

Agencies' Comments on the Draft Final Feasibility Study for Holden Mine

This document provides the Agencies' modifications to, and comments on, Intalco's Draft Final Feasibility Study (DFFS, URS 2004a).

In some cases, the Agencies have described modifications to the DFFS as noted below. Where the information provided was insufficient, the Agencies have conducted their own analysis to assist in remedy selection. In other cases, the Agencies have described changes that will need to be addressed or additional information that will need to be developed during remedial design.

At a minimum, items below numbered: 3, 4, 6, 16, 21, 24, 26, 27, 28, 43, 49, 50, 51, 52, 53, 72, 80, 85, 88, 90, 91, 93, 96, 97, 99, 103, 104, 105, 108, 146, and 153 need to be addressed during remedial design and/or remedial action (RD/RA).

The modifications and comments herein address the substantive portion of the DFFS. Since topics covered in the Executive Summary are a summary of the DFFS as a whole, the Agencies have not commented directly on the Executive Summary. The Agencies' modifications and comments on the remainder of the DFFS also apply to the Executive Summary.

The Agencies' comments include Intalco's references to East and West areas as used in the DFFS. The described limits of these areas have varied in previous project documents, and do not have consistent meanings to all readers. Accordingly, the Agencies have tried to avoid these terms except when referring to specific parts of the DFFS.

1. **Page 1-4, Section 1.1.2:** A sixth bullet is hereby added that states the following: *“Evaluation of the residual threats that would accompany each alternative and determine if remedies that are protective of human health will also be protective of ecological receptors (WAC 173-340-350(8)(c)(i)(E)).”* The bulleted list on page 1-4 is missing this requirement. This sixth item has been analyzed in the Supplemental Feasibility Study (SFS) for Holden Mine (Forest Service 2007).
2. **Page 1-5, Section 1.1.2:** The Agencies do not agree with the characterization that Model Toxics Control Act (MTCA) requirements for cleanup actions are to be addressed “as possible” within the CERCLA context in the DFFS. The DFFS does not fully address MTCA cleanup requirements. Substantive provisions of MTCA serve as applicable or relevant and appropriate requirements (ARARs) under CERCLA. Moreover, the State of Washington is implementing MTCA independently in this action. The Agencies have therefore conducted an evaluation of MTCA and CERCLA requirements for selection of a final remedy as part of the SFS.
3. **Page 1-5, Section 1.1.2:** Intalco's comment in the third bullet at the bottom of the page reads: *“...the identification of specific compliance monitoring locations and frequency will be determined following preparation of the proposed plan”*. While not requiring the development of specific detail, MTCA requires consideration of monitoring in the evaluation of alternative remedial actions. See WAC 173-340-360(2)(a)(iv). The Agencies developed a Conceptual Monitoring Program that is presented in Appendix H of the SFS. Details of the monitoring plan for the Site will be determined during RD, subject to approval by the Agencies.
4. **Page 2-12, Section 2.3.3.4:** The DFFS states that, *“The near-surface alluvial material associated with the abandoned streambed appears to act as a preferential pathway for near-surface groundwater movement through the western portion of the Site and beneath the tailing piles.”* The Agencies note that this qualitative statement is unsupported by specific information, and the effect of the former stream channel has not been addressed in any quantitative way in the DFFS. Intalco has not addressed how this potential pathway impacts metals transport or how this potential path may be influenced by remedial alternatives discussed in Sections 6 and 7 of the DFFS. The Agencies expect that the selected cleanup alternative would address this potential pathway, or other preferential flow paths that may be discovered during RD/RA, as necessary to achieve the remedial objectives.
5. **Page 2-12, Section 2.3.3.5:** The DFFS' characterization of the waste rock piles as *“generally non-mineralized”* is incorrect. The first paragraph of Section 2.3.3.5 is hereby modified to read as follows: *“Mining-related materials on the Site include the tailings and waste rock piles. The tailings consist of fine-grained silt and sand that resulted from processing the ore-bearing bedrock. The waste rock consists of angular rock fragments that contain metals, as indicated by the concentration of metals in seeps that discharge from the base of the piles. The waste rock and tailings piles contain acid producing sulfide minerals that produce acidic, metal-rich seeps and groundwater that exceed proposed cleanup criteria.”*
6. **Section 2.3.4, Figures 2-19 through 2-24:** The Agencies note that although illustrations such as Figures 2-19 through 2-24 of the DFFS are useful for discussion, the flow paths and interrelations depicted in the DFFS may not reflect all possibilities. The selected remedy would need to be capable of addressing other flow path relationships that may be discovered during RD/RA, as necessary to achieve the remedial objectives.
7. **Page 2-14, Section 2.3.4.3:** The Agencies agree in principal that essentially all alluvial groundwater in Railroad Creek Valley ultimately discharges into Railroad Creek. However, the assertion made in the DFFS that that Railroad Creek is a bedrock creek channel

approximately 2-1/2 miles downstream of the Site (near Sevenmile Creek, page 2-14) is unsupported by information received to date. The Agencies expect that any estimate for extent of the groundwater plume downgradient of the Site would rely on a combination of observations, engineering tests, and analyses.

8. **Page 2-15, Section 2.3.4.3:** Clarification -- Slug test data for new wells can be found in URS 2004b, which post-dates the DFFS.
9. **Page 2-15 though 2-28:** Discussion of potential constituents of concern in this section is based on a percentage relative to the loading measured at RC-2. While this may be helpful to Intalco in identifying areas of concern, it should be noted that the discussion does not address the expected conditional point of compliance for groundwater, which is the groundwater/surface water interface. The analysis in the DFFS is relative to a point up to a mile downstream from significant source areas, which results in a biased analysis.
10. **Pages 2-19 through 2-20, Section 2.4.1.1:** The Agencies do not believe that the baseline loading analysis presented in the DFFS (page 2-20) addresses the extent, if any, or effects of, seepage through the bedrock. Intalco has not provided any quantitative measurements or analysis that resolves the apparent contradiction between DFFS (page 2-18): *"precipitation and/or snowmelt is thought to enter the mine as diffuse flow through saturated bedrock at the ground surface"* and (page 2-19 and 2-20): *"it is not likely that significant mine leakage is occurring below the 1500-level under current conditions based on... the relatively "tight" nature of the faulted bedrock..."* The potential contribution of mine seepage to down-valley groundwater quality is not addressed in the DFFS.
11. **Page 2-19, Section 2.4.1.1:** The Agencies question the assertion that qualitative observations suggest that there is more airflow through the mine as a result of the rehabilitation of the 1500-Level Portal. The Agencies suggest that the statement is correct when the doors to the 1500-Level Portal are open, but is not necessarily correct when the portal doors are closed and the plastic tarp is in place. Also, prior to the portal rehabilitation work in 2000, the 1500-Level Portal was not 100% closed, as some airflow was occurring as well as portal discharge of mine water.
12. **Page 2-20, Section 2.4.1.1:** The Agencies concur with the statement (page 2-20) that the bedrock spanning above the mine is marginally stable. The Agencies note that instability (subsidence) would likely result in increased surface water and groundwater flow into the workings, increased oxygen flow into the workings, increased discharge water flow from the abandoned mine, and quite possibly increased metals discharge from the mine. The Agencies concern about this issue was renewed during the October 2004 trip underground based on observations on the 1100-Level of increased and fresh fractures and rock fall in drifts adjacent to stopes -- probably denoting continual release of rock pressure.
13. **Page 2-25, Section 2.4.1.6:** The third paragraph of Section 2.4.1.6 is hereby deleted. The baseline loading analysis does not include an estimate of load contributed to the subsurface from the lagoon area. Existing information is not sufficient to show that the loads measured at Copper Creek Diversion and seeps SP-1, SP-9, SP-10E/W, SP-11, SP-24, and SP-25 are related to groundwater flow from the lagoon area. Metals concentrations in wells MW-1 through MW-4 and HBKG-1 indicate that the groundwater contamination in the Lower West Area goes well beyond the lagoon area. Furthermore, since the Copper Creek Diversion receives water from SP-19 and comes into contact with Tailings Pile 1 (see Section 2.4.1.8), the suggestion that it may be related to the lagoon area groundwater is difficult to substantiate.

14. **Page 2-25, Section 2.4.1.8:** The last sentence of the first paragraph in this section is hereby deleted. Not enough monitoring well data are available to support the DFFS statement that groundwater flow may be upward in the area of the Copper Creek Diversion such that this channel may be intercepting groundwater from the lagoon area. The nearest deep/shallow well set (MW-4S/D) indicate groundwater flow is generally downward.
15. **Page 2-27, Section 2.4.2:** The following sentence is hereby added after the fourth sentence of the paragraph in this section: *"The higher zinc loads in Tailings Pile 1 may also be attributed to ore processing inefficiencies since these tailings were from the earliest millings."*

The Agencies note that Tailings Pile 1 is a significant source of zinc and cadmium released into Railroad Creek. Intalco has not provided any data or quantitative analysis to support its opinion that loading from Tailings Pile 1 may be related to sources west of the tailings piles. The DFFS should have considered measurements within or below the tailings pile in light of another possible source that was previously identified in a 1976 letter from Daniel Meschter (Forest Service Area Mining Engineer) to the Wenatchee Forest Supervisor; titled: Economic Evaluation, Holden Tailings; dated January 14, 1976:

"It is believed that the higher zinc values are due to the fact that Pile 1 and the bottom of Pile 2 contain tailings from the earliest milling when, it can be supposed, metallurgical efficiency with respect to zinc had not reached the higher degree represented by the later tailings."

