



United States
Department of
Agriculture

Forest
Service

Pacific
Northwest
Region

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Date: November 22, 2006

J. Chris Pfahl
Site Manager
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Dear Mr. Pfahl:

The Forest Service has reviewed ASARCO's Draft-Final Engineering Evaluation/Cost Analysis (EE/CA), Azurite Mine and Mill Site, submitted on September 21, 2006. The Forest Service requested and received preliminary comments from the Washington Department of Ecology (WDOE). Based on the Forest Service's review and WDOE's comments, the Forest Service requires that the EE/CA include an additional on-site removal alternative which more fully addresses long-term erosion potential of the waste rock by Mill Creek and the poor water quality of the seep discharges.

Please submit written responses to these comments by December 6, 2006, prior to revising the EE/CA. In addition, I suggest that we arrange a conference call for November 30, 2006 at 9AM PST to discuss the comments prior to the formal written response. I am inviting Rick Roeder of DOE to participate to provide WDOE's perspective. If ASARCO has a conflict at that time, please contact me to arrange a mutually acceptable time.

General EE/CA Comments:

1. **Executive Summary:** The Executive Summary is too long and should be substantially rewritten. The Executive Summary should get right to the important points. These are: 1. identify the problem; 2. identify what needs to be done to fix it; and 3. provide a short explanation of why the recommended fix is appropriate. There is no need for discussion of the investigatory history or the contaminants of concern that don't need to be addressed. Much of the Executive Summary focuses on risks that do not need to be addressed. Such discussion should be eliminated or relegated to a footnote, rather than placed first.
2. **ARARs:** Appendix F is generally a good compilation of potential ARARs, but we find no analysis of which ARARs are important at the Site. For example, there is no discussion of action taken to comply with the substantive requirements of the Endangered Species Act or the National Historic Preservation Act, both of which are denoted as applicable. Both are potentially important due the presence of a threatened species, bull trout, and the historic nature of the site (facilities dated from the 1930s). WAC 173-350-400 provides for a presumptive cover consisting of an impermeable membrane and a 2 foot cover. While there is flexibility regarding this requirement, there does not appear to be any analysis justifying relaxation of this requirement. Similarly, the discharge from the mine adit is a potential



pollutant point source discharge under the Clean Water Act. The EE/CA should identify whether there is a violation and whether the ARAR will or will not be met.

3. **Scope of the Removal Action:** Section 5.2 states that the scope of the removal action is to control releases and will not address mine discharges. Paragraph 20 of the May 2005 Administrative Order on Consent (AOC) provides: “The general objective of the EE/CA is to determine and evaluate removal action requirements and alternatives designed to prevent, mitigate, or otherwise respond to or remedy **any** releases, or threats of releases, of hazardous substances, at, or from, the Site in accordance with the NCP, 40 C.F.R. 300.415.” (Emphasis added.) The mitigation of unacceptable risk in all media (soil, waste rock, tailings, adit discharge, and surface water) should be driving the evaluation and selection of removal alternatives.
4. **Removal Alternatives:** A 2nd on-site action alternative needs to be developed and evaluated which better addresses long term erosion potential, rain and snow-melt seepage through contaminated waste rock and tailings soils and contaminated seepage from the waste rock and tailings piles. This alternative would be as follows:

Move the impacted soils from the mill building area to the tailings pile. Then utilize the waste rock pile by moving it to the tailings pile and strategically placing it to help in stabilizing the tailings pile and provide erosion protection in key areas. For the cover, combine 12” soil (to reduce infiltration and 12” talus rock (for erosion protection). The intent is to reduce infiltration considerably beyond the 20% in the current on-site alternative. Evaluate the effectiveness of this approach through use of the HELP-model. Consider other cap designs if necessary to obtain substantial reduction of infiltration. Combining and closing the piles in this manner will accomplish a few critical needs; it will remove the contaminated materials out of the Mill Creek and the base flood zone; it will avoid the reliance on rip rap at the base of the waste rock piles, which will need long term maintenance; and it should provide for a much greater reduction in both seep size and concentrations. Removal of the waste rock pile and the subsequent elimination of the seep should address the highest concentrations of Al, Cu and other metals to Mill Creek.

