the site. Please ensure the risk assessment separately addresses these T&E species and habitats.	Based on a review of current lists from U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Alaska Department of Game and Fish, no terrestrial threatened and endangered (T&E) wildlife or plant species have been identified that may be associated with the Site. None of the bat species that may potentially occur at the Site are listed T&E species. The SLERA will further consider if any threatened and endangered species and sensitive habitats are present at the Site, and will evaluate these as described in ADEC's "Risk Assessment

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			Procedures Manual". Indicator species from the same trophic level will be selected as surrogate species to assess potential risks to threatened or endangered species, if determined to be present at the Site.
31.	Page 99, last paragraph, 1st sentence, et seq.	Consider inserting a sentence at each pertinent point that addresses the consequences of surveys being cut short because of terrain hazards.	A sentence clarifying the consequences will be added at the pertinent sections. The termination of gamma scanning due to terrain hazards was limited to specific areas that did not compromise characterization of the mine features. Such conditions were encountered in relatively small areas limited to the 300-Foot and 700-Foot Level mine rock piles. The patterns of gamma activity in immediately adjoining areas is sufficiently defined such that the gamma activity in the un-scanned areas can be effectively and conservatively estimated for the purposes of the risk assessment and EE/CA.
32.	Subsection 6.1.1.1, 2nd paragraph, 3rd sentence	Editorial - suggest "isolated area of higher gamma *activity*"	The SCR will be revised as indicated by the comment.
33.	Page 101, 3rd full paragraph, last sentence and Subsection 6.1.2.1, last sentence	Suggest restating as "contrasts with a scenario where more widely distributed..." As presently stated, this can be read that such fine-grained sediments are actually present with lower associated activity levels than the cobbles and boulders rather than as a comparison against a theoretical alternative scenario.	The SCR will be revised as indicated by the comment. However, it is emphasized that the results of the visual observations and gamma measurements indicated that individual durable cobble- and boulder-sized ore rocks are the source of the higher gamma activity, rather than finer-grained sediment.
34.	Page 101, 5th full paragraph, 1st sentence	The text implies a high reading in the subtidal zone south of the floating dock without providing a number or reference. Consider adding a sentence that either clarifies that one of the readings earlier in section 6.1.1.3 is the reference number or adds an appropriate number.	The sentence is referring to the subtidal zone south of the floating dock, which was surveyed by KSI (2004) as depicted on Figure 6-8. The sentence will be revised for clarity.
35.	Subsection 6.1.2.3	Per Comment 11, it seems unusual to use "in excess of" relative to a fairly precise value, especially when usage elsewhere is to state the same level of precision as an upper-end boundary on measurements.	Comment is acknowledged. Per our Response to Item No. 14 (not Item No. 11), the text will be appropriately revised.

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36.	Subsection 6.1.4.1, 2nd paragraph, 2nd & 3rd sentences	These sentences do not correctly describe the comparison being performed. Suggest rewriting to "Sound linear relationships were identified between specific radionuclides of interest and gamma survey measurements. The r-squared values for these relationships are provided in Table 6-3."	The text will be revised as follows: "Sound linear relationships were identified between specific radionuclides of interest and gamma exposure readings. The r-squared values for these relationships are provided in Table 6-3."
37.	Subsection 6.2.1	This subsection and lower-tier subsections effectively present a complex background concept; acknowledgement and discussion of background as reported by previous investigations is particularly appreciated. However, some caution should be used in relegating background comparisons strictly to numeric evaluation in the context of determining a potential remedial action. While gamma activity measurements may be lower than pre-mining levels in a given location, modern measurements may represent a source that has been made more available to potential receptors due to Site activities (e.g., semi-enriched material exposed to increased environmental transport factors relative to its original in situ condition). This concept of background/pre-existing *availability to receptors* should perhaps also be acknowledged.	The SLHHRA and the SLERA will assess risk to human and ecological receptors using data collected in the ESI and by KSI based on current Site conditions.
38.	Page 111, Section 6.2.2.1, last paragraph	"all three samples were analyzed for arsenic, lead, selenium, and lead" – It appears that second use of lead should be "uranium".	The sentence will be revised to replace the second use of lead with uranium.
39.	Page 111, Section 6.2.2.1, lat paragraph	Also Table 6-8. With the limited sample set size, why is the data presented in a min, max, mean format? It would be clearer to just present the data.	For consistency, Table 6-8 was formatted similar to Table 6-9. All the data are presented in Table 6-6. Table 6-8 will be revised to eliminate the statistics (minimum, maximum, mean and median) where data are available for only one sample.
40.	Page 111, 5th full Paragraph, 2nd and 3rd sentences	Consider including a more detailed explanation for why the two KSI samples were not used. Given that the samples had higher *U* concentrations, the reason for declining to use them should be given somewhat more substance.	KSI (2004) acknowledged that soil samples SOIL-01 and SOIL-02 may not have been representative of background soils. Based on comparison of KSI (2004) and ESI data at the OSA, our interpretation is that the KSI samples SOIL-01 and SOIL-02 have been impacted by the OSA and are not representative of background soils. Accordingly these two samples were not used in our

