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Superfund Record of Decision:

Coalinga Asbestos Mine, CA

50272-101

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Second Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 557-acre Coalinga Asbestos Mine site, a former asbestos processing area and chromite mine, comprises part of the Johns Manville Coalinga Asbestos Mill site in western Fresno County, California. This rural mountainous area is used primarily for recreational purposes.. From 1962 to 1974, asbestos ore from several local mines was processed and orted onsite, and the resulting asbestos mill tailings were periodically bulldozed into an intermittent stream channel. Subsequently, from 1975 to 1977, a chromite milling operation was conducted onsite. Tailings were often washed downstream during periods of stream flow, and the resuspension of asbestos fibers from the tailings into the air produced a significant inhalation hazard. As a result of these activities, approximately 450,000 cubic yards of mill tailings and asbestos ore remain onsite within a large tailing pile. Other site features include an asbestos ore storage/loading area, an abandoned mill building, an inactive chromite mine, filled-in chromite settling ponds, and debris. In 1980 and 1987, State investigations indicated that the site was contributing a significant amount of asbestos into the surface water. This site will be remediated as two Operable Units (OU). This Record of Decision (ROD) addresses the

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Coalinga Asbestos Mine, CA
First Remedial Action - Final
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Key Contaminant: asbestos

b. Identifiers/Open-Ended Terms

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EPA/ROD/R09-90/049
Coalinga Asbestos Mine, CA
Second Remedial Action - Final

Abstract (Continued)

remedial action for OU2, the Johns Manville Coalinga Asbestos Mill Area. The primary contaminant of concern affecting the surface water is asbestos.

The selected remedial action for this site includes consolidating contaminated soil and asbestos ores within the tailing pile; grading and revegetating the tailing pile to reduce erosion and increase stability; diverting surface water away from the tailing pile; improving an existing sediment trapping dam by constructing a concrete spillway; dismantling the mill building; paving the mill access road; and implementing engineering controls, institutional controls including deed restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $1,947,000, which includes a total O&M cost of $815,000.

PERFORMANCE STANDARDS OR GOALS: A specific cleanup level for asbestos was not determined due to uncertainties in sampling parameters; however, the selected remedial action will reduce the excess lifetime cancer risk to the level of 10^{-4} to 10^{-6}.

JOHNS-MANVILLE COALINGA MILL AREA OPERABLE UNIT

OF THE

JOHNS-MANVILLE COALINGA ASBESTOS MILL NPL SITE
(COALINGA MINE SITE)

RECORD OF DECISION

United States Environmental Protection Agency
Region IX - San Francisco, California
September 21, 1990

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RECORD OF DECISION

DECLARATION

SITE NAME AND LOCATION

Johns-Manville Coalinga Asbestos Mill Area Operable Unit of the Johns-Manville Coalinga Asbestos Mill Site,
Fresno County, California

STATEMENT OF BASIS AND PURPOSE

This Record of Decision ("ROD") presents the selected remedial action for the Johns-Manville Coalinga Asbestos Mill Area Operable Unit ("JM Mill Area OU") of the Johns-Manville Coalinga Asbestos Mill Site ("JM Mill Site") in Fresno County, California. The remedy was selected pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, 42 U.S.C. Section 9601 et. seq., ("CERCLA") and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Section 300 et. seq., ("NCP"). This ROD explains the factual and legal bases for selecting the remedy for the JM Mill Area OU. This decision is based on the Administrative Record for this site. The attached index identifies the items that comprise the Administrative Record.

The State of California has concurred in the selection of this remedy.

THE SITE

The JM Mill Site includes three geographically distinct areas: i) The JM Mill Area (Figure 1); ii) The Ponding Basin of the California Aqueduct (Figure 2); and iii) The City of Coalinga, California. Asbestos mining and milling waste from the JM Mill Area has been transported to and come to be located in the other two areas. The JM Mill Site is also known as the Coalinga Mine Site. This operable unit ("OU") addresses the JM Mill Area ("JM Mill Area Operable Unit").

The JM Mill Area contains an estimated 340,000 cubic meters (450,000 cubic yards) of mine waste and mill tailings containing high concentrations of asbestos. Actual or threatened releases of hazardous substances from the JM Mill Area presents an imminent and substantial endangerment to public health, welfare, or the environment. The response actions selected in this ROD address this imminent and substantial endangerment.