It is doubtful that a one-foot soil cover would be acceptable for the off-site repository. Such a repository should include a presumed low-no infiltration cover and provide a high degree of toxicity and mobility reduction. Costs should be adjusted accordingly to reflect access and material sources for all alternatives.

Specific EE/CA Section Comments:

1. ES – 6 – 2nd paragraph, 5th and 6th sentence – Throughout the EE/CA, ASARCO speculates about state, federal and community acceptance. Delete these references. The Forest Service will determine “federal” acceptance when it issues an action memorandum. The Forest Service will rely on the State and the Public to provide their views, when we provide them with the final EE/CA.

2. ES- 7 – 1st line – What is the basis for the conclusion that Alternatives 2 and 3 would have a moderate to high compliance with ARARs? For the Executive Summary a statement that ARARs will generally be met followed by a short discussion of those that would not be met, would be more helpful. A more detailed discussion is needed later in the document (see below).
3. Page 8-9 – 2.1.7 – Hydrology – Section 2.1.7 indicates that a 100 year flood event would lead to an estimated peak flow of 656 cubic feet/sec., approximately 100 times the August 2004 flow. Approximately what portion of the waste rock would be inundated in such an event?
4. Page 16 – 2.2.3.1 – With respect to sediment generally, irrespective of current conditions there is a threat of a substantial release due to an earthquake, heavy rainfall and/or a 100 year flood.
5. Page 26 – 3.3.4 – Make clear that the 104 mg/kg cleanup concentration is for arsenic.
6. Page 35 – 4.1 – See General Comments
7. Page 40 – 6.0 – Data gaps were to be identified in this section but none were noted. Some data gaps that need to be listed include:
 - Geotechnical data assumed in the stability analyses;
 - Potential sources for a soil cover layer (e.g. additional glacial terrace deposits in the drainage);
 - The origin of the waste rock seepage water (is it the Wenatchee adit?);
 - Seasonal variation in water flows and quality; and
 - Extent, if any, of subsoil contamination beneath the waste rock piles.
8. Page 41 – 2nd full paragraph, 1st sentence. This indicates containment would result in, among other things, “removal of materials from contact with flowing water”. This is not accurate. Revise to “removal of materials from direct contact with flowing water”.
9. Page 43 – The 2nd and 3rd paragraphs both discuss drawbacks to either plugging adits or treating adit drainage. The discussion does not adequately support dropping adit plugging. Further details for the cost-to-benefit argument are needed. Consider distance from adit to stream and attenuation during subsurface flow, as well as existing stream water quality. Also quantify the plugging cost. If the mine adit discharge is reaching Mill Creek and it contains a pollutant, then the discharge violates the Clean Water Act. 33 U.S.C. 1311(a). A response that does not address this discharge would not meet ARARs and needs to be noted.
10. Page 44 – 6.1.2 – Delete or rewrite. This section attempts to minimize the impact of the contamination in conclusory fashion and is inconsistent with other text. There is no reason to discuss why a time-critical removal action is not needed. Except for the fact that planning is going to take considerably longer than 6 months, a good case can be made that a time-critical removal action is appropriate.