16. **Page 2-27 and 2-28, Section 2.4.2 (Potential Mass Release of Tailings, also applies to Page 6-23, Section 6.4.4.1):** The Agencies have conducted a study of available slope stability data and determined that most of the tailings slopes are steep enough that they are barely stable under current conditions and/or would be unstable during a moderate size earthquake (see Appendix D of the SFS). The Agencies are hereby modifying the DFFS by replacing the evaluation referenced on pages 2-27, 2-28, and 6-23 of the DFFS with an evaluation provided in Appendix D of the SFS. Implementation of the selected remedy must include additional analysis to design permanent slopes to assure stability and comply with potential ARARs.
17. **Pages 2-29 through 2-38, Section 2.5:** The discussion of areas of the Site that exceed potential cleanup levels is incomplete. The discussion of exceedances of individual ARARs is unnecessarily confusing – it would have been more meaningful to discuss potential ARARs first and then describe which areas of the Site exceed anticipated cleanup levels. The SFS provides such a discussion. Final cleanup levels, based on ARARs and other factors, will be determined at the time the Record of Decision (ROD) is issued.
18. **Page 2-29, Section 2.5.1:** The Agencies concur that surface water concentrations of cadmium, copper, zinc and other metals decrease through summer and fall relative to late spring conditions. However, the seasonally lower concentrations still typically exceed surface water quality criteria.
19. **Page 2-29, Section 2.5.1, second to last paragraph:** While concentrations may decrease in the creek with distance downstream, this is of little relevance in selecting a remedy. Regardless of changes in concentrations in Railroad Creek due to dilution by clean groundwater and surface water entering creek or other changes, the exceedances remain at the anticipated groundwater points of compliance, and at the surface water points of compliance. The surface water point of compliance is the point or points at which hazardous substances are released onto the surface water under both MTCA and CERCLA (see WAC 173-340-730(6)(a), and 55 FR 8713).

20. **Page 2-33, Section 2.5.3.1:** In reviewing the Site soil quality data in the SFS, the Agencies have identified more than a dozen metals and total petroleum hydrocarbons (TPH) as constituents of concern throughout the Site.¹ The presence of some hazardous substances above proposed cleanup levels is not restricted to the maintenance yard, lagoon area, surface water detention area, mill building, and Holden Village as indicated in the DFFS. In the SFS the Agencies have identified proposed soil cleanup levels based on potential ARARs or background concentrations that exceed ARARs. In addition to the areas noted above, soils exceed the proposed cleanup levels in the Lower West Area, the baseball field, the tailings piles, and the area of observed wind-blown tailings deposition east of the Village.
21. **Section 2.5.4, Figure 2-49:** Figure 2-49 is inaccurate. Other areas of soils (not shown on Figure 2-49) have constituent concentrations above proposed ARARs. For instance most areas covered with tailings should be shown as having at least a visual indication of potentially affected vegetation, since little vegetation is present. Other areas may also be identified during RD/RA with constituent concentrations above ARARs.
22. **Page 2-36, Section 2.5.4.1, and Section 6.1.1.1, Page 6-2:** Intalco claims that reduced populations “*may be due to a combination of chemical and physical effects. Physical effects observed at the Site include the presence of iron oxy-hydroxide precipitates (flocculent) and limited areas of ferricrete formation in the Railroad Creek streambed.*” The formation of flocculent and ferricrete is due to the release of hazardous substances and must be addressed by the cleanup.
23. **Page 2-36, Section 2.5.4.1:** It should be noted that aerial photographs indicate an orange coloration in the streambed all along the tailings piles. The visible presence of the iron oxide extends downstream several miles, which suggests that the release of hazardous substances that impact fish, macroinvertebrate populations, and habitat may extend farther than indicated in this section of the DFFS. Sediment and surface water quality sampling at Lucerne confirms the presence of hazardous substances nearly 12 miles downstream of the Site.
24. **Page 2-36 and Figure 2-45, Section 2.5.4.1:** The first sentence of the final bullet in section 2.5.4.1 is modified to read: “*Ferricrete formation within Railroad Creek has been observed along the tailings piles.*” Figure 2-45 is hereby deleted. The extent of ferricrete is not limited to the area of seeps SP-1, SP-2, and SP-3 as noted on Figure 2-45. The extent of ferricrete formation will need to be better defined during RD/RA to determine the extent of stream restoration.
25. **Page 2-36, Section 2.5.4.2:** The Agencies have previously indicated (Comment 20) that the cleanup plan will need to address all impacted areas with soil concentrations above potential ARARs, including Holden Village and the wind-blown tailings areas, regardless of whether those areas are addressed in the DFFS.
26. **Page 2-36, Section 2.5.4.2:** As outlined in Appendix E of the SFS, the Agencies have a number of concerns regarding the Ecological Risk Assessment (ERA). The ERA did not provide an exposure scenario for the wind-blown tailings area east of Holden Village. [Although Intalco subsequently attempted to address this area (URS 2005) that analysis was flawed, in part because it relied on an insufficient number of samples]. The ERA did not

¹ The Agencies refer to constituents of concern, rather than potential constituents of concern as used by Intalco, because the constituents that exceed screening levels are by definition “of concern” and the use of the word potential in this context is not appropriate.

adequately address the potential pathway of plant uptake of metals, and effects on animals that browse on the plant cover. Furthermore, the ERA relies on limited survey data and excludes amphibians and insects as receptors of concern. Refer to Appendix E of the SFS for a detailed discussion of the inadequacies in the ERA. Since soil concentrations exceed MTCA ecological screening levels, and the ERA conducted by Intalco was inadequate, additional terrestrial ERA will be needed during RD/RA (including assessment of wildlife usage at the Site for determining toxicological risks to wildlife) if other soil cleanup levels are to be used.

27. **Page 2-37, Section 2.5.4.3, and Page 2, Appendix K:** As outlined in Appendix E of the SFS, the Agencies have a number of concerns regarding the ERA. Insufficient detail was provided in the Draft Remedial Investigation (DRI, Dames & Moore 1999) and DFFS to assess the appropriateness of comparing soil concentrations for the Site with two other mine sites where plants were reported to be "*growing successfully*." Furthermore, no information was provided to distinguish effects of toxicity on plants from other factors that may be limiting plant growth. Refer to Appendix E of the SFS for a detailed discussion of these inadequacies in the ERA. Further analysis will be needed during RD/RA to determine the impacts of constituents of concern on species/community richness and whether areas of the Site can support the species present on comparable uncontaminated sites.
28. **Page 2-39, Section 2.6:** The limited scope of the baseline data is problematic considering the potential variability in concentrations and flows that occur at the Site both annually and daily. This variability is only one of the limitations of the mass loading model used in the DFFS to predict effectiveness of remedial alternatives, as discussed in Appendix A of the SFS. During remedial design, additional baseline monitoring is needed to provide a basis for evaluating effectiveness of the remedy.
29. **Page 2-41, Section 2.6.3:** The water balance, which is used as the basis for the DFFS loading analysis, does not include any term to account for groundwater that may be discharging into Railroad Creek as baseflow from the Lower West Area. This area receives flow from upgradient sources with elevated concentrations of hazardous substances, and baseflow from this area discharges into Railroad Creek. A separate analysis was done by the Agencies estimating groundwater discharge from the Lower West Area (Hart Crowser 2005a). These groundwater estimates were used in the SFS for calculations of metals removed by the treatment plant.
30. **Section 2 Figures:** The Agencies note numerous examples of incompletely labeled figures that may limit usefulness of the information presented for future applications. Examples range from the aerial photo on Figure 2-3 (most useful if it was labeled with the source, date/time) and Figures 2-36 through 2-39, which do not indicate whether the water quality data presented are for total or dissolved concentrations.
31. **Page 3-1, Section 3.0:** The introduction only addresses the requirements under CERCLA. Substantive provisions of MTCA are potential ARARs under CERCLA. In addition, Ecology is independently exercising its state MTCA authority in this joint action by the three regulatory agencies. MTCA is analogous to CERCLA in many respects, but has some requirements that are unique. MTCA must be complied with at the Holden Mine Site.
32. **Page 3-2, Section 3.1.1:** The federal Safe Drinking Water Act would be directly applicable to groundwater and surface water at the Site if either were developed as a public water supply in the future. Because groundwater and surface water at the Site are potable under MTCA, the federal MCLs are potentially relevant and appropriate. (Forest Service 2003, Attachment 1, page 5)

33. **Page 3-3, Section 3.1.2:** MCLs and non-zero MCLGs are considered to be potentially relevant and appropriate requirements for surface waters that are designated as potential drinking water sources. (Forest Service 2003, Attachment 1, page 5)
34. **Page 3-3, Section 3.1.3:** MTCA identifies the state MCLs as being directly applicable to potential drinking water sources, which include groundwater and surface water at the Holden Mine Site. The state MCLs are potentially applicable under MTCA regardless of whether they are less stringent than the federal MCLs. If a federal MCL for an individual contaminant is more stringent, however, it would govern as a cleanup level under MTCA.
35. **Page 3-4, Section 3.1.5, Final Paragraph of Section:** A mixing zone, as defined in WAC 173-201A, is that portion of a water body adjacent to an effluent outfall rather than “*any point source*” as stated in the DFFS. Mixing zones are not applicable to seeps or other groundwater flow/discharges. Also, the correct citation for the mixing zone provision in the State Surface Water Quality Standards is found in WAC 173-201A-400, rather than WAC 173-201A-410, as referenced.
36. **Page 3-4, Section 3.1.5:** Intalco has suggested an upward adjustment to the SWQC based on the argument that the SWQC are based upon sensitive species that would not naturally inhabit Railroad Creek or Copper Creek. The Agencies disagree with Intalco’s determination and note that it is inconsistent with CERCLA, MTCA, and EPA and state procedures for establishing site-specific water quality criteria. As previously commented by the Agencies (Forest Service 2003), daphnia, ceriodaphnia, hyallella, and other sensitive organisms are considered surrogate species for those untested species found in natural waters. These surrogate invertebrates, although not found in Railroad Creek, represent the range of possible biological responses to contaminants.
37. **Page 3-5, Section 3.1.6:** Intalco believes that the NWQC are not relevant and appropriate to the Holden Mine Site. As stated in previous communications between the Agencies and Intalco, the Agencies disagree (USFWS 2004 and 2005). The most recent NWQC including the 2006 and 2007 criteria are potentially relevant and appropriate in accordance with Section 121 of CERCLA. In addition, under MTCA the 1999 NWQC are potentially applicable to the Site [WAC 173-340-730(3)(b)(i)(B)], and the 2006 and 2007 NWQC are potentially relevant and appropriate.
38. **Page 3-5, Section 3.1.6:** The Agencies disagree with Intalco’s determination that the NWQC for iron and aluminum are not relevant or appropriate. The Agencies response to Intalco’s submittals regarding the NWQC for iron and aluminum are available in the administrative record (USFWS 2005) and are hereby incorporated by reference into these comments.
39. **Page 3-6, Section 3.1.7:** The National Toxics Rule (NTR) is potentially applicable at the Holden Mine Site regardless of whether there are exceedances of concentrations in groundwater or surface water. Additionally, MTCA has incorporated NTR values as potential cleanup levels for surface water [WAC 173-340-730(3)(b)(i)(C)].
40. **Page 3-6, Section 3.1.8:** MTCA is directly applicable to the Holden Mine Site.
41. **Page 3-7, Section 3.1.8.1:** WAC 173-340-730(5)(b) refers to adjustments of individual constituent cleanup levels when evaluating the protectiveness of standards in state and federal laws. Under WAC-173-340-730(5)(a), additional adjustments to proposed cleanup levels (not ARARs) may be required to ensure that the total site risk does not exceed an overall cancer risk of 1 in 100,000 (for carcinogens) and a hazard quotient of 1 (for non-carcinogens).