Asbestos is a hazardous substance as defined in 42 U.S.C. Section 9601(14) and as listed in 40 C.F.R. Section 302.4. Asbestos mining and milling waste is not regulated by the Resource Conservation and Recovery Act ("RCRA"). Asbestos is known to cause lung cancer and mesothelioma in humans. Asbestos also causes other lung diseases such as asbestosis. If asbestos is not further controlled at the JM Mill Area OU, the potential for human exposure

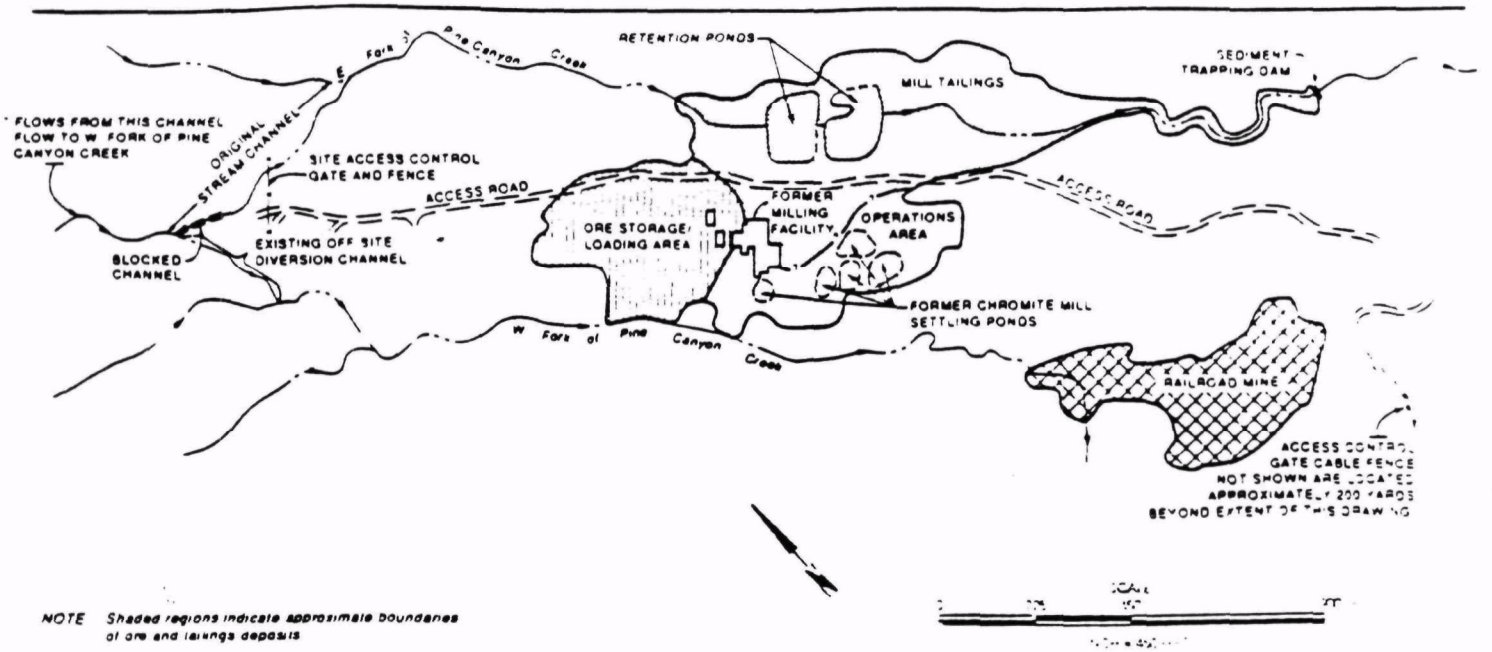

Figure 1: Detailed Site Map

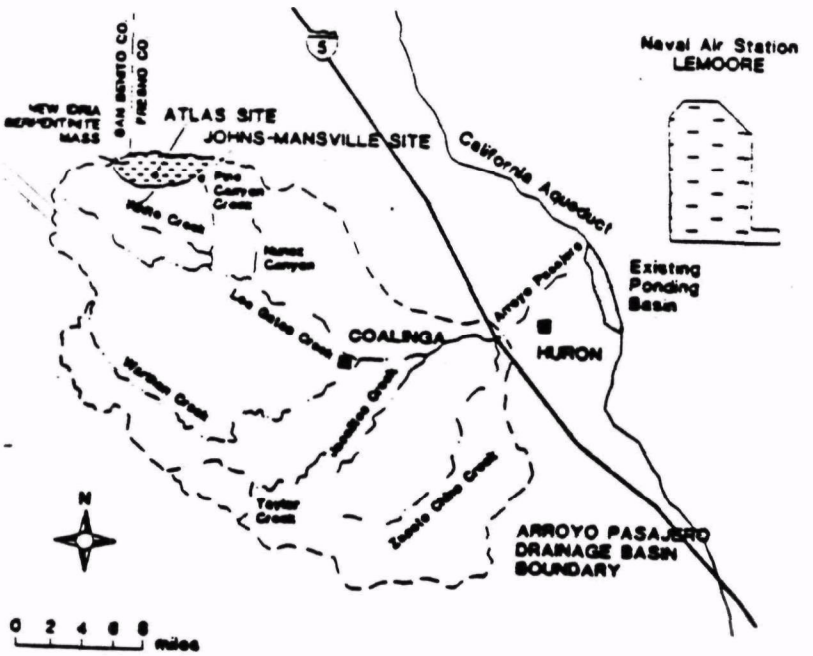

Figure 2: Greater Coalinga Area

to asbestos and the resulting increased risk to human health, primarily through the inhalation pathway, will remain.

DESCRIPTION OF THE SELECTED REMEDY

The JM MIll Area OU is one of two designated operable units for the JM Mill Site. The other operable unit is the clean up of asbestos contaminated soil in Coalinga, California by burying the contaminated material in a vault with an impermeable cap. A ROD for the City of Coalinga Operable Unit was signed on July 19, 1989.

Asbestos waste at the JM Mill Area OU presents three major problems: i) the release of chrysotile asbestos from the mill area into Pine Canyon Creek during heavy rains; ii) generation of airborne asbestos by vehicles driving in the Mill Area, on asbestos-bearing soils and on roads; and iii) the transport of asbestos from the Mill Area by vehicles which have been driven through the Mill Area.

Clean up of the asbestos at the JM Mill Area OU includes controlling the release of asbestos from the Mill Area and restricting access to the Mill Area using engineering and institutional controls. The remedy entails:

1) Constructing a cross canyon stream diversion to divert water flow away from the tailings pile;
2) Improving the existing sediment trapping dam to minimize the release of asbestos (approximately 340,000 cubic meters) into Pine Canyon Creek;
3) Fencing around the mine perimeter and around the disturbed areas to limit access;
4) Conducting a revegetation pilot project to determine whether revegetation is a practical means of increasing stability and minimizing erosion of the disturbed areas;
5) Dismantling of the mill building and disposal of debris;
6) Road paving or an appropriate engineering alternative; and
7) Filing deed restrictions.

Stabilization and control of asbestos waste will minimize the release of asbestos, thus providing long-term protection of human health and the environment. The estimated cost of the selected remedial action is $1.9 million.

