CASO Atlas 3.5.2.9

United States Department of the Interior

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IN REPLY REFER TO:
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CA-930

JUL 11 1990

Talked w/ Denise M & Scott on this 9/26/90

Daniel McGovern, Regional Administrator
United States Environmental Protection Agency
1235 Mission St.
San Francisco, CA 94103

Dear Mr. McGovern:

Over the past few years the Bureau of Land Management has worked closely and cooperatively with Region 9 of the Environmental Protection Agency in evaluating the Atlas Superfund site. We have reviewed and discussed with you the implications of, and our concerns with the draft remedial investigation, the feasibility study, the baseline risk assessment, and the proposed remediation plan.

In addition to our own internal staff review, BLM, through a Department of the Interior contract, had the January 1990 draft Atlas Remedial Investigation Report and Phase I of Johns-Manville Coalinga Remedial Investigation and Feasibility Study Report, and the Feasibility Study Report for the Atlas Asbestos Co. Site, Fresno County, reviewed for its technical adequacy (RI, FS). PTI Environmental Services have given us technical review comments on these documents.

Attached are the Bureau's comments on the RI, the FS and the proposed remediation plan. In providing you with these comments we are mindful that our role in remediation of the Atlas Mine site is minimal. Through implementation of the Bureau's Clear Creek Management Plan, we have fenced the mine site so as to restrict off-road vehicle traffic to existing roads; we have posted signs to warn the public of the potential asbestos hazard; and we continue to provide ground patrol of the Atlas mine site and the Clear Creek Management Area to assure public compliance with our rules for use of the area.

Our concerns for the Atlas Site reflect that the PRPs have left the area without any rehabilitation or cleanup. We believe any responsible mining company should have left the mine site in better condition than it now exists. Remediation called for in Alternative 3 of your proposed plan, except for paving of the road, is basically what the Bureau would expect from a mining company as good mining practice.

Our comments on the Clear Creek Management Area are the result of the many discussions with you and your staff. These discussions have resulted in our agreement to revise the Clear Creek Management Plan, using the Bureau's land use planning process. Our comments are directed at the effect the RI and the FS, as presently written, will have on the Bureau as we begin to revise our land use plan. Some of our greatest concerns are with the data and the analysis presented in the RI and the FS. If these two documents are not revised then the BLM will need assistance from the EPA in better defining the exposure risk, risk characteristics, the uncertainties related to both, and the threshold levels of human exposure to asbestos. Without this data we will be unable to adequately address the environmental and cumulative impacts to visitors to and users of the Clear Creek area.

As you reflect on our comments, we propose to maintain the openness and constructive dialogue we have had with your agency. In this manner we can arrive at a mutually agreeable record of decision on an appropriate level of remedial actions for both the Atlas Mine Site and the Clear Creek Management Area.

Sincerely,

Ed Hastey

Ed Hastey
State Director

Attachments
As stated

cc w/attach
DM, Bakersfield
AM, Hollister
WO (707), Room 3529 MIB
Regional Solicitor (Berger)

BUREAU OF LAND MANAGEMENT COMMENTS ON EPAs PROPOSED PLAN - ATLAS MINE SITE AND CLEAR CREEK MANAGEMENT PLAN

The Bureau supports Alternative 3 for the Atlas Mine site, with the following three exceptions. We believe the responsible mining parties should have left the Atlas Mine area in better condition than it now exists. The Bureau would expect cleanup of the site, accompanied with appropriate erosion control mechanisms, to be standard operating procedures for such actions on public land.

1. We disagree with the condition in the EPA plan that "The road through the Atlas Mine Area would be paved to reduce airborne asbestos emissions." As we discussed with you during our meeting on January 26, 1990, and in our February 22, 1990 letter to you, we believe paving this stretch of road is not warranted and an inappropriate expense. The road was well constructed; has, and continues to be well maintained each year; has good drainage features; and the surface is continually in good condition. We believe the restriction of access to the mine site, through the proposed fencing, will help achieve the objective of reducing visible emissions. Secondly, there are many miles of roads in the Clear Creek Management Area, virtually all of which are unpaved. It does not seem in the public interest, neither from a public health standpoint nor from an expenditure of public funds, to pave this one-half mile of road. Additionally, if in the final decision you determine paving is a necessity, there are other dust suppressant methods available which would achieve the objective and be less costly.