			background soils characterization, but were included as mine affected at the OSA. ESI soil samples OSA-2 and OSA-10 were collected at approximately the same locations as the KSI samples SOIL-01 and SOIL-02, respectively (see Figures 1-4 and 6-4). ESI soil samples OSA-2, OSA-10, OSA- 8 and OSA-14 comprised the OSA composite sample C-1, with a uranium concentration of 120 mg/Kg (Table A-3b). The uranium concentration of sample C-1 is within the range of values reported by KSI for their SOIL-01 (210 mg/Kg) and SOIL-02 (73 mg/Kg) samples. The KSI samples (SOIL-01 and SOIL-02) and the four ESI samples comprising composite sample C-1 (OSA-2, OSA-8, OSA-10 and OSA-14) are interpreted as being collected from areas influenced by historic operations at the OSA and, as such, they are not representative of background conditions. OSA soil samples OSA-1 and OSA-17 provide data that are considered representative of background soils in non-mineralized areas.
41.	Page 111, Section 6.2.2.1	Three samples are insufficient to identify a soil background concentration for non-mineralized areas.	The three background samples in non-mineralized areas are adequate for the purpose of assessing the risk and determining the removal action decision making for the Site. Preliminary screening of COPCs using the maximum metal and radionuclide concentrations of background non-mineralized soils and ecological and health based screening benchmarks indicates that background non-mineralized soil data will not drive the screening of COPCs for exposure units within the non-mineralized soil area, such as the 300-Foot Level mine rock pile and the OSA. For almost all of the metals and radionuclides, the maximum concentrations at the 300-Foot Level and the OSA areas exceed the maximum background non-mineralized soil concentrations. In the remaining instances, the maximum concentration of both the mine-affected areas and non-mineralized background soils are less than the benchmarks and would not be defined as COPCs. Therefore, collection of additional soil background samples in the non-mineralized area is

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			not warranted. The extensive set of gamma exposure rate data developed for the areas and the correlation with radionuclide concentrations provides sufficient information to characterize and delineate the extent of mine disturbance areas for removal action decision making. Specific and statistically valid background soil concentrations for the non-mineralized area are not needed.
42.	Page 112, Section 6.2.2.2	Use of maximum concentrations as representative of background is not adequately conservative for use in risk assessment. Typically the 90th or 95th percentile of the distribution is used rather than the maximum.	In the SCR, the maximum concentrations of background mineralized soils were used for site characterization purposes to evaluate soil conditions at the 700-Foot and 900-Foot levels. The SLHHRA and the SLERA will further evaluate the background data presented in the SCR and will use the appropriate statistical method, consistent with applicable guidance, in evaluating potential risks to human and ecological receptors. The results of the risk assessments, including the screening of COPCs, will be included in the EE/CA as specified in the ASAOC.
43.	Page 112, Section 6.2.2.2, 1st paragraph	Last word should be uranium rather than lead.	The last word in sentence will be revised to specify uranium, rather than lead.
44.	Page 112, Section 6.2.2.2	Why were so many background samples collected from the mineralized area, but only three from the non-mineralized area?	The SAP initially defined the distribution of the sample locations to focus on defining the local background in the mineralized area. Based on an understanding of the natural variability of soil concentrations in the mineralized areas, a greater number of background samples were designated than in the non-mineralized areas to capture the expected variability. The large data set of gamma exposure rate values provide additional information concerning background levels and variability in the mineralized area and led to additional soil sampling. As described in Response to ADEC Item No. 41, the collection of additional background soil samples in the non-mineralized area is not anticipated to change the results of the screening of COPCs in the risk assessments or the