42. **Page 3-7, Section 3.1.8.1:** MTCA cleanup levels are potentially applicable even though the Site cleanup levels may be based on another potential ARAR provided under state and federal law, whichever ARAR is most stringent.
43. **Page 3-7, Section 3.1.8.1:** The Agencies will require use of a more sensitive analytical procedure for metals in water to evaluate compliance for those analytes that have cleanup levels below practical quantification limits (PQLs) using Intalco's current analytical method. A common alternative method would be analysis by inductively coupled plasma-mass spectrometry (ICP-MS). Where a potential ARAR is less than an appropriate PQL, the proposed cleanup level may be increased to the PQL.

Cleanup levels will be established in the ROD. Where potential ARARs are below natural background, natural background will likely be the cleanup level. Background concentrations will be further adjusted as additional data are collected during RD/RA.

44. **Page 3-8, Section 3.1.8.2:** WAC 173-340-720(7)(b) refers to adjustments of individual constituent cleanup levels when evaluating the protectiveness of standards in state and federal laws. Under WAC 173-340-720(7)(a), additional adjustments to proposed cleanup levels (not ARARs) may be required to ensure that the total site risk does not exceed an overall cancer risk of 1 in 100,000 (for carcinogens) and a hazard quotient of 1 (for non-carcinogens).
45. **Page 3-8, Section 3.1.8.2:** This provision in MTCA applies to all groundwater that has been impacted by former mining operations at the Holden Mine Site if the impacted groundwater has a potential to enter surface water.
46. **Page 3-8, Section 3.1.8.2:** The Agencies will require use of a more sensitive analytical procedure for metals in water to evaluate compliance for those analytes that have cleanup levels below PQLs using Intalco's current analytical method. A common alternative method would be analysis by ICP-MS. Where a potential ARAR is less than an appropriate PQL, the proposed cleanup level may be increased to the PQL.

To date, Intalco has not defined background conditions for groundwater. Cleanup levels will be established in the ROD. Where potential ARARs are below natural background, natural background will likely be the cleanup level. Background concentrations may be further adjusted as additional data are collected.

47. **Page 3-9, Section 3.1.8.3** The Agencies disagree that MTCA Method B requirements are not a potential ARAR for the tailings and waste rock piles.
48. **Page 3-9, Section 3.1.8.3:** The Agencies agree that tailings and waste rock piles must be closed in accordance with the State limited purpose landfill standards in Chapter 173-350 WAC (incorrectly cited in the DFFS as WAC 173-351). The soil cleanup levels in MTCA are potentially applicable to the entire Site, including the tailings and waste rock piles. The Agencies note that closure of the tailings piles must be protective of human health and the environment, and that an alternative to the presumptive cover requirements (WAC 173-350-400(3)(e)(ii)) would need to satisfy the performance standards of WAC 173-350-040 and WAC 173-350(3)(e)(i), as well as MTCA requirements for protection of potential terrestrial receptors. Specifically, this would include protection of burrowing animals and invertebrates, plants with roots in the tailings, and animals that graze on such plants.
49. **Page 3-10, Section 3.1.8.3:** The DFFS notes that the purpose and methods used for conducting the ERA accomplished for the DRI "*were not intended for use in calculating*

numeric soil concentrations deemed protective of the various ecological receptors, including soil invertebrates and other wildlife" (Appendix K of the DFFS). The Agencies have determined it is not appropriate to rely solely on the ERA analyses to date as the primary means of setting cleanup levels for the Site. The additional ERA needs to be accomplished if any soil cleanup levels are to be used instead of those based on the MTCA screening levels for terrestrial receptors (MTCA Table 749-3). Additional ERA would also provide a basis to identify areas that may not need soil cleanup even though soil concentrations exceed the MTCA screening levels. Finally, additional ERA may indicate that closure of the tailings and waste rock piles as part of the cleanup action may rely on an alternative to the default cover as defined in WAC 173-350-400. Additional discussion is contained in the administrative record (URS 2005; Hart Crowser 2005b; and Appendix E of the SFS).

50. **Page 3-10, Section 3.1.8.3:** The Agencies reject the ERA findings presented in the DRI and the DFFS that *"there is no risk to most animals, plants and soil biota throughout a majority of the Site and only a low potential risk to select plants, soil biota and wildlife in limited Site areas."* The ERA needs to comply with the Terrestrial Ecological Evaluation Procedure in MTCA (WAC 173-340-7490 through -7494) and EPA Ecological Risk Assessment Guidance for Superfund (1997). Refer to Appendix E of the SFS for a full discussion of the Agencies' issues with the ERA presented in the DRI and DFFS.

51. **Page 3-10, Section 3.1.8.3:** The Agencies reject Intalco's contention that the DRI demonstrates that MTCA soil values based for protection of terrestrial ecological receptors are not potentially applicable to the Site. The Agencies do not agree with Intalco's interpretation of the five conditions for exemption provided on page 3-10. The five bulleted items below provide the Agencies' determination on each of these conditions outlined by Intalco.
 - The DRI excluded consideration of subsurface soils (regardless of whether they are within the depth to the standard point of compliance or to the conditional point of compliance). Soils that exceed proposed cleanup levels are within the depth to the point of compliance (15 feet) and Intalco has not provided support to develop any alternative point of compliance.

 - Not all of the soils at the Site that are contaminated with hazardous substances will be covered with physical barriers under all alternatives.

 - Land use at the Site includes wildlife habitat since the Site is surrounded by National Forest System lands, including the Glacier Peak Wilderness Area. Ecological risk in the maintenance yard, mill building, and other areas must be addressed as part of the remedy through removal, and/or capping, and institutional controls. Tailings in soils that exceed ecological risk values will need to be removed or otherwise addressed in the event such soils are encountered in Holden Village or elsewhere.

 - The Agencies do not agree that no potential exposure pathway exists from soil contamination to soil biota, plants, and wildlife. Existing and anticipated land use at the Site is not industrial. Exposure pathways to plants and soil biota do and will continue to exist. Soils with hazardous substance concentrations that exceed ecological risk levels will need to be addressed in the remedy, including but not limited to areas mentioned in the DFFS.

 - The Site includes areas greater than 1.5 acres of contiguous undeveloped land, within 500 feet of the Site. There is no exemption from further evaluation on this basis, or for remediation of ecological risk for areas of Holden Village that may be contaminated as a result of past mining activities.

52. **Page 3-10, Section 3.1.8.3:** The requirements in WAC 173-340-740(3)(b)(ii) are potentially applicable to the Site. The risk assessment, which is incomplete, shows that there is risk to some plants and animals. Soils at the site exceed MTCA screening criteria for terrestrial ecological receptors. Additional terrestrial ERA will need to be completed using the procedures specified in WAC 173-340-7490 through 173-340-7494 unless it is demonstrated under those sections that establishing a soil concentration is unnecessary.
53. **Page 3-11, First paragraph.** The Agencies specifically reject Intalco's contention that the Site is exempt from establishing potential cleanup levels for terrestrial ecological receptors. The Agencies position is noted in the September 11, 2003, letter from the Forest Service, in response to the two Intalco letters cited in the DFFS. The September 11, 2003, Forest Service letter is hereby incorporated by reference. Cleanup levels would be based on the potential ARARs as discussed in the SFS, unless the Agencies determine during RD, that other levels would be protective of terrestrial receptors based on additional ERA.
54. **Page 3-11, Section 3.1.8.3:** The Agencies agree that soil cleanup levels for protection of groundwater have some latitude in those areas that have downgradient collection and treatment. However, constituent soil concentrations in areas upgradient of collection and treatment will have to be low enough to allow compliance with the cleanup standards at the point(s) of compliance. In addition, soils downgradient of groundwater collection and treatment systems, and soils in areas without groundwater collections and treatment systems, are subject to cleanup criteria that satisfy WAC 173-340-740(1)(d).
55. **Page 3-12, Section 3.1.8.3:** Intalco has not provided a mechanism to evaluate the soil to surface water pathway nor has it evaluated alternatives in the DFFS against this applicable requirement [WAC 173-340-740(1)(d)]. The Agencies have addressed this in the SFS.
56. **Page 3-12, Section 3.1.8.3:** There is potential for overland flow from areas of contamination to enter Site surface water at concentrations that could cause an exceedance of surface water standards or present unacceptable conditions in fresh water sediments. The loading analysis in the DFFS does not include this pathway.
57. **Page 3-12, Section 3.1.8.3:** The Agencies disagree with the determination that it is not necessary to develop MTCA Method B soil cleanup levels for protection of groundwater. If an alternative is selected that does not provide containment, then soil cleanup to protect groundwater and surface water would be required under MTCA. If an alternative is selected that does provide containment, then such soil cleanup would not be required.
58. **Page 3-12, Section 3.1.8.3:** Proposed soil cleanup levels have been adjusted for background concentrations in the SFS. Cleanup levels that are below natural background or PQLs will be adjusted during preparation of the ROD. Background concentrations may be further adjusted as additional data are collected (e.g., during RD).
59. **Section 3.3:** For Ecology, proposed remedial activities at the Site need to be considered in accordance with requirements of SEPA, based on MTCA ARAR requirements. Ecology has completed the SEPA checklist and it will be included in the Proposed Plan. SEPA mitigation requirements will be determined based on Ecology's evaluation of comments to the SEPA Checklist prepared by Ecology. SEPA mitigation, if any, will be presented in the final ROD.
60. **Page 3-14, Section 3.3.1:** The Agencies have not found that the DFFS demonstrates that the alternatives presented would satisfy the requirements for monitored natural attenuation (MNA) as part of the remedy. As defined under WAC 173-340-370(7), MNA may be appropriate where there is evidence that natural biodegradation or chemical degradation is