2 No mention is made in this, or any other alternative in the proposed plan, to clean up the existing Atlas mill site. Currently the mill site contains remnants of old buildings, scrap metal and other debris from the operating mine. As a minimum the remediation should require the responsible parties to remove and appropriately dispose of all such material, and grade the site to its natural contour.

3. The remediation plan is silent as to the ownership of the 10 acre mill site on the Atlas Mine Site. We believe the current ownership of the mill site should be clarified, so that the responsibility for cleanup and disposal of materials left on the site (refer to 2 above) is clear.

BUREAU OF LAND MANAGEMENT COMMENTS ON EPA's RI/FS, ATLAS SUPERFUND SITE

The Atlas RI/FS report presents both regional and site specific data in an attempt to demonstrate that; 1) fugitive emissions from the area significantly impact regionwide public health, and 2) asbestos from the area generates runoff of asbestos found downstream into the California Aqueduct. However, in the Bureau's estimation the Atlas RI/FS report has the following major areas of concern that should be addressed prior to BLM's amendment to the Clear Creek Management Plan:

- The available data and modeling runs are subject to a wide range of values, thus can be manipulated to support a wide range of findings or recommendations.

- Field data and associated unmeasured data are used for conservative protection measures which extends data beyond data quality limits.

- The field data (measured) and predicted data (nonmeasured) modeling analysis appear to contradict each other

These issues were reviewed by section of the report and are discussed in detail below.

Section 2 - Study Area Investigations

The polarized light microscopy (PLM) methodology discussion (page 2-42) states that "analytical variance is on the order of 1% to 100%". This statement indicates a lack of quantitative data quality of PLM measurements. Further, Section 6.2.2.9 (Table 6-4) compares PLM and TEM values and states "there is a one-to-one correspondence between data obtained by the two methods within an order of magnitude". However, Figure 1 (a scattergram of the TEM-PLM asbestos data) shows there is almost no correlation between PLM and TEM asbestos concentrations. High TEM values correspond quite frequently to low PLM values and vice versa (i.e., TEM measurements are not systematically greater than PLM measurements). In one instance, the PLM concentration of a sample was reported as <1 percent, while the corresponding TEM concentration was 100 percent. Section 2 should stress the difficulty in measuring asbestos concentrations and make conclusions concerning the quality and usability of the data. Although field duplicates were required at a frequency of 1 in 20 samples (Appendix D), no field duplicates were collected. Also, laboratory duplicates were performed less frequently than 1 in 20 samples. After reviewing the available soil data and Figure 1, it is reasonable to conclude that soil asbestos measurements are widely variable and semi-qualitative (i.e., BLM's own PLM soil sample analysis indicate that deep serpentine soils have no measurable asbestos, where shallow serpentine soils can contain up to 20 percent asbestos). These measurements have limited value and should identify the limitations if used in numerical surface water modeling, air modeling, or risk assessments. Air data is generally of higher quality, but the report does not discuss the quality of air asbestos data. Detailed sections on the quality and acceptable uses for the data should be added to the report.

The high variability of TEM measurements (due to the extremely small portion of the sample examined) should be added to the list of TEM disadvantages presented on page 2-45.

Section 4 - Surface Water Transport Modeling

Data Use - The Atlas site was first ranked on the NPL based on the HRS for surface water concerns. Therefore, a major portion of the Atlas RI/FS investigation was devoted to sampling water and soil for asbestos analysis to develop a sediment transport model (SEDIMOT II). The objective of this effort was to quantify the mass of asbestos transported offsite to the California Aqueduct during flood events. The most conservative assumptions are used for input parameters, which creates uncertainties (amounting to orders of magnitude) that are propagated throughout the analysis. This results in asbestos concentrations that may be questionable based upon strict data quality assurance review. These surface water transport modeling results should only be considered to be valid over a wide range of modeling input parameters and the best and worst case scenarios presented.