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			evaluation of removal actions in the EE/CA. For almost all of the metals and radionuclides, the maximum background non-mineralized soil concentrations are less than the maximum concentrations at the 300-Foot Level and the OSA. On the other hand, background soil concentrations in the mineralized area will affect the screening of COPCs, which justifies the additional sampling that was conducted in the ESI.
45.	Page 112, Section 6.2.2.2, 2nd paragraph; also Sections 6.2.4 and 6.2.5	It is stated that maximum observed concentrations should be considered background. The range of concentrations is highly variable and the maximums are often greater than the means.	As described in Response to ADEC Item No. 42, the maximum concentrations of background mineralized soils were used for site characterization purposes in the SCR to evaluate soil conditions at the 700-Foot and 900-Foot levels. In a similar manner, the maximum background concentrations for surface water (Section 6.2.4) and background stream sediment (Section 6.2.5) were used in the SCR to characterize surface water and sediment conditions. The SLHHRA and the SLERA will further evaluate the background data presented in the SCR and will use the appropriate statistical method, consistent with applicable guidance, in evaluating potential risks to human and ecological receptors.
46.	Page 116, Section 6.3	It appears there is a word missing in the phrase "extent of the environmental media".	The sentence will be revised to delete "the nature and extent of".
47.	Page 117, Section 6.3	The reference to Appendix A information could be stronger. This information could be better presented by including it in Section 6.3.	The data tables in Appendix A will be included as a hard copy attachment to the SCR, rather than just as an electronic file, to assist readers in reviewing the environmental data collected during the ESI.
48.	Page 120, Section 6.3.2, second paragraph	TSS – In this location is appears to be referring to total dissolved solids rather than total suspended solids. Also, TDS and TSS were not observed in the abbreviations list.	The last sentence of the paragraph is referring to total suspended solids (TSS) and will be corrected. TDS and TSS will be added to the abbreviations list.
49.	Section 6.3, general	Section 6.3 needs an edit. There are several instances of missed words, tense issues, etc.	Section 6.3 will be carefully edited and any grammar or editorial errors will be corrected.
50.	Page 125, Section 6.3.2.3, 1st paragraph	This paragraph seems misplaced and doesn't seem to fit with the rest of the information included in this section.	The paragraph is intended to summarize the information presented in the previous Section 6.3.2. However, the paragraph will be edited to provide consistency with Section 6.3.2.

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51.	Page 127, 3rd full paragraph,	Suggest including a brief explanation for why the Tetra Tech and KSI data were combined at this place (and not others), along with a description and qualification of the KSI data and a comparison between the KSI and Tetra Tech data, all to give the reader an understanding of why it was acceptable to do this and what the effect of combining the two data sets was, i.e. what was the effect on residual values versus using the Tetra Tech data alone, and is there any significance to the deltas in residual values?	The SCR did include the KSI data in background and mine-rock pile evaluations on a matrix-by-matrix basis. In reviewing the sample descriptions provided by KSI (2004) in their Table 10, we consciously excluded only those background samples listed as having a "rock" matrix. It was believed that intermixing samples classified as having a "rock" matrix with those having a "soil" matrix in the background assessment was not justified. In the case of the marine sediment samples, both KSI (2004) and the ESI collected samples from the same matrix using similar sampling methods, justifying the consolidation of these sample results into one data set. Excluding the KSI (2004) data from the marine sediment data set would impact the residual values. However, the KSI (2004) sampling strategy was generally focused on characterizing the sources; consequently, many of their samples targeted mine features or were collected from obviously impacted areas immediately adjacent to these features. The ESI sampling strategy was primarily focused on delineating the transition zones from the mine-affected area around the mine features to non-impacted areas. In the case of the marine sediments, the combined data set defines both the impacted and non-impacted areas.
52.	Page 129, 2nd full paragraph, 2nd sentence	This sentence seems to contain an assumption that *U* and *As* would dissolve and be transported together. Is there justification for this assumption?	The referenced sentence does infer that arsenic and uranium would exhibit similar geochemical behavior in the near surface environment. Since support for that assumption has not been provided in the SCR, the sentence will be deleted.
53.	Pages 129-130	§6.3.4.3 presents *As* information for Kendrick Bay. §6.3.4.4 summarizes *As* information for the West Arm of Kendrick Bay. The detailed discussion and the summary should address the same geographical scope.	Marine sediment sampling during the ESI was conducted within the West Arm of Kendrick Bay. The SCR will be revised to consistently use West Arm of Kendrick Bay where appropriate.