occurring and will continue to occur at a reasonable rate at the Site, and where source control has been conducted to the maximum extent practicable. It should be noted that metals *degradation* is not occurring at the Holden Mine Site (and will not be occurring under any of the proposed alternatives). The Agencies have determined it is practicable to implement source control measures to a greater extent than proposed in any DFFS alternative (see SFS Appendix G). EPA also has policy requirements regarding use of MNA as part of remediation that are not addressed in the DFFS (EPA 1999). Refer to the SFS for further discussion of MNA.

61. **Page 3-14, Section 3.3.1:** The citation is hereby changed to WAC 173-340-360(4).
62. **Page 3-15, Section 3.3.1:** The citation should probably be WAC 173-340-360(3)(f)(iv), but the DFFS reference is vague.
63. **Page 3-15, Section 3.3.1:** WAC 173-340-830(2)(a) states that all hazardous substance analyses shall be conducted by a laboratory accredited under Chapter 173-50 WAC, unless otherwise approved by the department. This does not exclude analyses of soil samples as implied by the omission of soil from the list included in the DFFS.
64. **Page 3-16, Section 3.3.3:** Requirements for the Regulation and Licensing of Well Contractors and Operators are applicable to contractors who install and/or decommission wells and borings at the Holden Mine Site.
65. **Page 3-18, Section 3.3.5:** In the Section 3.3.5 heading, the DFFS lists specific sections of WAC 220-110; however all of Chapter 220-110 WAC is potentially applicable. For example, WAC 220-110-100 is applicable if pipes are used to convey collected groundwater across Copper Creek or Railroad Creek; however, this section is not listed in the Section 3.3.5 heading.
66. **Page 3-19, Section 3.3.7:** The citation is hereby changed to WAC 173-201A-400.
67. **Page 3-20, Section 3.3.12:** In the Section 3.3.12 heading, the DFFS lists specific subsections of WAC 332-30-163; however all of WAC 332-30-163 is potentially applicable and the particular requirements would depend on the remedial activities.
68. **Page 3-21, Section 3.3.14:** Tailings and waste rock pile operations ceased before the effective date of Chapter 173-350 WAC and its predecessor chapters. These waste piles are not being actively managed as limited purpose landfills. However, the tailings and waste rock piles fit the definition of a "landfill" under Chapter 173-350 WAC. While landfill closure and post-closure requirements may not be applicable, the Agencies have determined that such standards are potentially relevant and appropriate substantive requirements under CERCLA and MTCA [See WAC 173-340-710(7)(c)]. If determined to be ARARs in the ROD, requirements for closure and post-closure of limited purpose landfills [WAC 173-350-400] must be met during and after closure of the tailings and waste rock piles.
69. **Page 3-22, Section 3.3.16:** Potential applicability of Chapter 173-400 WAC is not exclusive to alternatives that may involve operation of equipment. Depending on the remedial action selected, these regulations are potentially applicable to the Site (e.g., generation of fugitive dust during remediation of soil and tailings, or emissions from equipment).
70. **Section 3.4:** Ecology's Permit Writer's Manual (Publication 92-109, Rev. July 2005) is a potential TBC and will be considered during remedy selection process. This will include but not be limited to evaluation of discharge limits, AKART, and mixing zones.

71. **Section 3.4.5:** The Land and Resource Management Plan for Wenatchee National Forest (LRMP), as amended, includes potential ARARs, and is not a TBC (Forest Service 1990). The LRMP, similar to other potential ARARs, needs to be considered in selection of a remedy, not just considered during RD.
72. **Table 3-3A, Chemical-Specific ARARs for Surface Water, Hardness:** Surface water cleanup levels for cadmium, copper, and zinc are hardness dependent. The DFFS provides a range of hardness-based cleanup levels based on the range of hardness values measured, including values adjacent to and downstream of the Site. However, hardness measurements adjacent to and downstream of the Site are not suitable for calculation of background hardness since they are affected by releases from the Site. For convenience, the Agencies have used an average hardness value of 12 milligrams/liter (mg/L) to represent the range of conditions observed in Railroad Creek to calculate proposed cleanup levels in the SFS. The Ecology Permit Writers Manual (Ecology 2005) requires background hardness to be based on the lowest hardness value observed during critical conditions where 20 or less data points are available, or the 10th percentile value, lognormally transformed, where more than 20 data points are available (Ecology 2005). The Agencies consider that fall (low flow) conditions represent critical conditions for aquatic life in Railroad Creek. The Agencies expect that additional data would be collected in the future, and ultimately, this methodology will be used in the process to determine Site cleanup levels for constituents that depend on hardness. Additional data will also need to be collected to establish the cleanup level for copper, which depends on other parameters in addition to hardness.
73. **Table 3-6, Clarification of Line item titled “Resource Conservation and Recovery Act; Dangerous Waste Act and Regulations”:** RCRA (42 USC 6901) and Washington State Dangerous Waste Regulations (Chapter 173-303 WAC) apply to any waste or environmental media containing either characteristic or otherwise designated Dangerous Waste that is generated during implementation of the remedial action. There is no Bevill amendment exclusion under Washington law. The limited exemption for “*mining overburden returned to the mining site*” is applicable to surface mines only, not an underground mine site such as Holden. Mining overburden returned to the mine site is defined as material overlying a mineral deposit which is removed to gain access to the deposit and is then used for reclamation of a surface mine (e.g., see 40 CFR § 260.10).
74. **Table 3-6, Correction to Line item titled “Hydraulic Project Approval”:** Chapter 75.20 RCW has been recodified as Chapter 77.55 RCW.
75. **Table 3-6, Clarification on Line item titled “Clean Water Act National Pollution Discharge Elimination”:** These regulations apply to any point discharge involving contaminated water. The stormwater requirements are potentially applicable to any runoff that has come into contact with contaminated materials at the Site.
76. **Table 3-6, Clarification to Line item titled “Washington State Water Quality Standards for Surface Water – Mixing Zone”:** Mixing zones may apply to treatment outfalls; they do not apply to all discharges that are covered by NPDES requirements.
77. **Section 5, Identification and Screening of Remedial Technologies:** As a general comment, the DFFS uses broad, qualitative statements to compare perceived effectiveness or limitations of technology and process alternatives, without references to published experience at other sites or supporting engineering analyses. The Agencies identified this as a problem with the first draft FS, and it has not been remedied in the current final draft.

Throughout the FS process, the Agencies have consistently taken exception to Intalco's elimination of some potential technologies and process options, while other technologies and

options were retained on the basis of vague assertions that the technologies eliminated were less feasible, and retained options provide similar effectiveness and lower cost.

78. **Page 5-24, Section 5.3.1.2:** Intalco indicated that tailings would need to be screened for removal of fine-grained materials prior to mine backfilling, however, this has not been necessary for some sites. Furthermore, if properly planned and constructed, mine backfilling operations would not necessarily disrupt Holden Village operations for several seasons as indicated in the DFFS.
79. **Sections 5.3.4.3 & 5.3.5.3:** The DFFS lacks discussion comparing the effectiveness and cost of barrier walls and extraction wells with diversion trenches/French drains. While there may or may not be a disproportionate cost between these alternatives, the comparison of the effectiveness in the DFFS is vague and unsubstantiated.
80. **Page 6-3, Section 6.1.1.3:** Soil constituents of concern cannot be based solely on protection of groundwater. In the SFS, the Agencies have identified more than a dozen metals and TPH as constituents of concern throughout the Site. These exceedances are not restricted to the maintenance yard, lagoon area, surface water detention area, and mill building as indicated in the DFFS. The Agencies have determined that information from the DRI, DFFS and URS (2005) is insufficient to support the soil cleanup levels proposed by Intalco for the Site. Therefore, soil cleanup to protect terrestrial receptors will be based on MTCA values presented in Table 749-3 unless other values are determined to be protective through additional terrestrial ERA. [WAC 173-340-7493].
81. **Page 6-6, Section 6.2.1:** In the third paragraph of this section, the DFFS discussion of institutional controls has modified MTCA language in a way that may be misleading. The DFFS is hereby modified as stated in WAC 173-340-440(6), *"In addition to meeting each of the minimum requirements specified in WAC 173-340-360, cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site."*
82. **Page 6-7, Section 6.2.1.2:** Details of Institutional Controls will be determined by the Agencies and will likely extend beyond modifications to the Wenatchee National Forest Plan, to include, for example, proprietary controls on private property to limit future exposures to source materials or changes in land use that could adversely affect the remedy.
83. **Page 6-9, Section 6.2.2 and then throughout Section 6:** The DFFS is hereby modified to say that a point between the center point of Railroad Creek and the south stream bank may *not* be considered an appropriate conditional point of compliance for groundwater. As stated in MTCA, the point of compliance for groundwater is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowestmost depth that could potentially be affected by the Site. The maximum extent from the source that a conditional point of compliance may be approved is within the surface water as close as technically possible to the point or points of groundwater flow into the surface water [WAC 173-340-720(8)(d)(i)].