Data for Surface Water Transport Modeling - The surface water transport model requires representative soil asbestos concentrations for tailings, mine surfaces, serpentinite soils, and sedimentary soils. For each soil type, 14-18 samples were collected for PLM analysis, but only 1 sample of each soil type was collected for TEM analysis (Table 5-26, page 5-116). The PLM data had less than 2 percent asbestos in these soils. Historic PLM data (presented on pages 1-10 to 1-14) detected asbestos concentrations up to a maximum of 60 percent (but generally in the 1-30 percent range), yet the single TEM analysis that detected 100 percent for both tailings and mine surfaces for the erosion analysis was chosen, (page 4-42) we assume, for the sake of being conservative. We suggest a more realistic range of values be based on multiple data values for the estimation of asbestos concentration in soils and not on a single sample. The available PLM data constitutes a much larger database. These data should have been used in the interpretation and analyses.

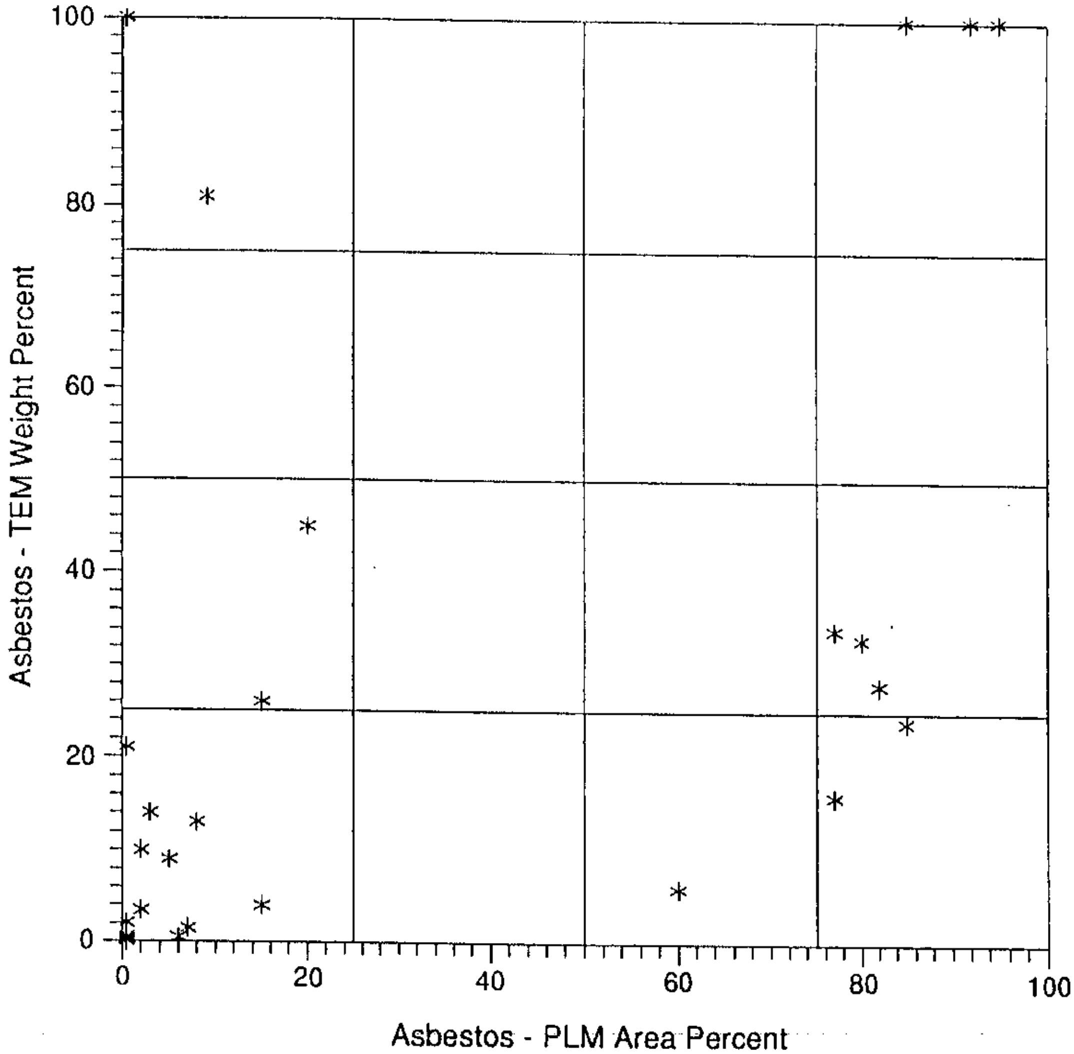

Figure 1. Scattergram of TEM vs. PLM soil asbestos

Selection of SEDIMOT II Model for Sediment Transport Modeling - The SEDIMOT II model has some inherent problems, since the model incorporates the modified universal soil loss equation (MUSLE) to calculate sediment yields. The MUSLE calculates sheet and rill erosion only, and does not account for mass wasting (landsliding, debris flow, and channel bank sloughing). The New Idria serpentinite mass is highly sheared and unstable, with slope failures and resulting mass wasting being common in the watershed which adds significantly to the sediment transport of asbestos. The geologic map of the Atlas/Coalinga site (Figure 3-17) shows this instability as large areas of landslide deposits. Since SEDIMOT II was calibrated using measured sediment data (which includes mass wasted material, channel bank and bed erosion) in addition to sheet and rill erosion, model predictions that are described only as sheet and rill erosion are actually overestimated by an amount equal to the mass wasting component of the total sediment loading. In order to properly calibrate the model, separate estimates should have been made of mass wasting for each