Operation and maintenance activities will be required to ensure the effectiveness of the response action. In the event of a natural event such as a flood or earthquake, all repairs necessary to contain the hazardous substances will be made. Because the asbestos waste will not be treated, long-term management of the waste will be required. EPA will review the remedial action no less often than every five years pursuant to CERCLA Section 121(c).

At this time, EPA is not proposing any action in the Ponding Basin because the U.S. Bureau of Reclamation ("USBR") and the California Department of Water Resources ("DWR") are considering actions to minimize the generation of airborne asbestos-laden dust in this area. In 1992 EPA will evaluate whether the USBR/DWR actions have been adequate to protect human health and the environment and will publish a public notice of its determination. EPA will decide at that time whether further EPA action under CERCLA in the Ponding Basin is necessary.

STATUTORY DETERMINATIONS

Pursuant to CERCLA Section 121, 42 U.S.C. Section 9621, and in accordance with the NCP, the selected remedy for the Johns-Manville Coalinga Asbestos Mill Area Operable Unit: (1) is protective of human health, welfare and the environment; (2) complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action; and (3) is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for the JM Mill Area OU. Treatment of asbestos contamination at the JM Mill Area OU was determined to be impracticable based on lack of effectiveness, technical infeasibility, problems with implementability and cost factors.

This remedy will result in hazardous substances remaining on site above health-based levels. Pursuant to CERCLA Section 121, 42 U.S.C. Section 9621, EPA will conduct a review within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Daniel W. McGovern
Regional Administrator
EPA Region IX

9.21.90
Date

RECORD OF DECISION

DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

The Johns-Manville Coalinga Asbestos Mill Site ("JM Mill Site") includes three geographically distinct areas: i) The JM Mill Area; ii) The Ponding Basin of the California Aqueduct near Gale Avenue ("the Ponding Basin"); and iii) The City of Coalinga, California. The JM Mill Site is also known as the Coalinga Mine Site. This Operable Unit selects the remedy for the JM Mill Area.