Under CERCLA, the area of contaminated groundwater underlying waste materials left in place may be established as a Waste Management Area (WMA) with the point of compliance being at the edge of the WMA. When restoration of groundwater is not practicable, it is necessary to prevent further migration of the plume and to prevent exposure to the contaminated groundwater [40 CFR § 300.430(a)(1)]. The NCP provides that groundwater cleanup levels should generally be attained throughout the contaminated plume. However, the NCP recognizes that groundwater may remain contaminated within the WMA, and cleanup levels should be attained at and beyond the edge of the WMA (55 Fed Reg 8712, 8753, March 8, 1990). Groundwater in the main area of the Site underlies tailings and other

materials that may be managed as a WMA. If a WMA is established in the ROD, the point of compliance for groundwater would be the outside edge of the WMA, along the south side of Railroad Creek.

The Agencies have addressed minimum monitoring requirements, including discussion of the point of compliance monitoring locations, as part of the draft Proposed Plan.

84. **Page 6-10, Section 6.3:** Diversion of upgradient surface and near-surface water, as discussed in Section 6.4.1, is common to all alternatives.
85. **Page 6-11 through 6-14, Section 6.3.2:** The environmental monitoring as discussed in this section and other parts of Section 6 is not considered adequate by the Agencies. The Agencies prepared a conceptual monitoring plan for discussion with Intalco in 2005. The Conceptual Monitoring Program is presented in Appendix H of the SFS. Details of the final Monitoring Plan for the Holden Mine Site will be determined by the Agencies during RD/RA. A maintenance program to assure continued effective operation of the remedy will also need to be developed and implemented during RD/RA.
86. **Page 6-14, Section 6.3.3:** The necessity for and effectiveness of airflow restrictions may need to be further analyzed during RD/RA. The Agencies note that both the SRK analysis and the DFFS loading analyses assumed zero effect of airflow restrictions on metal loads from the mine.
87. **Page 6-15, Section 6.3.5:** If the remedial action in the maintenance yard includes placement of a cap, this institutional control shall be documented in a restrictive covenant for the property (WAC 173-340-440). The hazardous substances must be removed or otherwise addressed in the event that any future change in land use would affect the integrity or ability to maintain the cap.
88. **Page 6-15, Section 6.3.4:** Soils in the mill building were not sampled and analyzed during the RI. Removal of mill structure will need to be accomplished to the extent necessary to adequately characterize and remediate all soils and mineral processing residuals that exceed proposed cleanup criteria. This includes characterization of any potentially hazardous materials to be left in place. Further characterization of mill building soils and residuals will need to take place during RD or as part of remedy implementation.
89. **Page 6-16, Section 6.3.7:** The DFFS does not indicate how a decision would be reached as to whether the impacted soils in the Ventilator Portal Surface Water Detention Area would be removed or covered, but says that covered soils would be compacted and revegetated. The DFFS does not address whether this is protective, and says a membrane cover will be considered only as part of Alternatives 7 and 8. The lack of existing road or trail access is irrelevant. To reduce releases to surface water and groundwater and to limit terrestrial ecological receptor exposure, the Agencies have assumed that soils exceeding criteria in the Surface Water Detention Area will be removed as part of any alternative selected as the final remedy. Alternatively, any wastes or soils above proposed cleanup levels would need to be addressed in conformance with all potential ARARs.
90. **Page 6-16 and 6-17, Section 6.3.8:** Modifications to the Copper Creek channel as part of the remedy needs to be based on a detailed geomorphic/stream hydrologic study to be completed as part of RD.
91. **Page 6-20, Section 6.3.11:** All of the old log cribbing along Railroad Creek is rotten and is now providing only minimal stream bank protection. The remedy will need to include a

detailed geomorphic/stream hydrologic study performed during RD. This hydrologic study will need to determine appropriate stream bank protection requirements for the remedy.

92. **Page 6-24, Section 6.4.4.2:** The Agencies do not believe there is sufficient room at the base of the tailings slopes to accommodate the rock buttresses proposed by Intalco to contain potential sloughing or slope failure, without significant regrading of the tailings piles.
93. **Page 6-24, Section 6.4.4.3:** The extent of riprap placement, including assessing the placement and competency of existing riprap, will need to be determined during RD following a geomorphic/stream hydrologic study; as part of any alternative selected.
94. **Page 6-25, with subsequent references in Section 6 for Alternatives 3, 4, 5a, 5b, 5c, 7, and 8, Monitored Natural Attenuation:** To varying extents, these alternatives rely on source depletion, dilution, and other forms of natural attenuation to address significant areas of the Site that release hazardous substances. Under MTCA [WAC 173-340-370 (7)(c)], natural attenuation may be appropriate at sites where *"There is evidence that biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the site."* In the DFFS, processes listed to be at work at the Site include dilution, acid buffering, adsorption, and precipitation in Railroad Creek, which are not biodegradation or chemical degradation. Furthermore, discussions in the DFFS of natural attenuation have focused on the *"reduction of release of PCOC's over time."* While the SRK analyses indicate that there would be a decrease in the release of metals at the Site over time due to a *"depletion of the sources of acidity and metals,"* this is not the same as the "chemical degradation" referred to in MTCA. Additional discussion of the inappropriateness of relying primarily on natural attenuation for conditions at this Site is presented in the SFS and its appendices.
95. **Page 6-29, Section 6.4.7.5, and Page 7-71, Section 7.7.1.1 (Comment also applies to other alternatives that include installation of a hydrostatic bulkhead):** While recognizing that there is some uncertainty regarding conditions that will be encountered when the mine is re-entered, the use of hydrostatic bulkheads would be more protective than an equalization basin to provide surge storage and reduce seasonal spikes to Railroad Creek. A bulkhead would provide surge control for a wide range of potential flows, whereas it would be difficult to determine the size of a pond or basin that could provide equivalent storage. No flow measurements were reported from the 1970 surge in discharge from the mine, and the 2005 surge due to an underground collapse in the MacDonald Mine (Fahrenthold 2006) lasted for more than 7 months.
96. **Page 6-29, Section 6.4.7.7:** In this section, Intalco proposes to consider diverting SP-23 into the underground mine during RD/RA. This approach might or might not be effective. The Agencies also note that no clear connection between seeps SP-14 and SP-23 has been corroborated in the field (i.e., inconclusive dye trace study). The need to collect SP-14 or other groundwater in this area will need to be better defined during RD or by monitoring following collection of seeps SP-12 and SP-23.
97. **Page 6-33, Section 6.5.2.1, (Unlined settling ponds for Alternatives 3, 4, 5, 7, and 8 as first mentioned under Alternative 3a):** The DFFS suggests that unlined settling ponds are expected to intercept or indirectly treat groundwater not captured by active groundwater collection measures. No analysis has been provided to substantiate this claimed benefit of unlined settling ponds on groundwater quality. Furthermore, unlined ponds may not satisfy potential ARARs. The SFS assumes (and evaluates alternatives against the assumption) that treatment system ponds shall be lined unless Intalco can demonstrate during RD that unlined ponds are protective and will satisfy ARARs.

98. **Page 6-38, 6-58, 6-70, 6-73:** Regarding the assertion that constituents of concern “*in soils and groundwater would be expected to flush out over time,*” the DFFS does not provide any basis for indicating whether this would occur within a reasonable restoration time frame. In accordance with CERCLA, natural attenuation processes (such as dispersion, dilution, and sorption) must be quantified in the RI or FS in order to be considered as part of the remedy, and Intalco has not done this.
99. **Page 6-39, Section 6.6.1.2:** The modifications to the Copper Creek channel that are proposed as part of Alternative 4 may not have been able to handle the October 2003 flood event. Modification to this channel as part of the remedy would need to be based on a detailed geomorphic/stream hydrologic study to be completed as part of RD.
100. **Sections 6.6 and 6.7:** Open trenches and French drains for the Alternatives 4 and 5 are not likely interchangeable since long-term maintenance of French drains could be more difficult relative to an open trench. If the effectiveness is different between the two collection systems, the analysis in Section 7 would be impacted.
101. **Page 6-41, Section 6.6.1.3:** A decrease in metals concentrations at seep SP-21 may or may not be observed following implementation of the upgradient water diversions. Flow nets provided in the DFFS indicate that surface water from the mountainside south of the tailings piles currently combines with the contaminated groundwater from the tailings to form the flow at SP-21. Therefore, the upgradient water diversions may reduce groundwater dilution and increase the metals concentrations as measured at SP-21, not decrease them as indicated in this section. In general, however, the Agencies support the exclusion of clean upgradient water from areas where it would become contaminated and subsequently need to be treated.
102. **Page 6-41, Section 6.6.1.3:** The last sentence of the first paragraph is hereby modified to refer to Seep SP-21, not SP-23.
103. **Page 6-45, Section 6.6.2.1:** Potential transport of constituents of concern and tailings should be avoided, not just *minimized* as stated in the DFFS, both during and after construction. Stormwater pollution prevention must be accomplished in accordance with potential ARARs. All regrading will need to be accomplished in accordance with an approved construction stormwater management plan.
104. **Page 6-45, Section 6.6.2.1:** The DFFS assumes no difference in collection efficiency for a French drain versus an open trench. This assumption is unsubstantiated. A comparison of these two alternative collection techniques will need to be conducted during RD, including potential iron fouling and other maintenance and operational issues.
105. **Page 6-46, Section 6.6.2.1:** The effect of the losing sections of the stream on groundwater collection will need to be evaluated during RD as it may affect the method of groundwater collection. This applies to any alternative that includes collection of groundwater along a losing section of Railroad Creek.
106. **Page 6-48 – 6-49, Section 6.6.3.1:** The DFFS does not adequately address reasonably anticipated adverse effects associated with relocation of Railroad Creek, such as creation of higher gradient and straighter creek sections that would not provide good fish habitat. Also, it is not clear that the relocated channel would eliminate the formation of ferricrete and iron flocculent, if the source of these materials is not also eliminated. As a result, the alternatives that include creek relocation are not adequately evaluated in the DFFS. Because of the issues related to potential creek relocation, the Agencies developed an alternative that did not require creek relocation.

