LFR ENVIRONMENTAL MANAGEMENT & CONSULTING ENGINEERING

December 22, 2006 003-09403-00

Mr. Rodney Lentz
Colville-Okanogan National Forest
1240 2nd Ave. South
Okanogan, WA 98840-9723

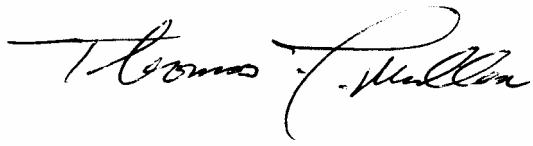
SUBJECT: Responses to USFS Comments for the Azurite Mine - Draft Final Engineering Evaluation / Cost Analysis

Dear Rod:

Please find attached the response to USFS comments for the report entitled Azurite Mine and Millsite, Whatcom County, Washington, Draft Final Engineering Evaluation/Cost Analysis (EE/CA) prepared by MFG, Inc. and dated September 21, 2006.

If you have any questions, or wish to discuss any items further, please do not hesitate to contact me at (509) 535-7225.

Sincerely,
MFG, INC.



Thomas F. Mullen, P.G.
Senior Hydrogeologist

TFM:bms

cc: J.C. Pfahl – Asarco
Jim Kienholz – MFG
Tom Hakonson – MFG
John Rahe – Rahe Engineering

Response to comments cover letter.doc

509.535.7225 m
509.535.7361 f
2310 North Molter Road, Suite 101
Liberty Lake, Washington 99019-8621
Offices Nationwide
www.lfr.com

Azurite Mine EE/CA – Responses to Forest Service Comments of 22 November '06

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*

Response: The Executive Summary in the Revised Draft Final EE/CA will be shortened to provide only the information listed above and various discussions of investigatory history, contaminants of concern and risks will be eliminated from this section or placed in footnotes.

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.*

Response: Discussions will be included in the Revised Draft Final EE/CA to address the actions taken to comply with substantive requirements of the Endangered Species Act and the National Historic Preservation Act. As discussed elsewhere, a presumptive cover consisting of an impermeable membrane and 2-foot soil cover will be addressed. A discussion of the mine adit discharge and its potential to be considered a point-source discharge under the Clean Water Act will be addressed.

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.

Response: Comment noted. Text will be revised to include and address mine adit discharges.

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.

Response: The second on-site alternative will be analyzed and addressed as Alternative 2B with the existing on-site alternative addressed as Alternative 2A in the Revised Draft Final EE/CA. It is likely that moving the existing waste rock pile to the existing tailings disposal area may require disturbance of adjacent land because the existing tailings area is already at a slope of about 2:1 and a relatively level area is not available for consolidation of such materials. It is possible that the consolidated on-site repository footprint could be within the existing tailings footprint if containment walls are constructed; such considerations will be made in development of Alternative 2B in the Revised Draft Final EE/CA. Analysis of this Alternative 2B will also include the use of a 2-foot thick cover consisting of 12-inches of soil and 12-inches of talus rock on the surface.

Furthermore, the off-site repository on Forest Service land will include a low-permeability cover system consisting of a 40-to 60-mil geomembrane and a 2-foot thick cover consisting of a drainage zone (geonet or granular drainage layer) and a soil cover of at least 18 inches thickness.

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.

Response: References to state, federal and community acceptance in an EE/CA are based on relative acceptance of the various alternatives analyzed (i.e. is one alternative likely to be better than another alternative in terms of state, federal and community acceptance?). The acceptance criteria are standard methods of comparative analysis which are typically only used to compare alternatives. Guidance criteria list state, federal and community acceptance as one of the recommended methods of comparative analysis along with other methods such as effectiveness and cost. However, for the purposes of this Revised Draft Final EE/CA such comparative analyses will be deleted from the document.

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).

Response: The intent of the statement is to provide a comparison between alternatives, not to provide a detailed discussion of which of the seventy one ARARs would not be met. The Executive Summary will be shortened based on General Comment No. 1. A more detailed analysis of which ARARs would not be met by each alternative will be included in Section 6.2.4.

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?