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54.	Page 129, Section 6.3.4.3	This section would fit better in Section 6.2.6. The rest of the background concentrations are included in Section 6.2. Why not include this discussion there also?	The inclusion of the marine sediment background discussion in Section 6.3.4.3, rather than Section 6.2, was preferred simply because the marine sediment background determination relies on the entire marine sediment dataset. The entire marine sediment dataset is not presented in the SCR until Section 6.3.4.
55.	Section 6.4, pages 132-133	From a cosmetic standpoint it would be more appropriate to either have all bullets end with a period or not end with a period instead of half and half.	The SCR, particularly Section 6.4, will be revised to use a consistent format for bullets.
56.	Section 6.4 page 132, bullet #14	Tetra Tech references the abandoned dynamite shack at the 900-Foot Level haul road, but didn't give rational for not sampling the soil at that location for TNT and related compounds.	Other than miscellaneous waste present at the dynamite shack, evidence of remnant explosive materials or soil staining was not observed.
57.	Section 6.4 page 132, bullet #16	Tetra Tech references soil sample 900L-BATT collected at the 900-Foot Level due to deteriorated lead acid battery plates but does not provide a summary of this sample's results in the text or reference a table which presents the results. This sample should have been analyzed for total lead and pH.	The second full paragraph on page 133 summarizes the analysis of DRO and GRO in the soil sample 900L-BATT. A reference to Table A-3a will be provided in the text. The sample was not analyzed for total lead or pH.
58.	Section 6.4, page 133, paragraph 3	It is unclear what parameters were used to calculate a method 3 cleanup level; please explain. Default method 2 cleanup levels should be used as screening criteria unless an alternative cleanup level (method 3 or 4) is proposed and approved. Correct citation is 18 AAC 75.341, not .351.	The Method 3 cleanup level was not independently calculated, but rather was duplicated from the method cited in KSI (2004) for consistency. The criteria prescribed by Method 2 lists cleanup levels for GRO and DRO as 1,400 mg/kg and 8,250 mg/kg, respectively. The highest GRO and DRO measured were 0.44 mg/kg (300L-GENSHACK) and 7,000 mg/kg (OSA-UST DOCK), respectively. Thus, the measured soil concentrations were below the cleanup criteria for Method 2. The SCR will be revised to reflect this information, and the citation will be revised to 18 ACC 75.341- Soil Cleanup Levels; Tables.
59.	Tables 6-15 through 6-22	It would be preferable to have a table in the main report section which listed the actual sample results by locations similar to the other media.	The data tables in Appendix A will be included as a hard copy attachment to the SCR, rather than just as an electronic file, to assist readers in reviewing the environmental data collected during the ESI.

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60.	Table 6-23	For those parameters which do not have a listed AWC, please determine an appropriate screening criteria.	Appropriate screening criteria for water quality will be described in the SLERA and used to identify COPECs.
61.	Appendix A	Throughout – In general, duplicate samples were not collected at the ten percent frequency accepted as standard by ADEC.	The QAPP specifies in Section 3.5.1- Field Quality Control that Field QC samples will be collected at a frequency of one each per 20 field samples, or 5%.
62.	Appendix A, Table A-3-a, page 42	The first three samples from July 2009 have no results listed.	The soil samples OSA-4DUP, OSA-5 and OSA-6 will be removed from this table as no organic parameters were analyzed for these samples.
63.	Appendix A, Table A-3-a, page 45	The last four samples have no results listed. Note – same comment on pages 48, 54, and 57.	Soil samples 300L-GENSHACK, 3TANK-TPH, 900L-BATT, and OSA-UST DOCK will be removed from pages 45, 48, 54, and 57 of Table A-3a, as none of the analyses were conducted for these samples.
64.	Appendix A, Table A-6-a, page 60	What does "Field QA" refer to? No duplicates are listed or labeled within that section. This comment also refers to Table A-1.	Field QA refers to Quality Assurance samples (Field blanks, rinsate blanks, duplicates) as listed in Table A-1 and other tables throughout Appendix A. These sample IDs would be more accurately labeled as Field QC to be consistent with the QAPP.
65.	Page 201, Section 7.1, Second paragraph	It is stated that an understanding of natural background levels is critical; however, background determinations do not appear to be sufficient to meet that statement.	As stated in the sentence, the "concept" of local background levels is critical to the understanding of the Site conditions because of the influence of the natural mineralization exposed at the surface throughout the 900-Foot and 700-Foot Levels. The sentence is referring to the concept of the influence of natural variability in mineralized soil and bedrock conditions, rather than numeric characterization of mineralized background soil and bedrock. As described in Responses to ADEC Item Nos. 41and 44, a greater number of background soil samples were collected and analyzed in the mineralized area due to the observed variability in the gamma exposure rates and the expected variability in mineralized soil metal and radionuclide concentrations. A sufficient number of soil samples were collected to determine the variation in background mineralized soil and to allow statistical evaluation, as appropriate, in the SLHHRA and the SLERA. An important aspect of the