11. Page 45 – Assume that the mine opening gratings would be bat friendly and adjust costs as needed.
12. Page 46 – 3rd paragraph – While the draft EE/CA initially contemplates both an offsite repository constructed nearby and hauling the waste material to an existing repository, the latter option is not analyzed. There is no explanation why.
13. Page 47 – 6.1.1 – last paragraph, last sentence. Clarify why the offsite alternative has lower overall effectiveness. Revise, as necessary, assuming a presumptive cover on the off-site repository.
14. Page 48 – 3rd paragraph – In addition to a single layer cover of soil or rock, this alternative should evaluate a two-layer cover, 12” of soil covered (assuming it is reasonably available) by 12” of protective rock . Such design can appropriately take into account the existing steep slopes, allows optimization of final constructed slopes (to maximize runoff) while decreasing infiltration and providing erosion protection for the finer-grained/lower-permeability soils.
15. Page 48 – Paragraph 4 – See item above.
16. Page 48 – Paragraph 5 – The presence of “reshaped glacial deposits” in the lower waste rock pile begs the question: Are there more glacial terrace deposits in the vicinity that could be used for cover soil? This is a data gap that needs to be addressed.
17. Page 49 – Paragraph 3 – The conclusion that the on-site repository “would provide the highest degree of long-term effectiveness and permanence” is not well supported. Wouldn't, the waste rock pile be within the 100 year flood plain, if left on site? Wouldn't the offsite repository be located above the 100 year flood plain and designed in a fashion not to adversely affect groundwater and surface water? Access for operation and maintenance of the offsite repository would be easier and more likely to be accomplished, as well. It seems that the offsite repository would be more effective in the long term and more permanent.
18. Page 49 – Last Paragraph – Rewrite assuming a low-no permeable presumptive cover on the offsite repository.
19. Page 50 -- 2nd paragraph – See page 49, paragraph 3 comment (#17).
20. Page 50 – section 6.2.4. – The two threshold criteria for a final response are protectiveness and compliance with ARARs. 40 C.F.R. 300.430(f)(1)(i)(A). Even removal actions should comply with ARARs “to the extent practicable considering the exigencies of the situation”. 40 C.F.R. 300.415(j). This section should explain how potential ARARs listed in Appendix F as applicable or relevant and appropriate will be met or why those ARARs are not practicable to be met. By not addressing the mine

drainage (or other aspects of the site that need to be addressed) ASARCO has only partially discharged its obligation under the Administrative Order on Consent.

21. Page 52 – section 6.2.6 – The EE/CA ought not to speculate regarding state and federal acceptance. Federal acceptance need not be addressed at all, since the Forest Service will determine “federal” acceptance initially through the identification of a preferred alternative in an EE/CA made available for public comment and ultimately through its action memorandum selecting a removal action after taking into account both public and state acceptance. At this point the State has not communicated its position regarding its preferences for response at the site. If the Forest Service receives such information before making the EE/CA available for public comment, it is appropriate to reference it in the EE/CA. Otherwise, the discussion will have to be deferred to the action memorandum and response to comments, where the state’s position should be discussed in any case.
22. Page 53 – Section 6.2.7 – Similarly, the discussion of community acceptance should be deferred until after the Forest Service has made the EE/CA available for public comment and received such comment.
23. Page 53 – section 6.2.8 – Cost –
 - Why are off-site O&M costs so much more than on-site costs?
 - Appendix I indicates that operation and maintenance costs at 2.5% of total capital costs for the 1st 5 years and 1 % thereafter, please provide explanation to support this approach. This approach increases offsite O&M costs compared to on-site costs, when the opposite is likely the case.
 - Please explain the justification for ending O&M after 30 years?
 - Provide a reference or support for use of a 5% discount rate.
 - Adjust off-site repository costs to reflect a presumptive cover.
 - Adjust costs to include bat-friendly adit closures.
24. Appendix H, Page H-1, last paragraph: What magnitude earthquake is modeled in the geotechnical analysis? How does it compare to the magnitude 5 earthquake identified on page 7-8? Include analysis of the new on-site alternative.

EE/CA Editorial Comments:

1. Page E-2, paragraph 2, 1st sentence – Correct the spelling of “Whatcom County”. This also has to be corrected in the tables of Appendix C in Appendix E.
2. Page E-3, paragraph 3 – Add a comma after “calculations” in last sentence.
3. Page E-3, paragraph 4 – Change 2nd to last sentence to read: “...wildlife drinking surface water from seeps and the adit discharge.”
4. Page E-7, paragraph 3 – Split paragraph.