of the subwatershed units, and these amounts should have been subtracted from the total measured sediment load. Otherwise, model predictions are overstated. A separate analysis of mass wasting should be provided to accurately represent this significant sediment source. Also, the MUSLE is not designed for slopes greater than 20 percent, although much of the modeled basin has slopes much greater than this value. This may also contribute to modeling results that appear to be nonrepresentative of the watershed.

Calibration and Verification of the Sediment Transport Model -The SEDIMOT II model was not properly calibrated or verified with available sampling data. Model results for different precipitation storm events are given in Tables 5-15 through 5-19 and are supported by data in Appendix A-2. These results were not adequately calibrated to observed asbestos concentrations during storm runoff, to observed sediment concentrations during storm runoff, or to reported annual sediment yield (page 5-81). Even though limited data were available, calibration of the model to observed asbestos concentrations for storm water runoff samples collected during the remedial investigation report was not done. Since the primary function of the model is to calculate (predict) asbestos transport offsite, failure to calibrate and verify using observed data questions the utility of using these modeling results.

Total suspended sediment (TSS) concentrations for rain runoff were also available for calibration, but were not used. Most important, however, are model results in Appendix A-2, which reveal that the SEDIMOT II model predicted peak TSS concentrations of over 700,000 mg/L for the 1-year event (2-year/6-hour event), and over 1,000,000 mg/L for the 100-year/24-hour storm during existing conditions. These TSS concentrations are unrealistic (i.e., this condition would be similar to a mud flow), and prove that the model cannot produce valid predictions. The peak observed TSS concentration was 17,000 mg/L at site S23, and 162 to 5,300 mg/L for the remaining sites (page 4-22). Since the 100-year/24-hour modeled storm was used as the basis for the risk assessment (Section 6.3.2.2), use of SEDIMOT II model predictions introduces significant errors in the determination of risk.