			"conceptualization" is that underlying the relatively thin soils and mine rock piles is variably mineralized bedrock. In addition, the extensive gamma survey data set provides information to assess the variability in the mineralized area and define the boundaries of the mine rock piles at the 900-Foot and 700-Foot levels. Gamma correlation with radionuclide soil concentrations provides reasonable estimates of the Ra-226 concentrations and other radionuclides in areas for which soil sample data are not available and thus does effectively delineate background radionuclide concentrations.
66.	Appendix B-3, Appendix C-3, and Appendix D-3	A number of the sample sets were shipped without ice, over the specified temperature upon arrival at the lab, analyzed outside hold times, duplicates were not blind labeled, rather were labeled as "DUP" or some variant thereof, and field duplicate samples were not collected at the required frequency of ten percent.	For sediment and soil samples, there are no EPA or laboratory-specific temperature requirements for sample shipping except for mercury (soils), organics (GRO and DRO in soils) and total organic carbon (marine sediment). Blank samples were collected for mercury analysis, but not for GRO, DRO, and TOC. Some surface water samples were received by the laboratory for radiochemical analysis outside the recommended shipping temperature; however, preservation temperature is not required for radiochemical analysis and does not affect the analysis and data quality. These temperature exceedances were noted in the individual laboratory report data validation memoranda. The labeling scheme described in the QAPP (Section 3.3.3) was not consistently followed for the field duplicate samples. The QAPP stated that field duplicates would be collected at a rate of one per 20 samples per sample media, or 5 percent. This was followed for all sampling events and media except for the soil and marine sediment samples collected in July, which resulted in a total of two field duplicates for soil and one field duplicate for marine sediment not being collected. However, no evidence of a systematic bias associated with field sampling or laboratory analysis was indicated

			by the QC data provided by the duplicate samples that were collected. Concentrations of the primary and duplicate samples were within precision control limits stated in the QAPP, indicating low sampling variability and acceptable sample quality. Equipment blanks were not required for water samples as dedicated (disposable) sampling equipment was used. Review of the data indicates that a "J" qualifier may be appropriate for some of the results in question; however, none of the data will be rejected. The SCR will be modified to include more discussion on the validation of data as discussed herein.
67.	Appendix B-4, C-4, and D-4	There are several instances of analyses, primarily inorganic analyses, completed outside the specified hold times.	There were minor exceedances in holding times (1-2 days) for the surface water inorganic results (pH, conductivity, TDS and TSS) and soil organic analysis (GRO and DRO) that were noted in the attached individual laboratory report data validation memoranda. This condition is not sufficient to invalidate the data. A summary of the holding time exceedances will be added to the data validation summaries in the SCR.
68.	Appendix E, Section 3.2, 3rd paragraph	The regression demonstrated in Figure E-1c is not linear, as stated in the text. Justification for use of a polynomial regression should also be provided--i.e., is it logical that this relationship shows such a high coefficient of correlation when the general expectation for gamma radiation would be a linear relationship, or is this just an "over-optimization" of a strong linear correlation?	Several types of regression equations were applied to the data. The polynomial regression appeared to fit the data best and was therefore used to define the correlation between gamma exposure rates and soil radionuclide concentration. A linear relationship between exposure rate and concentration would be expected if there was only one gamma emitter in the surface material, assuming the instrument response is linear. However, in field situations, the gamma exposure rate is a function of the K-40 and Th-232 decay series radionuclides as well as the Ra-226 concentration. The ratio of K-40 and Th-232 is not necessarily a constant in an area with a mixture of geologic materials which is the case at the Site. Therefore, a linear relationship may not be applicable. This condition does not diminish the reliability of the relationship (correlation) provided by a polynomial, but rather more accurately and realistically defines the