5. Page 1 -- 1.0 – Fourth line - The correct CFR reference is “7 CFR 2.60(39)”.
6. Page 1 - 1.1 – 1st line change “outline” to “outlined”. 2nd line – insert a comma after “Compensation”. Last Sentence – insert “with” before “open” and add a comma after “rock”.
7. Page 2 – 2nd sentence – Change “rational” to “rationale”. Add paragraph break before “Section 8”.
8. Page 3 – 2.1.1 -- Add “and” after “(1918-1934)” in the 1st sentence.
9. Page 3 – 2.1.1, Revise 3rd sentence to read as follows: “Gold and minor amounts of silver were produced at the mine from 1918 until 1939. Underground exploration continued until 1940. ASARCO removed all mining and milling equipment in 1942.”
10. Page 4 – 1st complete sentence – Insert “of” before “ore”. 1st full paragraph – Delete “appears to”. By the EE/CA stage we know whether there are elevated levels, or not. Change “contain” to “contains”. Change last sentence to read, “The waste rock piles are currently subject to soil erosion by gravity and runoff to Mill Creek.” Last line on page – Use of the word “detectable” minimizes the sample results. An arsenic concentration of 3800 ppm is at least “elevated”.
11. Page 5 - 2.1.2.2, 1st sentence – Add “and” before “sediments.
12. Page 9 – 2.1.8 – Change the 1st two sentences to “The area surrounding the Site is federally owned land managed by the Okanogan and Wenatchee National Forests. The current Forest Plan land allocation emphasizes semi-primitive non-motorized recreation and Late Successional Reserves. The area is inventoried roadless and given high value by special interests for potential wilderness designation (Okanogan LRMP, 1989). Land use in the area includes primarily recreation with some mining (in the form of placer mining) and mineral exploration.”
13. Page 16 – 2.1.1 – Last paragraph before 2.2.3 – Define HQ and explain significance if not previously discussed and explain the import of these numbers. Also are the arsenic and zinc HQs for both human health and ecological exposure? “The HQs for the other evaluated constituents were generally less than 10.”
14. Page 16 – 2.2.3.1 – 2nd sentence – replace “suggest” with “indicate” and delete “possibly”.
15. Page 17 – 2.2.4.2 – Revise this paragraph in terms of identifying potential problems. Add “analyses” after zinc in 1st sentence.
16. Page 18 – 2.2.5.1 -- 6th sentence – Correct(?) to “...queen’s cup and mosses of numerous species.” This also needs to be changed in App. E.

17. Page 19 – 2nd sentence – Add a semicolon after “zinc”. In the last sentence change “is” to “maybe” unless site-specific evidence is provided.
18. Page 23 – Last paragraph – Split into 2 paragraphs. Divide “usingEPAs” in 2nd to last sentence.
19. Page 24 – 2nd to last sentence – Add “s” to “hazard”.
20. Page 25 – 3rd paragraph – 4th sentence is incomplete.
21. Page 26 – 3.3.4 – Make clear that the 104 mg/kg cleanup concentration is for arsenic.
22. Page 27 – paragraph above 3.3.5 – What is the basis for the linear relation between concentration and risk? (100 times the concentration = 100 times the risk)
23. Page 29 – Last sentence – Delete “likely”.
24. Page 30 – 2nd full paragraph – 4th sentence – add “are displayed in Table 3-9” after “exceeding 1.0”.
25. Page 30 – last paragraph, 3rd sentence beginning “Based on the survey results...” contains 3 parentheses in the middle that muddle the meaning. The end of the last sentence of this paragraph is garbled.
26. Page 34 – 1st paragraph – Last line – Divide “(RAOs)for”.
27. Page 34 – last paragraph – Change “to” to “be” in 1st line.
28. Page 37 – Last paragraph – 1st line – Add a hyphen to “risk based”. Change “water” to “waste” in 2nd to last line.
29. Page 39 – 5.2 – Scope of Removal Action – The last word of the 1st sentence should be “practicable”. In the 2nd and last sentence of the 1st paragraph the 2nd “removal” should be “response”. Same change for 1st and 3rd “removal” in the last sentence of the last paragraph of this section. Future actions may be either removal or remedial (collectively response) actions.
30. Page 41 – 1st paragraph – 2nd to last sentence – Could add “considering the poor access and the primitive non-motorized land management allocation”.
31. Page 43 – 3rd paragraph – Expand the no-water treatment justification (e.g. for passive wetland--the long, cold and snowy winters in the cascades which limit biological activity; for active treatment--the need for power and regular maintenance, supply and disposal of contaminated sludge during all times of the year, including winter months when access is impractical and dangerous due to snow conditions and active avalanching).