107. **Page 6-71, Section 6.10.1:** Residual metals are anticipated to remain in the soils beneath the former waste rock pile locations based on the SRK analysis in the DFFS. Therefore, it appears the Upper West Area barrier and collection system would still be necessary for a period of time until metals have been flushed from the subsurface.
108. **Figure 6-14:** Seep SP-23 has been observed to consist of three seeps that emanate along the intermittent drainage. Capturing the southernmost seep may or may not eliminate the lower seeps. Remedial design of seep collection will need to address this.
109. **Figure 6-29:** The figure indicates that the former Railroad Creek channel would be dry after relocation. The purpose of the channel is to collect groundwater emanating from the Site; therefore, we would expect water in the channel.
110. **Section 7. Various Subsections titled Protection of Aquatic Life:** Sections in Chapter 7 that refer to protection of aquatic life should not only refer to total and dissolved constituents of concern in surface water. As discussed on page 2-36 of the DFFS, a possible correlation was noted between iron oxy-hydroxide flocculent on the creek sediment and the reduced populations of fish. The Agencies believe that reductions in fish and benthic invertebrates observed during the RI may be due in part to the reduction of habitat from iron oxide precipitation and ferricrete formation in the creek bed. The iron oxide precipitates and ferricrete are produced as a result of the release of hazardous substances. Both CERCLA and MTCA require that the feasibility study evaluate the residual effects that an alternative may leave [e.g., 40 CFR § 300.430(e)(9)(C), and WAC 173-340-350(8)(c)(i)(E)]. Several alternatives do not remediate groundwater below the tailings piles, a major source of the iron to Railroad Creek, or address only part of the impacted groundwater flow. Over time the ongoing release of metals above cleanup standards will continue to adversely affect aquatic life and, therefore, needs to be addressed by the remedy. This includes metals in the water column as well as sediment effects such as ferricrete.
111. **Page 7-4, Section 7.1.2:** The Agencies take exception to the statement: *“Failure to satisfy [the threshold criteria] usually means an alternative is eliminated from further consideration; however, waivers of some requirements may be allowed under certain circumstances.”* Except as provided with respect to individual ARARs, the threshold criteria cannot be waived.
112. **Page 7-7, Section 7.1.3.1:** The second sentence of the first bullet includes *“Volume, toxicity, mobility, and potential for bioaccumulation of remaining hazardous materials...”* The DFFS has not addressed the differences in scale of ongoing releases that will occur with each alternative. For example, some sediment sample results for iron exceed current regional freshwater sediment quality guidelines (U.S. Army Corps of Engineers et al. 2006). If iron continues to be released for hundreds of years; it is likely that concentrations will continue to exceed protective levels, and/or the extent of impacts may increase. The DFFS should have discussed the accumulation of iron and other metals in the sediments of Railroad Creek. The selected remedy must address this issue.
113. **Page 7-11, Section 7.1.5:** The citation for MTCA’s requirement for use of permanent solutions to the maximum extent practicable should be WAC 173-340-360(2)(c) and WAC 173-340-360(3), and not WAC 173-340-360(4)(b), as shown. The DFFS is incorrect in noting that the disproportionate cost analysis is one of the threshold criteria. MTCA specifically allows the disproportionate cost analysis to be applied only to compare alternatives that satisfy all of the threshold criteria [WAC 173-340-360(2)(b)].
114. **Page 7-12, Section 7.1.6:** The DFFS should have noted that the requirement for the selected action to provide for a reasonable restoration time frame is only applicable to alternatives that have already been shown to satisfy the threshold criteria, and ALL of the

other requirements specified in WAC 173-340-360(2). Also, since by definition a conditional point of compliance is only permitted when cleanup levels cannot be achieved in a reasonable restoration timeframe [see WAC 173-340-720(8)(c)], the criteria for accepting a longer reasonable restoration timeframe under WAC 173-340-360(4)(c) are not applicable.

115. **Page 7-12 – 7-43, Section 7.2:** In Section 2.3.3.4 on page 2-12, the DFFS states “*The near-surface alluvial material associated with the abandoned streambed appears to act as a preferential pathway for near-surface groundwater movement through the western portion of the Site and beneath the tailing pile.*” The supporting evaluation of alternatives does not address this potential pathway. The effect of the abandoned streambed on groundwater movement will need to be addressed by the remedy.
116. **Pages 7-13 through 7-20, Section 7.2.1.1:** As a general comment, the Agencies disagree with Intalco's assignment of specific numeric “effectiveness” values to upgradient source controls, collection efficiencies, and treatment effectiveness, without supporting documentation. In most cases the factors are presented with a brief discussion of what was assumed, but without discussion of conditions that could influence these assumptions; how they might change over time; or how such changes (if they occurred) could be mitigated or would affect one alternative compared to another. Where the DFFS does discuss the assigned values (e.g., changes in collection efficiency downgradient of the tailings over time due to iron fouling), the DFFS typically does not provide any references to reported experience at other sites, or supporting engineering analysis. Similarly, there is no independent “reality check” on the uncertainty factors in Tables D1-1 through D1-14. The Agencies found that the DFFS loading model is not appropriate as the primary basis for selection of a remedy, as discussed in the SFS, Appendix A.
117. **Page 7-14 – 7-20, Section 7.2.1.1:** Performance factors should not be applied to unaccounted loading as done in the DFFS post-remediation loading analysis. In Section 2.6.3 (Page 2-41), unaccounted loading is said to represent “*a combination of accuracy of measurement techniques, groundwater baseflow, and/or metals attenuation in Railroad Creek.*” However Section 7.2.1.1 (pages 7-15 and 7-19) and the post-remediation loading analysis (throughout Appendix D-3 and D-5) refer to unaccounted loading as groundwater. The performance factors applied to the unaccounted loading term due to upgradient controls may not be realized since it is not certain that this source is groundwater. For example, unaccounted load that may be caused by measurement error would not provide a predictable decrease (or increase) in post-remediation loading.

Furthermore, “(Groundwater)” is hereby removed from the text in the first bullet on page 7-15 and the third bullet on page 7-19, as this is misleading. “(Groundwater)” is also hereby removed from line items called “*Unaccounted (Groundwater) Load*” in tables in Appendices A, D-3, and D-5.

118. **Pages 7-15 and 7-17, Section 7.2.1.1:** The DFFS does not provide adequate justification for the load reduction attributed to material being removed from the mill building and/or covered in place, and how mitigation of this source can be assured without demolition and removal of the relic structure. Without having characterized soils and processing residuals associated with the mill building, a 50% reduction is speculative. Any cover for wastes and contaminated soils that are left in place would have to satisfy state landfill standards, which are not discussed in the description of mill building actions in the DFFS. The mill building structure will need to be removed to the extent necessary to complete characterization and so contaminants associated with the mill can be fully addressed.
119. **Pages 7-15 through 7-17, Section 7.2.1.1:** The DFFS notes that the SRK analysis indicates that upgradient surface water diversion will not reduce loading, but Intalco includes an

upgradient source reduction term in the model for Alternative 2 and 4. All of the alternatives proposed by Intalco (except the no-action alternative) include upgradient diversions as a component of the remedy. The SFS also assumes that the upgradient surface water run-on controls will be implemented, in order to reduce the amount of clean water that would otherwise become contaminated.

120. **Pages 7-15 and 7-17, Section 7.2.1.1:** The DFFS assumes a 90 percent reduction factor in metals loading from the waste rock piles for Alternatives 7 and 8, in which the piles are moved to the consolidated tailings pile. No justification for such a reduction factor is provided. The discussion in the DFFS indicates that residual metals in the soils below the waste rock piles would likely continue to be a source of dissolved metals to the Lower West Area. This source may be greater than the 10 percent that the model assumes would remain after application of the reduction factor.
121. **Page 7-16, Section 7.2.1.1:** While the short-term analysis is said to represent approximately 5 years after remedy implementation, the long-term is said to represent conditions after dissolved metals and metal oxides remaining in groundwater and soils downgradient of source controls and collection systems have been depleted after a period of approximately 30 years. No justification for the 30-year assumption is provided. The Agencies question whether there is any basis to assume that the short-term reductions due to upgradient controls would be realized in 5 years, or whether the assumption of 30 years is supportable (see Appendix A of the SFS).
122. **Page 7-16, Section 7.2.1.1:** The Agencies note that the application of a 75 percent reduction factor to West Area seeps has not been substantiated. Appendix A of the SFS report provides a full discussion of the Agencies' opinion regarding this reduction factor including Intalco's submittals that were provided subsequent to the DFFS.
123. **Pages 7-16 and 7-17, Section 7.2.1.1:** Metals concentrations measured in the Copper Creek Diversion are likely elevated due to commingling with groundwater and seeps. Although placing the diversion in a culvert should be effective in reducing the load measured in the diversion, it will not affect the contaminated groundwater and seep water that contributes to Railroad Creek base flow. The model and text do not address this potential continued source of contamination to Railroad Creek.
124. **Page 7-18 and 7-19, Section 7.2.1.1:** In Section 6.6.2.1 and 6.6.2.2, the DFFS states that the collection efficiency would decline over time due to iron fouling. However the collection efficiencies used in Intalco's loading analysis remain constant over time. Also, Intalco did not address the potential for maintenance to address changes in collection efficiency.
125. **Page 7-19, Section 7.2.1.1:** The Agencies believe that a 10 percent increase in collection efficiency from 80 to 90 percent due to the location of the eastern treatment plant is not warranted. The proposed treatment plant will not necessarily intercept flow tubes as described. Unlined settling ponds may not conform to ARARs. This needs to be resolved before assuming commingling of groundwater and pond water is an acceptable part of a remedy.
126. **Page 7-22, Section 7.2.1.3:** The DFFS mass loading analysis does not adequately discriminate between the effectiveness of alternatives, and is not an effective basis for selection of a remedy (see Appendix A of the SFS). The DFFS loading analysis provides surface water concentrations in the fully mixed condition at the sample locations designated RC-4 and RC-2. In technical meetings with Intalco, the Agencies have stated that the loading analysis model does not represent concentrations at the point of compliance. In response to this comment, URS, on behalf of Intalco, provided what is referred to as the South Bank

Analysis (URS 2004d). URS's analysis used data for RC-4 and RC-2 to estimate post-remediation metals concentrations at the south bank of Railroad Creek (URS 2004d). Upon presentation of this analysis, the Agencies discussed flaws in the analysis with Intalco. The Agencies' discussion of the limitations of the South Bank Analysis is documented in Appendix A of the SFS. The flawed South Bank Analysis does not cure the flawed DFFS mass loading model. Neither the DFFS nor the South Bank Analysis adequately discriminate between the effectiveness of alternatives, and they are not an appropriate basis for selection of a remedy.