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			relationship.
69.	Appendix E, Section 3.3, 1st sentence	Suggest restating "U-nat" as "U-total" for consistency with use elsewhere.	The appropriate term is U-nat. The SCR will be revised to consistently use U-nat, instead of U-total.
70.	Appendix F, Section 3.0, 2nd paragraph	Please add a statement identifying if any of these bat species are identified as indicator species for evaluation in the ecological risk assessment.	The SLERA will include a discussion of the approach used to select wildlife indicator species and will indicate what species are selected for evaluation in the SLERA. The SLERA will evaluate potential risks to mammalian insectivores by comparing sediment concentrations to the screening levels provided for bats developed by LANL (2009).
71.		--end--	

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EPA COMMENTS – Loren Setlow

1.	General	This is a relatively extensive report on the Ross Adams uranium mine and builds on the earlier evaluations conducted by Kent and Sullivan and the BLM. The haul road, open pit and waste rock at the 900 foot level, as well as portal/adit openings and waste rock at the 700 and 300 foot levels, loadout and dock areas, and shallow intertidal and marine ore spill areas all are candidates for risk assessments in evaluating future site cleanup. I was pleased to see the additional sample collection efforts undertaken for the intertidal and marine areas.	No response is necessary.
2.	General – Section 4	Although there is an introductory discussion of the site geology, the report fails to provide a section on the mineralogy of the area and, in particular, the mineralogy of the uranium/thorium minerals constituting the mining assemblage at the site. This is an important issue for the reader to understand the results of the sampling and, ultimately, the radionuclide abundances which are present and would constitute the basis of any risk assessments conducted on the site. Unlike the majority of deposits in the southwestern U.S, the principal ore minerals were uranothorite and throrianite according to the K&S study--the greater presence of thorium in the wastes and site contamination may have some ramifications for cleanup. Additionally, the complications of the presence of rare earth elements, often associated with radium contamination, may help to better understand the site's radioactivity levels.	A section will be added to the SCR to summarize the mineralogy of the uranium/thorium minerals constituting the mining assemblage at the site.
3.	Tables 6-8, 6-9, 6-15, 6-16, 6-18, 6-19, 6-21, 6-22	Tables 6-8 and 6-9 report concentrations of radionuclides in non-mineralized areas and mineralized areas, while 6-15 through 6-22 report radionuclide concentrations in soil and sediment sample locations. There is a labeling issue here: are the measurements truly in mg/kg, or shouldn't they be in pCi/g or pCi/kg?	The unit labeling for radionuclides in Tables 6-8, 6-9, 6-15, 6-16, 6-18, 6-19, 6-21, and 6-22 was inadvertently omitted. The correct unit is pCi/g.

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4.	Table 6-10	Table 6-10 reveals that an entire string of radon detectors DOT-RAD-6 through 10 were defective or missing. While this could have been coincidence or chance, it does merit more discussion possibly for resampling as this represents a key area for potential future cleanup near the coastal strip, and should be included as a recommendation in the Conclusions and recommendations section-7.2.	While a number of the radon detectors were damaged or malfunctioned, the causal link between mined materials as defined by the gamma radiation and radon generation has been defined.
5.	Table 6-28	Table 6-28 provides a comparison of radon measurements by BLM, K&S, and Tetratech. The significant differences in numbers merits additional discussion than what is currently provided in the document.	The data presented in Table 6-28 of the SCR do not indicate significant differences in the radon measurements. The BLM data were collected inside the mine workings and therefore the radon concentrations would be expected to be greater, as they are, than concentrations measured outside of the mine workings some distance from the portal openings. The variation between the KSI data and the ESI data is likely due to location of detectors, duration of data collection and the climatic conditions at the time of data collection.
6.	General	While groundwater may play a small role in migration of contaminants through the study area, the authors note that there is likely an interconnection between the 900,700 and 300 foot levels of the mine. The extent of migration to surface water other than through spillover from the 300 foot level portal is not examined due to thin soils and inability to emplace piezometers. In my study of other underground mines, a key issue has been the location of underground mine workings and exploration/production holes drilled at the site which are effective conduits of contaminated water beyond the mine portals into underlying rock and drainages. It would be useful to have duplicated the mine workings map from K&S for this report. If the Forest Service is interested, I may be able to provide contacts at the Department of Energy who can	The potential for exploration/production holes drilled within the mine workings to be conduits for contaminant migration was evaluated by reviewing historical data for 60 exploration drill holes. These data show that the holes were drilled within the 700-Foot and 900-Foot levels to elevations ranging from 182 to 659 feet (asl), with an average of 404 feet. The holes extended horizontal distances ranging from 72 to 390 feet, with an average of 196 feet. Thus, the exploratory drilling program was confined to the Bokan Mountain Granite immediately beneath and surrounding the Ross-Adams ore body. The drill holes did not extend beyond or below that bedrock formation. Further, the geologic information for the Site as presented in MacKevett (1963) and others indicates that the granitic mass of the Bokan Mountain Granite is extensive with depth in the area and that no other geologic formation is present beneath the granite that could be an "aquifer". The absence of groundwater use in the area is