The JMC Mill Area

The JM Mill Area is a privately owned, 2.3 square kilometer (557-acre) tract of land located in upper Pine Canyon on the southern flank of the Joaquin Ridge in the Diablo Range, which is part of the Coastal Range Mountains in western Fresno County, California (Figure 2). It is located approximately 1 kilometer (0.6 miles) downslope from the outcrop margin of the New Idria Formation, a diapiric serpentine plug containing naturally occurring chrysotile asbestos. The nearest population center is Coalinga (population 8250) located approximately 27 kilometers (17 miles) to the southeast. The JM Mill Area includes asbestos mill tailings, an asbestos ore storage/loading area, an abandoned mill building, an inactive chromite mine (the Railroad Mine), filled-in chromite settling ponds and debris. It is drained by the east and west forks of Pine Canyon Creek (See Figure 1). The areas adjacent to the JM Mill Area are rural. Land uses include mining, ranching, farming and recreation (camping, hunting, hiking, mineral collecting and riding off-highway vehicles ("OHVs")).

The Ponding Basin at the California Aqueduct

The Ponding Basin is an area between State Highway 198 and Gale Avenue to the west of the California Aqueduct (see Figure 2). It was designed to hold floodwaters from the Arroyo Pasajero alluvial fan. During heavy rains, asbestos-bearing sediments can be washed down Pine Canyon Creek, into White Creek, into Los Gatos Creek and eventually carried through the Arroyo Pasajero drainage basin and deposited in the Ponding Basin and in the surrounding area. During heavy flooding, asbestos-laden water has filled the Ponding Basin and been released into the California Aqueduct. The Ponding Basin has been designated as a part of the JM Mill Site because it contains asbestos which has been transported from the JM Mill Area. The Ponding Basin also contains asbestos from other natural and disturbed areas (including the Atlas Asbestos Company Superfund Site or "the Atlas Mine Site", which is located approximately 5 kilometers from the JM Mill Area). The Ponding Basin is administered by the United States Bureau of Reclamation ("USBR") and the California Depart-

ment of Water Resources ("DWR"). Ponding basin land is used mainly for agriculture. Huron, a community of approximately 3000, is located adjacent to the Ponding Basin. The USBR and DWR are currently developing plans to address the Arroyo Pasajero flooding and the impact of such flooding on the California Aqueduct.

The City of Coalinga

During the investigations of the JM Mill Site and the Atlas Mine Site, asbestos was discovered in Coalinga, California. This asbestos had been shipped from the JM Mill Area and other sources to a depot in Coalinga for eventual shipment out of Coalinga by rail and truck. The asbestos is concentrated in a 44 hectare (107 acre) parcel of land in the southwestern corner of Coalinga. The City of Coalinga is an Operable Unit of the JM Mill Site and the Atlas Mine Site. A ROD was signed for that Operable Unit on July 19, 1989 and cleanup of the asbestos began in February 1990. Clean up is scheduled to be completed by June 1991.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

In the mid-1950's, an investigation by the California Division of Mines and Geology indicated that the serpentine matrix of the New Idria Formation was chrysotile asbestos. Subsequent investigation in the southeastern third of the New Idria Formation demonstrated that the asbestos ore could be mined and milled to produce a marketable short-fiber asbestos product. From 1959 through 1962, the Coalinga and Los Gatos Creek areas experienced an intensive land rush for asbestos mining claims. The Southern Pacific Railroad acquired the JM Mill Area land from the federal government as part of a land grant under the 1871 Railway Act. For a 25-year period, the Southern Pacific Land Company ("SPLC") leased part of the property to the Coalinga Asbestos Company. The Coalinga Asbestos Company, a joint venture between the Johns-Manville Corporation ("Johns-Manville"), the Kern County Land Company and private investors, constructed the asbestos mill at the JM Mill Area and operated the mill from approximately 1962 to mid-1974. During the Coalinga Asbestos Company's asbestos milling operations at the JM Mill Area, asbestos ore was processed and sorted and asbestos mill tailings were periodically bulldozed into the eastern fork of Pine Canyon Creek. Asbestos ore was brought to the JM Mill Area from several nearby open pit mines, including the Jensen Mine and the Christy Mine. An estimated 340,000 cubic meters (450,000 cubic yards) of asbestos ore and asbestos tailings remain at the JM Mill Area.