Using modeled percent asbestos (and back-calculation from information given in Tables 5-15 to 5-19 and Appendix A-2), an average asbestos concentration of 21,230 mg/L is calculated for the 2-year/6-hour storm event under existing conditions (e.g., 1,584 tons of asbestos in 40.71 acre-feet of runoff). This average asbestos concentration is higher than the highest measured TSS concentration during the remedial investigation, which further questions the accuracy of the model. The summary of historic data (page 1-13) includes a March 1987 storm runoff event with a peak asbestos concentration of 72 mg/L. Although the sample location or storm magnitude was not specified, it is significant that the modeled asbestos concentration is 2-3 orders of magnitude higher than the observed asbestos concentration.

The sediment yield for the Levine-Fricke model for the 100-year flood event is 504,966 cubic yards (Section 6.3.2.2). In contrast, the SEDIMOT II estimate for the same event was 306,428 tons, or about 222,000 cubic yards (based on a density of 1.65 grams/cm^3). This 100 percent discrepancy was not identified in the remedial investigation report, and clearly indicates that one or both of the models cannot produce reliable results. The use of these overly conservative estimates results in a very improbable estimate of asbestos concentration in aqueduct drinking water. These models should be recalculated using realistic values and the model be verified using measured data. Existing sampling data of surface water is unrepresentative of existing conditions because only one runoff event was sampled, and therefore is limited for model calibration and verification.

Section 5 - Air Modeling

The assumptions used for the air modeling were generally more realistic than those used for the surface water model. The most conservative assumption is that the entire tailings pile and mine surface areas are completely disturbed on a monthly basis (page 5-18). As stated in the text, this assumption will lead to an overestimation of erosion emissions.

A sensitivity analysis describing the difference in erosion emissions as a function of the assumed level of disturbance should have been provided to assess the degree of overestimation introduced by this assumption.

The effects of the asbestos "crust" of mine waste and tailings in the report states that the "crust, if undisturbed, does appear to provide some protection against sheet-flow hydraulic erosion and wind erosion". A second model run that allows for the effect of the crust should be performed for comparison purposes. As discussed on page 5-38, numerous assumptions were made during air modeling that will tend to overestimate the actual airborne asbestos concentration.

Section 6 - Baseline Risk Assessment

Use of Geometric Means - A source of unsupported data is by the calculation of geometric means in the absence of a level of detection. In Table 6-5 (page 6-16) there is a footnote indicating that data on asbestos concentrations in the California Aqueduct did not have limits of detection and that geometric means were calculated on detected values only. Use of this procedure ignores measured low concentrations and leads to an overestimate of the actual average concentration. Also in this table, there is no indication of why geometric means were the appropriate value (e.g., whether the data were log-normally distributed). Use of the geometric mean in this situation directly contradicts page 5-40 that correctly states "Arithmetic averages were used [in air modeling] because human exposures are related to arithmetic means."

Discussion of Uncertainties - In Section 6.7,it is stated that the uncertainty introduced by conversions is probably not more than 1 order of magnitude (page 6-79). Yet, actual uncertainty using the conversions may be much higher, (Section 6.2.2.9) states that there is an inconsistent relationship between PLM area percent and TEM weight percent. The actual relationship between TEM and PLM measurements ranged over 4 orders of magnitude, and the conversions introduce a much higher source of uncertainty than the single order of magnitude suggested in Section 6.7.

Modeling -The contribution of asbestos from the Atlas and Coalinga sites to surface water is not well characterized due to the failure to use representative soil concentrations, the inappropriate modeling assumptions used, and the failure to verify the model. In Discussion of Uncertainties - Section 6.7, all uncertainties that could affect the risk estimates are not acknowledged. Several uncertainties in the modeling of asbestos concentrations and in the risk assessment are not included in Section 6.7. Other assumptions are discussed, but the potential influence of the assumption is not well characterized. Table 1 presents uncertainties in the Atlas/Coalinga RI report, an indication of whether the uncertainty tends to over- or underestimate risk, and the potential magnitude of the overestimate. The magnitude of potential overestimates associated with aspects of the model or the risk assessment are not evaluated, or are underestimated. The estimates of magnitude are derived from statements made in the report, or in the case of exposure frequency and duration, from alternative assumptions suggested in these comments. While U.S. EPA (1989b) does not require quantitative evaluation of uncertainties, estimates are presented here in order to gain a perspective on the total uncertainty associated with the risk estimates.