Response: The 100-year peak flow of 656 cfs would produce a maximum depth of flow in Mill Creek adjacent to the Waste Rock Piles of approximately 2.5 feet as presented in Appendix B (Sheet #3), which would likely inundate the toe of the portion of the pile

approximately 2 to 2.5 feet. Therefore, as shown on Figure 6-4, riprap is proposed along the toe of the Waste Rock pile to a minimum height of 3.5 feet above the toe (one foot freeboard) in Alternative 2. This area extends along approximately 200 feet of the upstream portion of the Waste Rock Piles, which is the portion closest to the creek. This toe protection, along with the up-gradient runon-control ditches and outfalls will effectively protect the Waste Rock Piles during extreme flood events up to and including the 100-year 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.

Response: Comment noted. The intent of the section is only to summarize the results of the previous CES investigations.

5. Page 26 – 3.3.4 – Make clear that the 104 mg/kg cleanup concentration is for arsenic.

Response: The text in the second sentence of Section 3.3.4 will be revised to clarify that the 104 mg/kg is for arsenic.

6. Page 35 – 4.1 – See General Comments

Response: See response to General Comment No. 2 above.

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.*

Response: Mention of various data gaps in the introductory paragraph in Section 6 will refer to a new Section 6.3 Identification of Data Gaps, which will be added to the end of Section 6.

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".

Response: The sentence will be revised as noted in the comment.

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.

Response: The added detail regarding the cost:benefit ratio of plugging, distances from adit to stream, overall costs and a discussion of ARARs as the mine adit discharge relates to the Clean Water Act will be included in the Revised Draft Final EE/CA.

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.

Response: This section will be deleted.

11. Page 45 – Assume that the mine opening gratings would be bat friendly and adjust costs as needed.

Response: The mine adit metal safety gratings would be bat friendly because they would typically have welded bars on approximately 6-inch centers. This will be discussed in the Revised Draft Final EE/CA

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.

Response: The text on page 46 refers, third paragraph, second and third sentences to an off-site permitted landfill facility. The closest such facility identified is located more than 300 miles from the Azurite Mine site (eg. Arlington, Oregon). This distance is considered too long to haul the mine wastes because of the excessive cost and the potential for spills on public roads over this distance. It is not a necessary, practical or feasible alternative for off-site disposal. This will be clarified in the Revised Draft Final EE/CA text.

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.

Response: Construction of an off-site repository on Forest Service land would disturb an existing, undisturbed piece of land by requiring clearing of trees and vegetation, construction of the subgrade and construction of new access roads, runon-control ditches, monitoring wells and other items associated with an off-site repository. This is considered to have a relatively lower overall protectiveness of the environment than on-site closure. As mentioned previously, the presumptive low-permeability cover will be analyzed as part the Revised Draft Final EE/CA, which may increase the overall effectiveness of the containment system. However, disturbance to existing, undisturbed Forest Service land will still occur, which in our opinion is not the best solution to the containment of mine wastes at the Azurite Mine site.

14 and 15. 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.

Response: The on-site closure will be analyzed for the 2-foot cover consisting of 12-inches of compacted soil and a 12-inch rock cover in the Revised Final EE/CA in addition to the 12-inch rock cover analyzed in the present document. A cost:benefit assessment will be provided to determine if the additional 12-inches of soil cover provides increased effectiveness at a reasonable cost.

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.

Response: The site investigation observed that the lower Wenatchee Adit waste rock pile consists primarily of glacial deposits that have been leveled to accommodate the former camp site. Reconnaissance during MFG's site investigation indicated limited volumes of glacial deposits that might be used for soil cover. Further, the glacial deposits were typically too coarsely graded to be of suitable use as a cover.

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.

Response: In the Draft Final EE/CA the on-site closure Alternative 2 would have toe protection along the portion of the waste rock within the limits of the 100-year floodway as discussed elsewhere. This is a common practice for mine waste closures to protect such areas from erosion during extreme flood events. If designed and installed properly the solution is very effective and permanent. The off-site repository may be located outside the 100-year floodplain, if such a location can be found. If this is not the case, this repository would also require erosion protection during extreme flood events. We agree that access for O&M at an off-site repository would likely be easier than for the on-site repository, especially if the existing road to the Azurite Mine cannot be improved. Discussions regarding the long-term effectiveness and permanence of the off-site repository versus the on-site closure alternative will be modified as necessary in the Revised Draft Final EE/CA.

