



Date: March 15, 2006

J. Chris Pfahl
Site Manager
ASARCO LLC
PO Box 440
Wallace, ID 83873

Dear Mr. Pfahl:

The Forest Service has reviewed the risk assessment portion of ASARCO's Draft Engineering Evaluation/Cost Analysis (EE/CA), Azurite Mine and Mill Site, submitted on December 30, 2005. In general, the risk assessment is incomplete, uses inappropriate assumptions and techniques, and includes findings that are not well supported. Substantial revision is required. Since a change in the findings of the risk assessment will require a change the EE/CA analysis, forthcoming Forest Service comments on the rest of the EE/CA will be limited to general process issues and specific tasks not affected by the outcome of the risk assessment. The following Forest Service risk assessment comments are split into general and section specific categories.

Please submit written responses to these comments by March 31, 2006, prior to revising the risk assessment. To assist ASARCO, I suggest that we arrange a conference call on March 24, 2006 at 9AM PST to discuss the comments prior to the formal written response. If ASARCO has a conflict at that time, please contact me to arrange a mutually acceptable time.

General Comments:

1. ***Executive Summary:*** It would be useful to have an executive summary at the beginning that summarizes the findings and conclusions.
2. ***Data Used:*** It appears as though only some of the available data for the site (i.e. data collected in September 2005) was used for the risk assessment. All data from the site should have been included. In particular, any comparison of concentrations to risk based screening criteria should have included earlier data.
3. ***Risk Assessment Approach:*** A quantitative risk assessment for both human health and ecological receptors is required. This includes calculating the excess cancer risk, hazard quotients and hazard indexes for human receptors and calculating risk ratios for ecological receptors. Provide a methodology (including equations) to calculate these values. See also comment 2 in the specific section comments below.
4. ***Contaminants of Potential Interest (COPIs):*** The report states that the COPIs were taken from the Site Inspection (SI), but not all of the COPIs identified in the SI are included in the risk assessment. Provide justification for omitting COPIs from the risk assessment. See also comment 3 in the specific section comments below.
5. ***No Observed Adverse Effect Level/Lowest Observed Adverse Effect Level (NOAEL/LOAEL):*** Provide additional justification for the selection or reselection of screening standards. Provide a table with all the screening criteria used, arranged by media,



specifying the source of screening value (e.g. EPA Region 9 Residential PRGs, MTCA Method A, etc.).

6. **Macroinvertebrates as Indicator of Water Quality:** The report did not provide an explanation for the use of macroinvertebrates as an indicator of aquatic life. Surface water concentrations must be compared against Ambient Water Quality Criteria. In addition, expected impacts to fish must be assessed.
7. **Ecology Cleanup Levels and Risk Calculation (CLARC) Database:** How do the Ecology CLARC database values relate to MTCA Method A values and EPA IRIS database values?
8. **Calculation of the Upper Confidence Limit (UCL) on the Mean:** The report did not provide information about how the UCLs were calculated (i.e. presumed distribution of log normal or other type, use of statistical software like EPA's PROUCL, etc). Present the methodology used to calculate background concentrations and exposure point concentrations. The report also relies on UCLs calculated from small data sets. EPA recommends a set of size 10 or more for the UCL to be meaningful. Although smaller data sets can be used, the statistical variability increases as the size of the data set decreases. Thus, it is inappropriate to calculate a UCL for a data set of size 3 if the underlying distribution is unknown. Most of the background UCL calculations were based on a data set with three elements. In this case, the mean of the samples should have been used as a conservative background value. All of the background and exposure point concentrations must be recalculated.
9. **Threatened and Endangered Species:** An assessment of risks to threatened and endangered species is missing, but required.
10. **Significant Erosion of Tailings and Wasterock:** An assessment of the risks presented by erosion and/or a catastrophic release from the contaminated materials adjacent to the stream is missing, but required. In particular, how would such an event impact aquatic life, including bull trout?

Specific Section Comments:

1. **Section 1.2, Streamlined Risk Assessment Approach**, page 3, last paragraph: This paragraph is unclear as to whether concentrations were screened against background or not. The paragraph states that the entire set of sample data was carried over to a screening level, implying that it was not screened against background, while the final sentence states a purpose of a background screen. This paragraph also conflicts with Section 5.0 which says that "concentrations in samples that exceeded mean background concentrations were then subjected to a screening-level exposure assessment".
2. **Section 1.2, Streamlined Risk Assessment Approach**, page 4, last paragraph: Exceedances of risk based screening criteria indicate the need for a quantitative risk assessment, instead of the proposed further comparison to less conservative screening values. For human health, an evaluation of the excess cancer risk for carcinogens and the use of hazard quotients and hazard indexes for non-carcinogens must be calculated for each complete pathway in each affected media. For ecological receptors, calculation of risk ratios for protected and non-protected species is required. This comment also applies to Section 5.0.
3. **Section 2.2, Chemicals of Potential Interest**, page 5: The COPIs were selected based on information presented in the Site Inspection (SI) but don't appear to include all of the COPIs identified in the SI (e.g. cobalt, silver, iron, thallium, vanadium). Provide justification for the COPIs selected and not selected, and list the COPIs by media type.

4. **Section 2.3, Potential Receptor Types and Exposure Pathways**, page 7: Why isn't the inhalation pathway being considered for the recreation user in addition to ingestion of water and incidental ingestion of soil? Why isn't surface water consumption being considered for the terrestrial pathway? Provide justification for the exclusion of these pathways.
5. **Section 3.1, Data Collection Methods**, page 8, 1st paragraph: Was the reference to "Estimating exposure and associative risks ..." intended for another section? If not, what is its role in relation to data collection methods?
6. **Section 3.1, Data Collection Methods**, page 8, 2nd paragraph: The paragraph indicates that samples from September 2005 only were used to establish the contaminant exposures to receptors. All existing data for the site should be used for the risk assessment.
7. **Section 3.2.1, Surface Water Sampling**, page 8, 1st paragraph: Why was only one water sample taken from the Tinson adit discharge when duplicates were taken elsewhere? Was water hardness calculated? Please note that Washington Department of Ecology (Ecology) water quality criteria depend on hardness.
8. **Section 4.0, Field Data**, page 14: The discussion in this section about contaminants being below detection limits is confusing and can be misleading since most of the concentrations were above detection limits. The purpose of Table 2 is unclear, since a non-detect is most meaningful if the detection limits are not elevated, but no information was provided about the detection limits. This section also mentions Tables 2-2 to 2-6, but I could not locate them in the report.
9. **Section 5.0, Risk Analysis**: The inclusion of Tables 3 – 7 (35 pages worth) in the middle of the text section makes this section difficult to read. Include this at the end of the section.
10. **Figure 3**: Not all of the sample locations can be seen on this figure.
11. **Table 8**, page 53: It would be more useful to see a table of metal types that exceeded background.

Sincerely,

Cheryl Woodall
On-Scene Coordinator

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