Section 6.7 states that potential errors resulting from modeling are expected to be within an order of magnitude. Several potentially substantial uncertainties are not discussed (e.g., data used as a basis for modeling). Interlaboratory variance in asbestos analyses could result in 20- to 200-fold over- or underestimates. This uncertainty is acknowledged in Section 4, but the magnitude is not characterized and the uncertainty is not discussed in Section 6.7. Similarly, model assumptions of a source-area asbestos concentration of 100 percent (which overestimates concentrations by up to 3 times) and a 100-year flood flow from the source area every year (which is not realistic) are not discussed.

TABLE 1. UNCERTAINTIES IN ATLAS/COALINGA RI REPORT

Source of Uncertainty	Impact of Uncertainty on Risk Measurement	Potential Magnitude of Uncertainty
Model Assumptions		
Source area asbestos concentrations assumed to be 100 percent	Overestimate	Up to 3 times
Limited data used to predict asbestos in surface water	Overestimate	Unknown
Interlaboratory variability in asbestos measurements	Overestimate or Underestimate	20 to 200 times
Assumption of continuous exposure to 100-year flow from source area	Overestimate	Unknown
Relative contribution of asbestos from source compared to background	Overestimate	Unknown
Risk Assessment		
Conversion from PLM to PCM	Overestimate	10 to 10,000 times
Use of soil with 5 percent asbestos in air sampling experiment	Overestimate	Up to 5 times
Use of slope factor for asbestos types other than chrysotile	Overestimate	Unknown
Frequency and duration assumptions in exposure assessment	Overestimate	Up to 5 times
Use of unit risk for ingestion based on benign tumors	Overestimate	Unknown
Use of fibers less than 5 μm in risk estimate for exposures to asbestos in water	Overestimate	Unknown

BUREAU OF LAND MANAGEMENT COMMENTS ON EPA's RISK ASSESSMENT, ATLAS SUPERFUND SITE

Finding #1: The risk assessment greatly overestimates risk due to a series of highly conservative assumptions. These assumptions include:

- converting asbestos measurements from PLM to PCM
- using a soil concentration of 5% asbestos in the air sampling experiment
- using a slope factor for other types of asbestos (other than chrysotile)
- using assumptions of greater frequencies and durations of exposure than is probable
- using unit risk for ingestion based on benign tumors
- using fibers less than 5um in the risk estimate for exposures to asbestos in water.

Effect of Finding #1 on BLM's role: Risks had been expected to be higher than they actually turned out to be in the Risk Assessment. Even at that, risks have undoubtedly been overestimated. BLM will need a Risk Assessment that predicts risk throughout the Management Area during the process of revising the Clear Creek Management Plan. In order for the BLM to consider realistic alternatives to minimize asbestos exposure in the area, a defensible Risk Assessment must be prepared. Since the BLM has no expertise in this field, we will need the EPA's assistance in designing and conducting such a Risk Assessment.

Finding #2: Several problems were identified in procedures used to apply sediment transport modeling results to the Risk Assessment. For example, to determine the amount of asbestos a person might be exposed to by drinking water from the California Aqueduct, three different data sets were applied in the risk analysis. These include monitoring data from California Department of Water Resources (DWR), SEDIMOT II model predictions, and Levine-Fricke Sediment modeling data. Several limitations in the data and models result in an overly conservative estimate of asbestos concentration in aqueduct drinking water. These limitations include:

- In the risk analysis (Section 6.3.2.2), which relied on modeled sediment transport (SEDIMOT II and Levine-Fricke), a 100-year flood flow was assumed in the exposure assessment. For example, the SEDIMOT II model assumed that a sediment concentration equal to that produced by the 100-year flood occurs during each of the Gale Avenue diversions to the aqueduct. Actual diversions occurred eight times over a 17-year period, or about every 2 years. Cumulative risks should have been based on average annual exposure and not on continual exposure to statistically infrequent events.