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		provide access to some business confidential documents associated with the mine including drill hole data.	consistent with the geologic setting which indicates that no local or region aquifer exists.

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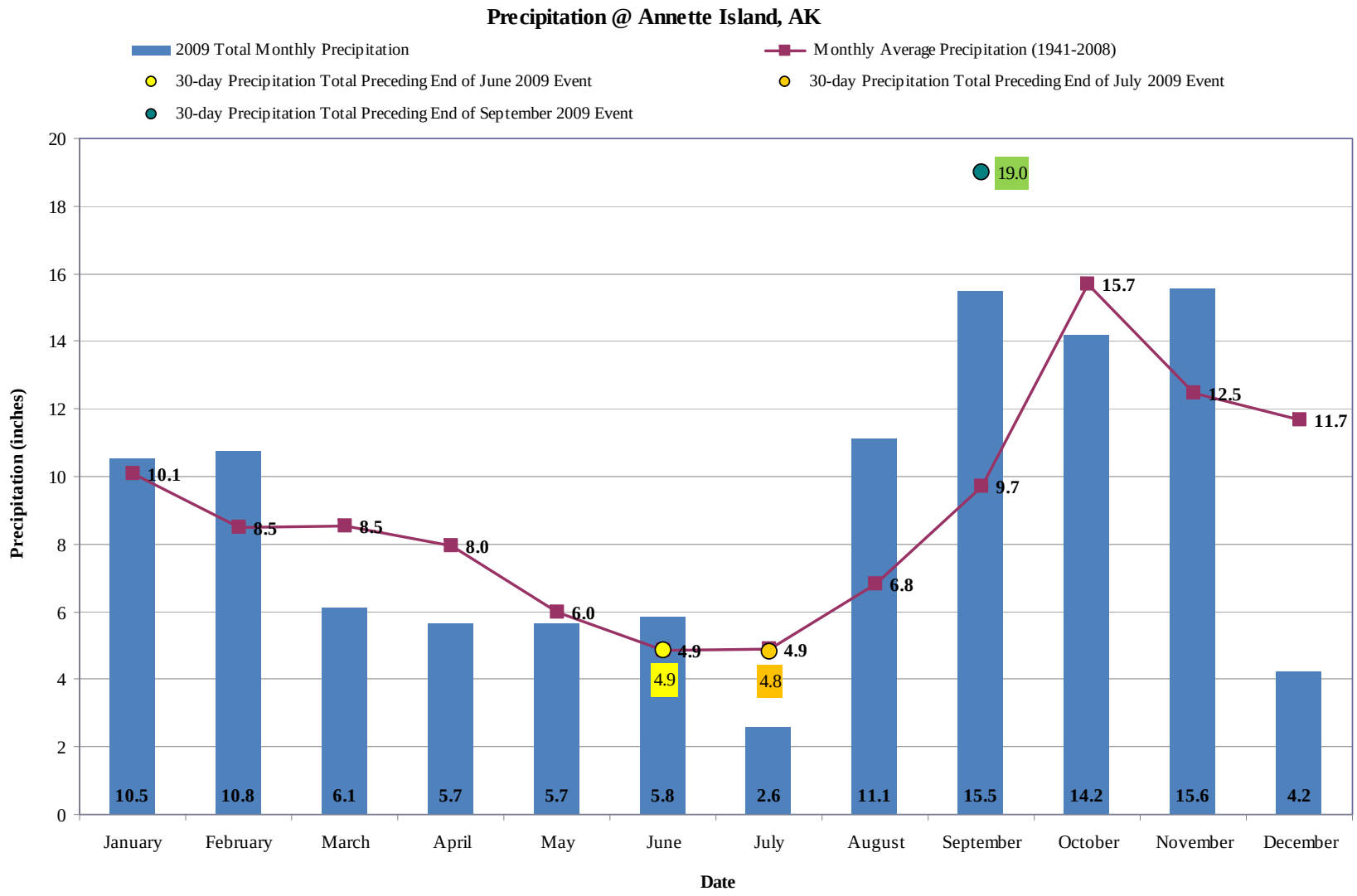