In November 1975, the Coalinga Asbestos Company assigned the lease to the Marmac Resource Company/Mareco ("Marmac"), which used the JM Mill Area to conduct a chromite milling operation. Although all milling operations at the JM Mill Area were believed to have ceased in October 1977, Marmac retained its lease on the property until July 31, 1981.

In early 1980, the Metropolitan Water District ("MWD") of Southern California detected elevated levels of asbestos in water samples from the California Aqueduct near Los Angeles. An extensive sampling program along the Aqueduct, conducted by the MWD in August through September of 1980, suggested that the JM Mill Area was one probable source of asbestos in the California Aqueduct. Asbestos levels of up to 2500 million fibers per liter ("MFL") were measured.

In May 1980, EPA had the JM Mill Area inspected. Three samples of the tailings pile were collected and analyzed using polarized light microscopy ("PLM"). The PLM analysis indicated that the tailings contained 20% to 40% chrysotile asbestos. An emission rate of asbestos fibers from the tailings pile was estimated to be 0.39 to 0.69 tons per year. However, no air monitoring was conducted to make this estimate.

On October 17, 1980, the Central Valley Regional Water Quality control Board ("CVRWQCB") and the California Department of Health Services ("DHS") inspected the JM Mill Area to determine if waste discharges from this facility were in compliance with state regulations. The CVRWQCB concluded that additional corrective measures should be taken to prevent mine- and mill-generated asbestos from entering the drainage basins. SPLC and Johns-Manville submitted plans to the CVRWQCB proposing remedial actions but Johns-Manville filed for bankruptcy before the plans could be implemented. SPLC subsequently prepared another remediation plan, dated August 18, 1983 and submitted it to the CVRWQCB.

On June 14, 1983, the risks posed by the JM Mill Site were rated using the Hazard Ranking System. The JM Mill Site was approved for listing on the NPL in September 21, 1984. Remedial Investigation/Feasibility Study ("RI/FS") activities were initiated by EPA in 1985.

The Santa Fe Pacific Railroad Company ("SFPRC" and formerly Southern Pacific Land Company or "SPLC"), the Marmac Resources Company, Kern County Land Company and the Manville Sales Corporation have been identified as Potentially Responsible Parties (PRPs) at the JM Mill Site. On June 26, 1986 and June 23, 1988, general notice letters were sent to these PRPs, notifying them of their potential liability for clean up. On November 16, 1987, SPLC signed an Administrative Order on Consent and agreed to conduct an RI/FS for the JM Mill Site. The RI and the FS were submitted to EPA on January 17, 1990 and May 3, 1990, respectively.

The problem of asbestos contamination at the JM Mill Site is part of a larger, regional problem in the New Idria Formation, where many other mines and disturbances related to mineral exploration exist. EPA intends to address this regional problem in the future.

Enforcement efforts regarding the City of Coalinga Operable Unit

have resulted in a Consent Decree with Southern Pacific Transportation Company under which a clean up is being performed. No PRPs have been sent notice letters with respect to the Ponding Basin.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS Report and the Proposed Plan for the JM Mill Site were released for public comment on May 25, 1990. These documents and the Administrative Record were made available to the public at an information repository maintained at the EPA Superfund Records Center, Region IX office, San Francisco, California. The complete Administrative Record, which EPA used to select the remedy, was available for public review at an information repository at the Coalinga District Library, Coalinga, CA. In addition, three other information repositories were established in the following California municipalities: Avenal, Hanford, and Huron. These three repositories contain the most important documents related to the remedy selection such as the RI/FS, the Proposed Plan and the Administrative Record Index. The notice of availability for these documents was published in the Hanford Sentinel on May 25, 1990 and in the Coalinga Record on May 30, 1990.

A 30 day public comment period on the RI/FS and Proposed Plan was held from May 25, 1990 to June 25, 1990. In the Proposed Plan, EPA solicited requests for a public meeting but none were received. Therefore, no public meeting was held. EPA has prepared the attached responsiveness summary, which provides responses to the comments submitted in writing during the public comment period.

4.0 SCOPE AND ROLE OF THE RESPONSE ACTION

The JM Mill Area OU is one of two designated operable units of the JM Mill Site. The second operable unit is uncontained asbestos- and nickel-contaminated soils in Coalinga, California.

The threat at the JM Mill Area OU is posed by uncontained asbestos which, if not controlled, would lead to the generation of airborne asbestos emissions. This response action is designed to: i) limit the surface water transport of asbestos downslope from the Mill Area; and ii) minimize current and future airborne asbestos emissions from the Mill Area. If asbestos carried downstream from the JM Mill Area is deposited and then resuspended, the resulting airborne emissions would pose a threat to human health. Therefore, it is important to minimize the hydraulic transport of asbestos from the JM Mill Area OU into Pine Canyon Creek.