127. **Page 7-38, Section 7.2.2:** The lack of adequate aluminum data for Railroad Creek makes it difficult to use dissolved aluminum data to support conclusions about potential aquatic impacts due to total aluminum. The selected remedy must eliminate discharges above ARARs, be protective, and not rely on a "*first order approximation*" based on incomplete data.
128. **Page 7-38, Section 7.2.2:** Flocculent is a sediment issue for aluminum and other metals. Flocculent data from RC-2 dated 10/4/97 show very high levels of aluminum and other precipitated metals. The DFFS has not addressed the differences in scale of ongoing releases that will occur with each alternative. Some sediment sample results for aluminum exceed current freshwater sediment quality standards. If aluminum continues to be released for hundreds of years; it is likely that the concentrations will continue to exceed protective levels, and/or the extent of impacts may increase. The DFFS should have discussed the accumulation of aluminum and other metals in the sediments of Railroad Creek. The selected remedy must address this issue.
129. **Page 7-40, Section 7.2.2.4:** To clarify, the 80 to 90 percent collection efficiencies do not directly correlate to 80 to 95 percent load reduction. The sentence is slightly misleading as written.
130. **Page 7-41, Section 7.2.3.1:** Stormwater management design for regrading for the remedy selected shall be based on ARARs. Proposed ARARs include the State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity, and Ecology's Stormwater Management Manual for Eastern Washington.
131. **Sections 7.4 through 7.16:** The limited slope regrading as described under Alternatives 2, 3, 4, 5, and 6 does not eliminate the risk of tailings instability, which could cause significant releases of metals to Railroad and Copper Creeks.
132. **Sections 7.4 through 7.16:** The slope regrading as described for Alternatives 2, 3, 4, 5, and 6 does not include provision for detention and treatment of stormwater runoff during tailings regrading, which could cause significant releases of metals to Railroad and Copper Creeks. The regrading described under these alternatives does not provide adequate room at the base of the slope for stormwater control during construction, or for long-term monitoring and maintenance. Regrading is discussed in Appendix D of the SFS, which provides the rationale for proposed regrading of the tailings piles. Appendix D also presents a summary of tailings pile stability analyses that have been accomplished for the Site.
133. **Page 7-50, Section 7.4.1.2:** The Agencies disagree with Intalco's suggestion that the use of upgradient water diversion and source control actions in conjunction with natural attenuation are considered AKART. The DFFS is hereby modified to remove this assertion. Reliance on upgradient diversions and the source control actions proposed for Alternative 2a would allow for the continued release of hazardous substances into Railroad Creek. The SFS provides a more detailed discussion of AKART. This comment also applies to Alternatives 2b, 3a, and 3b, which rely on upgradient controls and natural attenuation in the East Area (i.e., Tailings Piles 1, 2, and 3).

134. **Page 7-54, Section 7.4.2.3:** The groundwater RAO is not being met in monitoring wells downgradient of the Site. Groundwater concentrations exceed proposed cleanup levels for the protection of surface water in both shallow and deep monitoring wells, located downgradient of the Site.
135. **Page 7-55 to 7-56, Section 7.4.3:** The DFFS states that the tailings piles are not an injured natural resource, but ignores information that the area beneath the tailings was a former wetland area with riparian forest. As a point of clarification, the Agencies consider the areas under the tailings piles an injured resource (Stratus Consulting 2005). A waste that is releasing hazardous substances was placed on the former riparian forest area; despite Intalco's contention (elsewhere) that this was legal at the time the tailings were dumped. Additionally, historical photos show that during placement of the tailings, water with associated metals was decanted from the waste piles and released into the wetlands and Railroad Creek. Groundwater with concentrations of hazardous substances above proposed cleanup levels continues to be released into the wetlands east of TP-3.
136. **Page 7-56, Section 7.4.3:** The DFFS states that the revegetation under Alternative 2a would provide replacement habitat over time for other potentially injured areas on the Site. The Agencies do not agree. The replacement habitat, mature or maturing forest, is not the same in terms of structure, function, or importance as the habitat removed, which was riparian floodplain forest. This comment also applies to Alternatives 2b through 6, which include revegetation of the tailings piles.
137. **Sections 7.6 through 7.18:** Treatment facility locations proposed in Alternatives 3 through 8 include removing riparian/floodplain habitat. Further reduction in habitat reduces the overall protectiveness to the environment for these alternatives. Potential detrimental effects of alternative treatment facility locations were not addressed as part of the DFFS.
138. **Sections 7.6 and 7.7, Alternatives 3a and 3b:** The Agencies do not agree that Alternatives 3a and 3b would be protective of human health and the environment and would satisfy potential ARARs. Alternatives 3a and 3b would not be protective of human health since they would not address tailings that exceed allowable concentrations for dermal contact and ingestion. Alternatives 3a and 3b would not be protective of the environment, since they would not eliminate releases to surface water that cause exceedance of aquatic life protection criteria. Alternatives 3a and 3b rely on source depletion and natural attenuation to address hazardous substance concentrations above proposed cleanup levels in groundwater and surface water in the Lower West Area, and Tailings Piles 1, 2, and 3 at the Site. Reliance on source depletion and natural attenuation to clean up groundwater means surface water would continue to exceed aquatic life protection criteria for hundreds of years. Alternatives 3a and 3b would not address ecological risk to other areas of the Site impacted by releases from the mine, including Holden Village and the wind-blown tailings area. Because Alternatives 3a and 3b do not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the DFFS analysis of the primary balancing criteria for remedy selection.
139. **Page 7-66, Section 7.6.1.2 and Page 7-72, Section 7.7.1.2, Groundwater:** The Agencies do not accept the statement on pages 7-66 and 7-72 that the analysis provided in the DFFS demonstrates that "*upgradient water diversions and source controls in the East and West areas, combined with upper West Area collection and treatment constitute all known, available and reasonable treatment (AKART) for this site.*" The DFFS is hereby modified to remove this statement. The SFS provides a more detailed discussion of AKART.
140. **Sections 7.8 through 7.16, Overall Protection of the Environment:** Alternatives 4 through 6 involve relocation of Railroad Creek to various extents, which would have an overall

detrimental effect to the ecosystem function in Railroad Creek, and reduces protectiveness of the remedy.

141. **Sections 7.8 through 7.10, Alternatives 4a, 4b, and 4c:** The Agencies do not agree that Alternatives 4a, 4b, and 4c would be protective of human health and the environment and would satisfy potential ARARs. Alternatives 4a, 4b, and 4c would not be protective of human health since they would not address tailings that exceed allowable concentrations for dermal contact and ingestion. Alternatives 4a, 4b, and 4c would not be protective of the environment, since they would not eliminate releases to surface water that cause exceedance of aquatic life protection criteria. Alternatives 4a, 4b, and 4c rely on source depletion and natural attenuation to address hazardous substance concentrations above proposed cleanup levels in groundwater and seeps in Honeymoon Heights, the Upper West Area and Lower West Area, and the Main Portal drainage from the underground mine. Reliance on source depletion and natural attenuation to clean up groundwater means surface water would continue to exceed aquatic life protection criteria for hundreds of years. Alternatives 4a, 4b, and 4c would not address ecological risk to other areas of the Site that have been impacted by releases from the mine, including Holden Village and the wind-blown tailings area. Because Alternatives 4a, 4b, and 4c do not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the DFFS analysis of the primary balancing criteria for remedy selection.
142. **Sections 7.11 through 7.14, Alternatives 5a, 5b, 5c, and 5d:** The Agencies do not agree that Alternatives 5a, 5b, 5c, and 5d would be protective of human health and the environment and would satisfy potential ARARs. Alternatives 5a, 5b, 5c, and 5d would not be protective of human health since they would not address tailings that exceed allowable concentrations for dermal contact and ingestion. Alternatives 5a, 5b, 5c, and 5d would not be protective of the environment, since they would not eliminate releases to surface water that cause exceedance of aquatic life protection criteria. Alternatives 5a, 5b, 5c, and 5d all rely on source depletion and natural attenuation to address hazardous substance concentrations above proposed cleanup levels in groundwater and seeps for some portions of the Site. Reliance on source depletion and natural attenuation to clean up groundwater means surface water would continue to exceed aquatic life protection criteria for hundreds of years. Alternatives 5a, 5b, 5c, and 5d would not address ecological risk to other areas of the Site that have been impacted by releases from the mine, including Holden Village and the wind-blown tailings area. Because Alternatives 5a, 5b, 5c, and 5d do not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the DFFS analysis of the primary balancing criteria for remedy selection.
143. **Sections 7.15 and 7.16, Alternatives 6a and 6b:** The Agencies do not agree that Alternatives 6a and 6b would be protective of human health and the environment and would satisfy potential ARARs. Alternatives 6a and 6b would not be protective of human health since they would not address tailings that exceed allowable concentrations for dermal contact and ingestion. Alternatives 6a and 6b would not be protective of the environment, since they would not eliminate releases to surface water that cause exceedance of aquatic life protection criteria. Alternatives 6a and 6b rely on source depletion and natural attenuation to address hazardous substance concentrations above proposed cleanup levels in groundwater and seeps for portions of the Site. Reliance on source depletion and natural attenuation to clean up groundwater means surface water would continue to exceed aquatic life protection criteria for hundreds of years. Alternatives 6a and 6b would not address ecological risk to other areas of the Site that have been impacted by releases from the mine, including Holden Village and the wind-blown tailings area. Because Alternatives 6a and 6b do not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the DFFS analysis of the primary balancing criteria for remedy selection.