- All asbestos transported from the source area to the aqueduct to the consumer is assumed to remain in suspension, even though a detention basin exists and trap efficiencies can easily be calculated. An analysis of sediment deposition in the aqueduct (page 6-38) indicates "exposures calculated on the basis of runoff from the 100-year flood are likely to be highly overestimated" (page 6-39).

- Page 6-38 contains a discussion of the use of the DuBoys' sediment transport model to evaluate the extent to which sedimentation would reduce the concentrations of asbestos in the aqueduct. This model relies on the unsupported assumption that asbestos particles behave like spherical particles with a diameter three times as great (e.g., fine clay). Clay is far from representative of asbestos due to differences in surface chemistry and particle shape and size. The uncertainties introduced in the risk assessment by this assumption are not discussed in this section or in Section 6.7, Discussion of Uncertainties.

- Historic asbestos data for the California Aqueduct from the DWR is dated (collected between 1977-1984) and is not presented in raw form in the remedial investigation. No evaluation of methods or data quality was made in the remedial investigation (page 6-19). Water samples should have been collected during the remedial investigation to, at a minimum, verify these concentrations. This historic data should be reviewed to verify that it meets the data quality objectives of the RI/FS. Factors that should be considered include:

    - Age of the data

    - Analytical methods used

    - Detection limits of methods

    - Quality assurance/quality control (QA/QC) procedures and documentation.

The EPA has stated that data used for risk assessment purposes (i.e., Level III, IV, and V) must be of similar quality to that generated by a participating Contract Laboratory Program (CLP) laboratory (i.e., Level IV and V), but allow for less rigorous QA/QC (Data quality objectives for remedial response activities, OSWER Directive 93350.7B, March 1987). The purpose of setting data quality objectives is to define uses for the data, and to assure that the data obtained is of known quality. The quality of these historic data were not evaluated, even though there may have been other asbestos sources and activities that have affected the aqueduct monitoring results (page 6-19). It is probable that little or no information is available to assess data quality, further stressing the need to collect additional water samples from the aqueduct.

- Soil asbestos concentrations are assumed to be 50 percent (Section 6.3.2.2). This concentration is without basis and is much higher than the SEDIMOT II model estimates (which are less than 5 percent for the 100-year event) and nearly all remedial investigation data.

- SEDIMOT II-modeled and Levine-Fricke modeled risk values are reported as "modeled 10um fiber concentrations" (Table 6-15). The models actually calculated total asbestos concentrations, with very little 10um data collected during the remedial investigation and no conversion from total to 10um documented. The source of data used for the risk analysis should be clarified.

- Calculation of SEDIMOT II-modeled risk values are based on asbestos concentrations in the aqueduct. No discussion was provided to detail how asbestos concentrations were translated from Coalinga (provided in Table 5-21, page 5-90) to the aqueduct.

Effect of Finding #2 on BLM's role: Effects are similar to the effects of Finding #1. In revising the Clear Creek Management Plan, BLM must assess the effects of existing land uses on sediment transport. We have no additional data we can use. In addition, the Management Area includes lands within other watersheds. We will need EPA's assistance in gathering and analyzing sedimentation data to determine the impact of land uses on sediment transport and subsequent exposure of the public.

Finding #3: Section 6 of the RI presents a detailed risk assessment and Appendix C-1 provides further supporting documentation. In addition to limitations in sampling data and modeling discussed earlier, the following are additional problems with the Risk Assessment.

- Key EPA guidance documents were not used in the assessment. The Risk Assessment does not follow current guidance in the EPA Interim Final **Risk Assessment Guidance for Superfund: Human Health Evaluation Manual Part A** (U.S. EPA 1989b). For example, this guidance identifies the EPA Integrated Risk Information System (IRIS) database as the primary source of up-to-date risk assessment data. The asbestos file from the IRIS database (U.S. EPA 1989a) was not consulted.