The remedial action selected in this ROD addresses the problem of uncontained asbestos ore and asbestos mill tailings in the context of a remote and largely rural area that is close to large amounts of naturally occurring asbestos. The asbestos waste will be stabilized to minimize erosion and to minimize the

release of asbestos into the local drainage basin. In addition, access to the disturbed areas within the Mill Area will be limited to prevent disturbance of the asbestos waste and the resulting generation of airborne asbestos. The abandoned mill will be dismantled to reduce the attraction to the public and all debris will be disposed of.

The Ponding Basin contains asbestos which has been transported from the JM Mill Area and other natural and disturbed areas in the New Idria Formation. EPA's risk assessment (summarized in Section 6.0 below) suggests that a significant cancer risk may exist for people who live and work adjacent to asbestos-containing areas where agricultural practices put asbestos-laden dust into the air. At this time, EPA is not proposing action in the Ponding Basin because of actions being considered by the USBR and the DWR to minimize the generation of asbestos-laden dust in this area. In 1992 EPA will evaluate whether the USBR/DWR actions are protective of human health and the environment and will publish a public notice of its determination. EPA will decide at that time whether further EPA action under CERCLA in the Ponding Basin is necessary.

Water in the California Aqueduct is known to contain high levels of dispersed asbestos fibers. This water is used to supply municipalities with drinking water and farmers with water for agricultural purposes, such as irrigation. Municipalities are required to treat drinking water to remove asbestos under the Safe Drinking Water Act. EPA recommends that DWR evaluate the potential, long term public health effect of delivering asbestos-laden irrigation water to agricultural areas of the San Joaquin Valley.

5.0 SITE CHARACTERISTICS

Figure 1 is a site map showing major features at the JM Mill Area OU. The JM Mill Area includes asbestos mill tailings, an asbestos ore storage/loading area, an abandoned mill building, an inactive chromite mine (the Railroad Mine), filled-in chromite settling ponds and debris. The RI for the JM Mill Site included analyses of soil and water at the mill and in the surrounding area, as well as an ecological assessment of the Mill Area. SPLC also prepared a regional study titled, "Offsite Source Characterization/Regional Soil Sampling and Watershed Modeling Report", which characterizes the occurrence and transport of asbestos from the JM Mill Area and other source areas in the Los Gatos Creek Drainage Basin.

The total disturbed area at the JM Mill Area OU is approximately 10 hectares (25 acres). The main asbestos tailings pile is located in the east fork of Pine Canyon Creek. The tailings pile is approximately 116 meters (380 feet) across, 350 meters (1150 feet) long and 27 meters (90 feet) deep. The tailings pile is contained on all sides except the downstream face, where it drops off at a slope of approximately 2.5:1 for an elevation of about

61 meters (200 feet). The slope contains extensive gullies, some as large as five meters (15 feet) wide and three meters (10 feet) deep.

Detailed soil sampling found levels of asbestos ranging from 61 area percent to 80 area percent in the mine and mill waste using Polarized Light Microscopy ("PLM") as described in the Interim Method for the Determination of Asbestos in Bulk Insulation Samples (EPA-600/M4-82-020). Appendix 1 provides a discussion of the various asbestos analytical techniques. Surface water samples taken in the Mill Area were measured for asbestos using Transmission Electron Microscopy ("TEM"). Asbestos concentrations in these samples ranged from 2.0E3 to 8.0E5 million fibers per liter ("MFL").

Regional air monitoring was conducted in the winter and summer of 1986 and 1987. Air monitoring stations were located upwind and downwind of the JM Mill Area as well as in Coalinga and thirteen other locations in the greater Coalinga area. Air monitoring samples were analyzed using TEM. The data showed that elevated levels of asbestos occur at the JM Mill Area and throughout the Los Gatos Creek Drainage Basin and the Arroyo Pasajero Alluvial Fan. Over time, a protective crust has formed on the tailings pile that appears to reduce wind erosion if left undisturbed. In addition, wind velocities in the Mill Area rarely exceed the velocity required to entrain asbestos fibers into the air if the surfaces are undisturbed.

Winds that exceed the threshold velocity and activities that disturb asbestos-bearing surfaces, such as driving a vehicle on the tailings piles, can cause airborne asbestos emissions. Exposure to airborne asbestos has been shown to cause cancer in humans (see Section 6.0 below). Surface water transport modeling showed that during heavy rains, up to five percent (5%) of the total asbestos yield in the Los Gatos Creek Drainage Basin is contributed by the JM Mill Area. If asbestos is transported downslope from the JM Mill Area by surface streams, deposited and then resuspended, the airborne asbestos could have a negative impact on human health and the environment.