144. **Section 7.17, Alternative 7:** The Agencies do not agree that Alternative 7 would be protective of human health and the environment and would satisfy potential ARARs. Alternative 7 would not be protective of the environment, since it would not eliminate releases to surface water that cause exceedance of aquatic life protection criteria. Alternative 7 relies on source depletion and natural attenuation to address hazardous substance concentrations above proposed cleanup levels in groundwater and seeps for portions of the Site. Reliance on source depletion and natural attenuation to clean up groundwater means surface water would continue to exceed aquatic life protection criteria for hundreds of years. Alternative 7 would not address ecological risk to other areas of the Site that have been impacted by releases from the mine, including Holden Village and the wind-blown tailings area. Because Alternative 7 does not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the DFFS analysis of the primary balancing criteria for remedy selection.
145. **Section 7.18 Alternative 8:** The Agencies do not agree that Alternative 8 would be protective of human health and the environment and would satisfy potential ARARs. Alternative 8 would not be protective of the environment, since it would not eliminate releases to surface water that cause exceedance of aquatic life protection criteria. Alternative 8 relies on source depletion and natural attenuation to address hazardous substance concentrations above proposed cleanup levels in groundwater and seeps for portions of the Site. Reliance on source depletion and natural attenuation to clean up groundwater means surface water would continue to exceed aquatic life protection criteria for hundreds of years. Alternative 8 would not address ecological risk to other areas of the Site that have been impacted by releases from the mine, including Holden Village and the wind-blown tailings area. Because Alternative 8 does not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the DFFS analysis of the primary balancing criteria for remedy selection.
146. **Table 7-8:** The DFFS predicts that worst-case metals concentrations in stormwater runoff from the regraded tailings are thousands of times greater than the proposed surface water cleanup levels. Stormwater management during and post-construction will need to comply with ARARs, including the State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity, and Ecology's Stormwater Management Manual for Eastern Washington. Development of an appropriate construction stormwater management plan will need to be completed during RD.
147. **Section 8, Comparative Analysis of Alternatives:** As previously discussed in comments on Section 7, the Agencies do not agree that Alternatives 2 through 8, including subalternatives, are protective of human health and the environment. Because these alternatives do not satisfy the threshold requirements under CERCLA and MTCA, the Agencies have not provided detailed comments on the comparative analysis of alternatives presented in the DFFS.
148. **Notes for Tables A-1 through A-4, Appendix A, Flow Data:** Discrete seep flow values used in the loading analysis were up to ten times the actual flows measured in the 1997 sampling events. The notes for Tables A-1 through A-4 that explain the source of the seep flow values reference various tables in the DRI. However, neither the notes in Appendix A of the DFFS nor those referenced in the DRI provide sufficient explanation of how and why these flow volumes were increased. Also, the DFFS does not discuss the effect on the model output if the actual measured flows had been used.
149. **Attachment A-1, Flow Net Analysis:** The aquifer thickness was set at 10 feet based on a sensitivity analysis presented in the Fall 2003 Hydrogeologic Investigation Data Transmittal (URS 2004b). The sensitivity analysis used the unaccounted load as a means to establish an

appropriate aquifer thickness. This seems inappropriate since unaccounted load may represent "a combination of accuracy of measurement techniques, groundwater baseflow, and/or metals attenuation in Railroad Creek" (Section 2 of DFFS). The groundwater baseflow also includes water entering or leaving via the north side of Railroad Creek. Therefore, by "calibrating" the flow analysis to unaccounted load, loading estimates for what is coming from the south side of Railroad Creek are likely incorrect.

150. **Appendix D5 CD-ROM:** For some of the fall loading analyses (e.g., Alternatives 2a, 2b, 3a), flows for flow tubes S8 OUT, SL-1 through SL-3 were set to zero. No cut off wall is being installed along Tailings Pile 3 in these alternatives; therefore, the flows should not be set to zero.

151. **Appendix H (and related discussion throughout the DFFS):** Proposed surface water cleanup levels that are based on the NWQC are based on ecological risk assessments by EPA to establish concentrations that are protective of aquatic life. Analyses by the Fish and Wildlife Service (USFWS 2004 and 2005) show the appropriateness of the NWQC for the Site. The DFFS is hereby modified to eliminate Intalco's characterization of aquatic life risk.

Page 4, Item 5, Appendix H: No references are provided to support the argument that aquatic organisms adapt genetically rather than acclimate physiologically to ambient metals concentrations. The DFFS statement that fishes "*consequently are less sensitive to these metals than would be expected based on lab-derived values in the water quality criteria documents*" has no scientific basis. Intalco has not provided scientific support for its contention that fish in Railroad Creek have adapted to elevated metals concentrations, and that this "adaptation" is not merely physiological acclimation that comes at a physiological cost such as reduced growth, reduced fitness, or reduced reproduction. The Agencies disagree with Intalco's contention.

152. **Appendix I, Cost estimate:** Upon review of the DFFS, the Agencies determined that inadequate supporting information was available in Appendix I for the costs used in Section 7, and in subsequent submittals (URS 2004c).
153. **Appendix K:** The DFFS notes that the purpose and methods used for conducting the ERA accomplished for the DRI "*were not intended for use in calculating numeric soil concentrations deemed protective of the various ecological receptors, including soil invertebrates and other wildlife*" (Appendix K of the DFFS). Cleanup levels will be based on potential ARARs, unless the Agencies determine during RD, that other levels would be protective of terrestrial receptors based on additional ERA.
154. **Page 2, Appendix K, Soil Invertebrates:** MTCA specifies that the lowest relevant Lowest Observed Adverse Effect Level (LOAEL) will be selected to establish a toxicity reference value. Intalco selected a value for invertebrates that was the 20th percentile rank of the data. The Agencies have determined that existing information from the DRI and DFFS is insufficient to set final soil cleanup levels at the Site.

REFERENCES

Dames & Moore 1999. Draft Final Remedial Investigation Report, Holden Mine Site. Prepared for Alumet Inc. by Dames and Moore. Seattle, WA. July 28, 1999.

Ecology 2005. Water Quality Program Permit Writer's Manual. Publication No. 92-109. Revised July 2005.

EPA 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. OSWER Directive No. 9200.4-17P. April 21, 1999.

EPA 2006. National Recommended Water Quality Criteria: 2006.

EPA 2007. National Recommended Water Quality Criteria: 2007.

Fahrenthold, D.A. 2006. A Mine's Still-Toxic Legacy, Washington Post. November 3, 2006.

Forest Service 1976. Letter from Daniel Meschter (Forest Service Area Mining Engineer) to the Wenatchee Forest Supervisor; titled: Economic Evaluation, Holden Tailings. January 14, 1976.

Forest Service 1990. Land and Resource Management Plan for Wenatchee National Forest as Amended by Pacific Northwest Forest Plan (NWFP, 1994) and subsequent amendments of the NWFP (2001, 2004, and 2007).

Forest Service 2003. Agencies Response to Your [Intalco's] June 4, 2003 Letter – ARARs. July 28, 2003.

Forest Service, 2004. Letter From Norman Day to David Jackson, regarding Additional Data Request. September 28, 2004.

Forest Service 2007. Supplemental Feasibility Study, Holden Mine Site, Chelan County WA. September 2007.

Hart Crowser 2005a. Lower West Area Groundwater Discharge Estimates. Memo prepared for Norman Day of USDA Forest Service. February 3, 2005.

Hart Crowser 2005b. Summary of Review Comments Appendix K, Evaluation of Preliminary Risk-Based Soil Values for the Protection of Terrestrial Ecological Receptors at Holden Mine Site Draft Final Feasibility Study (DFFS). March 9 2005.

Hart Crowser 2005c. Holden Mine Site, Chelan County, Washington, Site Information Package. Prepared for USEPA National Remedy Review Board. September 1, 2005.

Stratus Consulting 2005. HEA Calculations for the Holden Mine site, Chelan County, North Central Washington State. April 15, 2005.

URS 2004a. Draft Final Feasibility Study, Holden Mine Site. Prepared for Intalco by URS Corporation. February 19, 2004.

URS 2004b. Fall 2003 Hydrogeologic Investigation Data Transmittal, Holden Mine RI/FS. Prepared for Intalco by URS Corporation. March 29, 2004.

URS 2004c. Letter to Norm Day from Rik Langendoen re: Holden Mine RI/FS, Cost Backup for Holden Mine 2004 DFS, URS Project No. 33750803. August 4, 2004.

URS 2004d. Estimation of Post-Remediation South Bank Dissolved Metals Concentrations. Memorandum dated August 16, 2004.

URS 2004e. Holden Mine RI/FS, Response to Agencies' 9/28/04 Additional Data Request Letter. Memorandum dated November 11, 2004.

URS 2005. Responses to Agency DFFS Appendix K Comments, Holden Mine RI/FS. July 15, 2005.

USFWS 2004. Tables of Published Toxicity Values at Water Hardness Concentrations Similar to Railroad Creek. June 16, 2004.

USFWS 2005. Aluminum and Iron Toxicity Related to Water Quality Parameters Similar to Railroad Creek. January 3, 2005.

J:\Jobs\476911\SFS Final\DFFS comments.doc