- The assessment used 10^{-7} as the lower limit of risk in contrast with standard risk assessment practice and the new National Contingency Plan lower limit of 10^{-6}.

- Conversions between different analysis methods for asbestos in soil that were used in this risk assessment may result in overestimates of up to 4 orders of magnitude in the risks predicted from inhalation and ingestion of asbestos.

- Selection of contaminants of concern is not well supported. The selection (Section 6.2, pages 6-2 to 6-19) was based on comparison with the background level of contaminants measured by the USGS. The risk assessment does not document the degree to which the USGS data is representative of the Atlas site. Table 6-1 of the RI lists background concentrations which do not appear valid for the site area. Serpentinite in the area is derived from ultramafic rocks typically containing high concentrations of chromium, nickel, and other metals. The nearby New Idria Mine was also a significant producer of mercury. Background concentrations of these metals were not measured during the RI. The Risk Assessment states (p. 6-7) that asbestos is the focus of the Risk Assessment because it is the most common and most toxic contaminant present. The risk posed by other heavy metals should also be assessed if they are found to be above background levels.

- In Table 6-5 (page 6-16) there is a footnote indicating that data on asbestos concentrations in the California Aqueduct did not have limits of detection and that geometric means were calculated on detected values only. This ignores measured low concentrations and leads to an overestimate of the actual average concentration.

- The following statement on page 3-1 of Appendix C-1 implies that there is a body of literature that demonstrates an increase in adverse health effects following environmental exposures to asbestos:

> "Because the highest asbestos exposures have been reported for relatively well defined work place populations, occupational data are most frequently used in health hazard assessments for inhalation."

In fact, the occupational studies have been relied on, not only for this reason, but also because studies of populations exposed at lower concentrations have not produced a consistent pattern of adverse effects.

- The toxicologic significance of asbestos fiber size, shape and mineral type is discussed on pages 3-3 to 3-7 of Appendix C-1. However there is no discussion of the implications of these data for the predominantly chrysotile type of asbestos found in the Atlas area. The EPA **Airborne Asbestos Health Assessment Update** (U.S. EPA 1986) notes that the cancer risks predicted by the approach outlined may be overestimated "in some pure chrysotile exposure circumstances (such as mining and milling)". This potential overestimation of risks should be discussed in the uncertainty section of the Risk Assessment.

- The risk characterization for exposure due to inhalation uses frequencies and durations of exposure that seem too high (p. 6-57 to 6-62). It is unlikely that hikers, campers, and hunters would be exposed for the frequencies and durations described. It should also be stressed that off-highway vehicle use is prohibited and that violators are cited to appear in Federal court. While they may not deter some individuals, the impact of these restrictions should have been addressed.

- The statement on page 6-77 in the Environmental Assessment that asbestos exposure may cause cancer in mammals exposed onsite is not well supported. The concentrations of asbestos in air are orders of magnitude lower than those that resulted in cancers in experimental animals.

- Page 6-21 states that no restrictive fencing is present at the Atlas site. As stated in our comments to you on 6-1-89, over 7000 feet of fence prevent access to the Atlas site. In addition there are 8' high berms behind the fence to further discourage vehicle access. Pipe barriers have been constructed to block vehicles at every point of access around the perimeter. The area is signed as closed to vehicle use on the main road through the site and by hundreds of signs placed around the perimeter.

Effect of Finding 3 on BLM's role: In addition to the effects discussed under numbers 1 and 2, we are concerned about the risks associated with other metals and the need to predict those risks. We will also need EPA's assistance in determining how environmental exposures are related to the effects known to occur from occupational exposures. As you realize, large numbers of people use the Clear Creek Management Area whereas none use the Atlas Mine site. The justification for changing management practices must be based on data that accurately describes asbestos transport and the risks associated with that.