32. Page 46 – End of 3rd paragraph – The statement is made that the access trail would have to be upgraded to a two-lane road. It is improbable that the Forest Service would allow an upgrade of the existing narrow-gauge road to a two lane road for a short term construction project such as this (considering the terrain and the considerable impacts it would cause to resource values in the area). The more likely scenario would be increased number of turnouts and a careful traffic schedule, both of which would add to the cost of the alternative. Also, the estimated road construction costs for this alternative do not reflect a two-lane road.
33. Page 44 – 6.2 – Delete “some” in the 1st line.
34. Page 46 – Complete Removal with Offsite Disposal. 4th sentence – Delete “U.S.” before Forest Service.
35. Page 47 – 6.2.2 – 1st paragraph – Should clarify that disturbance to contaminated soils contributes to mobility of contaminants until slopes are vegetated or otherwise stabilized.
36. Page 48 – 1st paragraph – Change to “The short-term effectiveness of this alternative would be moderate because site disturbance would be limited to the existing facility foot prints and involve limited reshaping or contaminated materials. Minimal offsite disturbance resulting mainly from access trail reconstruction would result from the removal action construction.”

3rd paragraph –Appendix D should be G.
37. Page 50 – 2nd paragraph – Provide details on the added disturbance effects of the offsite repository (increased area of total disturbance, potential contamination of uncontaminated land, better access by public, creation of a waste repository in highly valued semi-primitive recreational land).
38. Page 54 – section 7.0 – Delete the 2nd sentence
39. Page 54 – section 7.2 – 2nd paragraph – The Forest Service will look to the State to provide its recommendations for what the State views as an appropriate response at the site. Similarly, the Forest Service will evaluate community acceptance based on the public comments it receives.
40. Page 56 – section 8.0 – While an on-site alternative may become the preferred alternative, the advantages are not so clear cut as this conclusory statement makes it appear. This section should be rewritten in light of the preceding comments.
41. Table 2-7 – Use landscape format to align data rows.
42. Appendix E – Page iii – Add CSM, HQ, and EPC to acronym list.
43. Appendix E – Page v, 2nd paragraph, line 3 – Define HQ
44. Appendix E – Page E-1, 3rd paragraph, line 3 – “...used; Section 3...”
45. Appendix E – Page E-2, 3rd paragraph, line 1 – “...ERA-HHRA...”
46. Appendix E – Page E-10, 1st paragraph, line 1 – “...ADD by the reference doses (RfDs).”

47. Appendix E – Page E-11, 2nd paragraph, line 3 – Add “s” to “hazard”.
48. Appendix E – Page E-13, 3rd paragraph, line 9 – Why isn’t 1×10^{-6} used here?
49. Appendix E – Page E-15, 3rd paragraph, last line – “Ecological Stressors”???
50. Appendix E – Page E-16, 2nd paragraph, line 7 -- Change to “...queen’s cup and mosses of numerous species.”
51. Appendix E – Page E-18, 5.2, line 2 -- “...begins remaining...”??
52. Appendix E – Page E-28, 5.3.1.6, line 8 – Delete “would”.
53. Appendix E – Page E-29, 5.4, line 3 – Delete “within these localized areas”—repetitive.
54. Appendix E – Page E-31, 2nd paragraph, line 1 – Delete “primary”—repetitive.
55. Appendix E – Page E-32, 1st paragraph, 2nd to last line – Divide “2000lbs/CY”.
56. Appendix E – Tables C-xx – Correct spelling of Whatcom County.

Sincerely,

/S/ RODNEY T LENTZ

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cc: James Alexander-OGC
Dick Sawaya – Forest Service
Bob Fujimoto – Forest Service
Rick Roeder – Washington Department of Ecology
Tom Mullen – LFR Inc.