6.0 SUMMARY OF SITE RISKS

The following discussion of site risk summarizes results of a public health evaluation ("PHE") or risk assessment conducted as part of the remedial investigation. A summary of the PHE is included as Chapter 10.0 and the complete PHE text is included as Appendix M in the RI. Because of certain similarities between the Atlas Mine Site and the JM Mill Site with respect to the contaminant and the media of concern, EPA prepared one PHE for both sites. However, where possible, the excess cancer risk due to the Mine and Mill Areas' individual contribution of asbestos was calculated separately.

Asbestos is a generic term referring to two groups of naturally-occurring hydrated silicate minerals having a fibrous crystalline structure, the amphiboles and the serpentines. The asbestos found in the New Idria Formation is the serpentine mineral chrysotile. Asbestos fibers are widely used for their high tensile strength and flexibility and for their noncombustible, nonconducting, and chemical-resistant properties. The fibers have been used in insulation, brake linings, floor tile, plastics, cement pipe, paper products, textiles, and building products.

Asbestos is the contaminant of concern at the JM Mill Site. Asbestos is one of the few substances which is known to cause cancer in humans. Asbestos exposure can also cause other lung diseases, such as asbestosis. EPA considers carcinogens to be nonthreshold in nature, that is, any amount of a human carcinogen in the environment represents a cancer risk to the exposed population. Asbestos has been the subject of numerous epidemiology studies. Exposure to asbestos has been positively linked to asbestosis, lung cancer, and mesothelioma. Also associated with asbestos exposure in some studies are cancers of the larynx, pharynx, gastrointestinal tract, kidney, and ovary, as well as respiratory diseases such as pneumonia.

The adverse human health effects from exposure to asbestos are extremely serious. A full discussion of the health effects of asbestos is found in the EPA document Airborne Asbestos Health Assessment Update, June 1986. Remedial action is warranted to mitigate the exposure to a carcinogen that is present as a result of human activity. Actual or threatened releases of hazardous substances from this OU may present an imminent and substantial endangerment to public health, welfare, or the environment.

Major sources of asbestos at the JM Mill Area are contaminated soils, unprocessed asbestos ore and asbestos mill tailings. In localized areas unpaved roads and trails may also be a source of asbestos. The three media of concern are air, surface water and soil. Asbestos is not soluble in water and is not transmitted to ground water.

There are two general routes of exposure to asbestos at the JM Mill Area: inhalation and ingestion. Inhalation is the exposure pathway of greatest concern to human health because this pathway has been positively linked to cancer in humans. While not of primary importance, ingestion exposure to asbestos may also be associated with an increased risk of cancer.

Potentially exposed populations include the following groups: i) individuals who use the JM Mill Area for hunting and ranching; ii) individuals who live in close proximity to the JM Mill Area; and iii) the populations of communities in Fresno and San Benito Counties such as Huron, Coalinga, Idria, Five Points, Stratford, Kettleman City, Priest Valley, Lonoak, Panoche and Avenal.

In the greater New Idria-Coalinga study region, a wide variety of potential regional sources of asbestos may contribute to asbestos concentrations in the air. These regional sources include other mines and disturbed areas, unpaved roads, trails and naturally occurring serpentinite soils in the New Idria Formation. The risk assessment evaluated exposure to ambient levels of asbestos due to all potential regional sources and also to asbestos present in the air due to the JM Mill Area alone. It is difficult to directly measure the individual contribution of asbestos emissions from the JM Mill Area to ambient air monitoring results because of the nearby sources in the New Idria Formation. Therefore, models were used to estimate the concentration of asbestos in air which may occur if the only sources of asbestos in the region were wind erosion of tailings piles and mine surfaces and vehicle traffic on the unpaved road running through the JM Mill Area. The air monitoring data were used in conjunction with historical Total Suspended Particulate ("TSP") data to obtain annual average air concentrations in various locations with all sources considered. The TSP data account for time periods when the threshold wind velocity for entrainment was exceeded. Section 5.2.1 of the RI for the Atlas Mine Site provides a more detailed discussion of the air modeling methods.