A better analysis could be provided in the Revised Draft Final EE/CA regarding the actual location of the potential off-site repository shown on Figure 6-5 of the Draft Final EE/CA based on additional site-specific information. We have selected a relatively close available area on FS land on a relatively level area based on a GIS search. If the Forest Service wants to have a more detailed analysis of this site, we would need better data such as better topography to verify that the location is outside the 100-year floodplain (Please see sentences 8 and 9 of "Complete Removal with Offsite Disposal" subsection, page 46). This may require hydrologic analysis of *North Fork of Trout Creek which is south of Harts Pass or Slate Creek which is located north of Harts Pass.* The Forest Service should also provide verification that this selected property is available for use as a repository. We request that the Forest Service provide the information necessary for the additional detailed analyses required to address the comments.

18. Page 49 – Last Paragraph – Rewrite assuming a low-no permeable presumptive cover on the offsite repository.

Response: The low-permeability presumptive cover will be analyzed for the Offsite Repository in the Revised Draft Final EE/CA.

19. Page 50 -- 2nd paragraph – See page 49, paragraph 3 comment (#17).

Response: See response to Comment No. 17 above.

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.

Response: As discussed above, a more detailed discussion of ARARs will be included in the Revised Draft Final EE/CA which will include an explanation how ARARs will be met and why specific ARARs are not practicable to meet including the addressing of mine adit discharges.

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.

Response: See response to Comment No. 1 above.

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.

Response: The discussion of community acceptance will be deferred until after the Forest Service has received comments on the Revised Draft Final EE/CA.

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.*

Response: The off-site versus on-site O&M costs will be revisited in the Revised Draft Final EE/CA. Thirty years is a typical time period for analyzing O&M costs in a present-worth analysis; however, a longer time period can also be analyzed if the Forest Service desires. Similarly, a 5 percent discount rate is a common unit for present-worth analyses; however, if the Forest Service desires another discount rate, or a range of discount rates, such analyses could be performed. We request direction from the Forest Service.

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.

Response: The earthquake seismic factors used in the analyses represent a 10 percent probability of occurrence in 50 years, or an approximately 500-year recurrence interval as shown on page 3 and Reference C (USGS National Earthquake Information Center) of the calculations presented in Appendix H. This represents an earthquake having a magnitude of approximately 5.5 at the site or a magnitude of approximately 6 near the site. Stability analyses of the new on-site alternative will be included in the Revised Draft Final EE/CA.

EE/CA Editorial Comments:

EE/CA Editorial Comments 1 through 56.

Response: All editorial comments will be incorporated into the Revised Draft Final EE/CA and the following responses are added to the editorial comments requiring further explanation:

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."

Response: Hazard quotient (HQ) will be defined and the significance of the numbers will be explained. Arsenic and zinc hazard quotients in the context presented in this section related to ecological exposure. This distinction will be made in the document.

32. Page 46 – End of 3rd paragraph – The statement is made that the access trail would have to 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.

Response: The existing access trail would need to be upgraded for safe truck access for a large number of heavy truck loads (up to 7,300 loads using 12-cy trucks). The minimum width for such activity for a single lane road would be 12 feet with turnouts likely every 500 to 1,000 feet to avoid trucks having to back up long distances. Portions of a single-lane access road may also require outside berms for safety at some locations. This can be added to the Revised Draft Final EE/CA. The access road construction costs will be revisited and revised as necessary and the cost of the off-site disposal alternative will also be revised to reflect the slower truck haul times required for single-lane use with turnouts.

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.

Response: As discussed in the response to Specific EE/CA Section Comment No. 1, the state, federal and community acceptance of the various removal action alternatives will be deferred until final review and public comment on the Revised Draft Final EE/CA.

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.

Response: Section 8.0 will be re-written based on the additional analyses required by the Forest Service's comments on the Draft Final EE/CA.