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Figure 1
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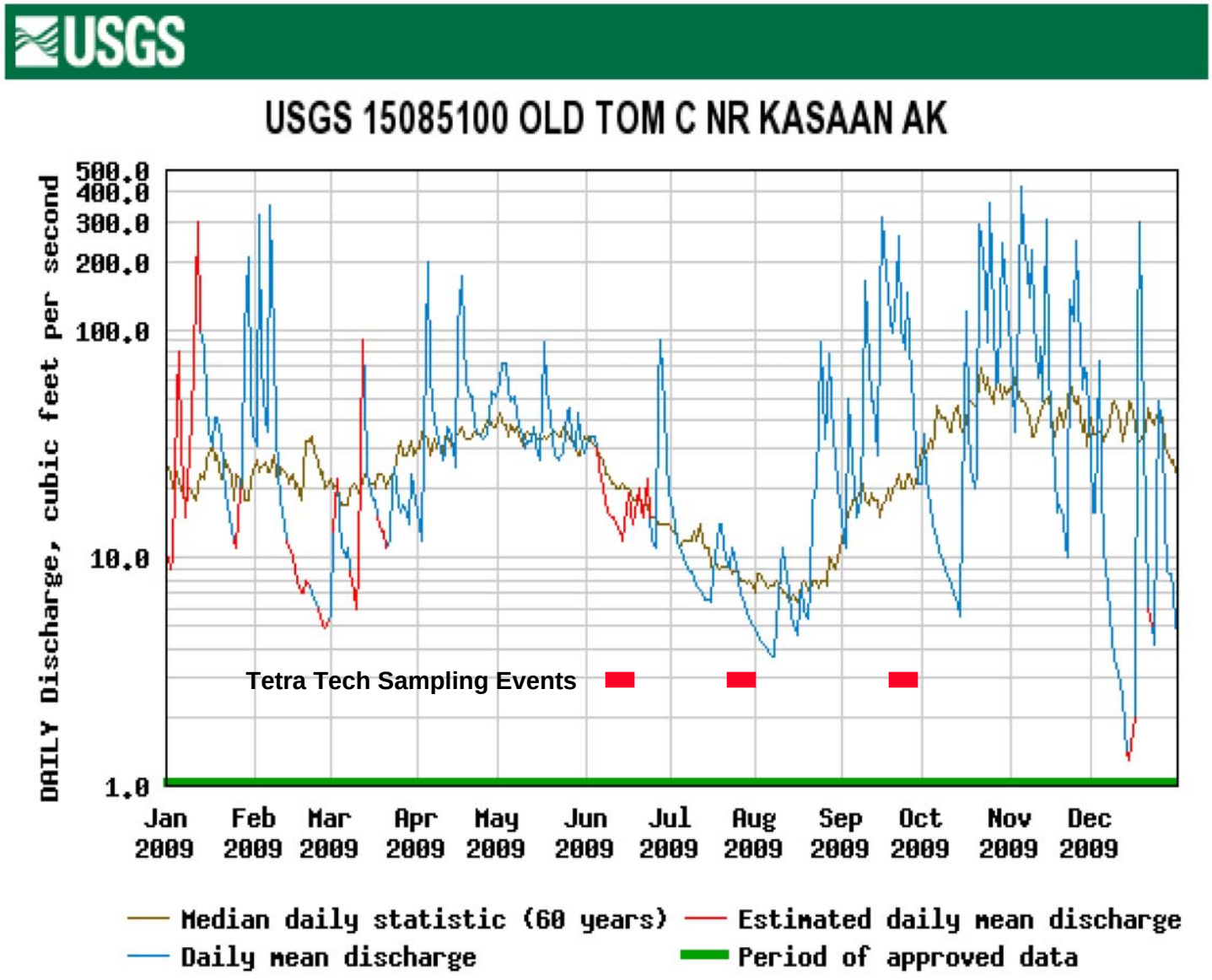

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Figure 2
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