The highest risk posed by the JM Mill Area is correlated to activity-related exposure, such as exposure due to disturbance by motorized vehicles of asbestos-bearing surfaces. This exposure could occur either at the Mill Area or off-site in areas to which asbestos from the Mill Area has been transported. Exposure point concentrations were calculated using concentrations of asbestos in soils, mine surfaces and mine tailings in conjunction with estimated emission rates and an air dispersion model. Emissions of asbestos-contaminated dust generated by off-road vehicle activities and by agricultural tilling were estimated using equations presented in EPA's Compilation of Air Pollutant Emission Factors for Stationary Point and Area Sources (EPA, 1985c). The air dispersion model was a simple box model which defines a certain volume of air (the box) in which emissions from the area sources are present. The box model assumes that wind speed and direction are constant within the box and that the air is uniformly mixed. For exposure to ambient air at the JM Mill Area, it was assumed that a 20-year-old-male will be present for 8 hours per day, 52 days per year, for 10 years, to yield an average continuous exposure duration of 0.47 years (the average case). For exposure to air during off-road vehicle activity, it was assumed that a 20-year old male drives for three hours per day, 16 days per year for five years (the average case). Table 1 summarizes the average and maximum exposure assumptions use for the various activity related exposures. For both types of activity, the EPA unit risk factor of .21386 (PCM fibers/cubic centimeter)1.0E-1 was used.

Experiments conducted by the California Department of Health Services ("DHS") in 1985 show that a pickup truck driving on unpaved asbestos-contaminated soil can produce asbestos dust con-

TABLE 1

SUMMARY OF EXPOSURE PARAMETERS

INHALATION DURING OFF HIGHWAY VEHICLE ACTIVITY

EXPOSURE PARAMETER	PARAMETER VALUE AVERAGE	MAXIMUM
Age At Onset of Exposure (Yrs)	20	20
Total Years Exposed	5	5
Frequency of Exposure (Hrs/Yr)	48	160

INHALATION DURING HUNTING, CAMPING OR HIKING

EXPOSURE PARAMETER	PARAMETER VALUE AVERAGE	MAXIMUM
Age At Onset of Exposure (Yrs)	20	20
Total Years Exposed	10	20
Frequency of Exposure (Hrs/Yr)	416	832

centrations in the air that pose a potential health risk to individuals close to the activity. A discussion of this experiment has been included in the Administrative Record for the JM Mill Area OU.

The excess lifetime cancer risk from drinking asbestos-contaminated water from the California Aqueduct was not found to be significant. The risk estimates were calculated assuming ingestion of two liters of water per day for a 70 year period by an adult weighing 70 kilograms (154 pounds). EPA's unit risk factor of 1.4E-13 (fibers/liter)1.0E-1 was used (EPA, 1985b).

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., 1.0E-6). In this risk assessment, an excess lifetime cancer risk of 1.0E-6 indicates that, as a plausible upper bound, an individual has a one in one million chance of dying from cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under specific exposure conditions. The estimated excess lifetime cancer risk for individuals hiking, camping or hunting at or nearby the JM Mill Area varied from 1.0E-6 to 6.0E-6 under average and maximum exposure conditions, respectively. The estimated excess lifetime cancer risk for individuals driving a four-wheel-drive truck on the JM Mill Area varied from 8.0E-4 to 4.0E-1 under average and maximum exposure conditions, respectively. (When SFPRC data are used to calculate the latter risk range, the risk varies from 1.0E-4 to 1.0E-1 for average and maximum exposure conditions, respectively). The estimated excess lifetime cancer risk for individuals ingesting untreated California Aqueduct water, contaminated with asbestos from all sources in the Los Gatos Creek Basin, varied from 2.0E-6 to 4.0E-5 under average and maximum exposure conditions, respectively. However, it should be noted that municipalities are required to filter drinking water under the Safe Drinking Water Act, thereby further reducing exposure to asbestos.

When evaluating risk from asbestos in the environment, there are sources of uncertainty associated with asbestos measurement that make quantifying the risk difficult. One of these sources of uncertainty is the difficulty of obtaining accurate and precise measurements of asbestos concentrations in soil, air, and water. For example, all risk assessments require an accurate and precise measurement of contaminant concentration. When a gaseous or soluble chemical is the contaminant of concern, the measurement of only one parameter, concentration, is sufficient to establish how much of that contaminant is present in a given sample. However it is significantly more complex to measure the concentration of particulates accurately and precisely, especially fibrous particulates, because many more parameters must be accounted for. When measuring spherical particles the following parameters must be measured: i) the overall particle size distribution; ii) the concentration of each individual size category; and iii) the change in concentration of each size

category in different parts of a dust cloud. When measuring fibrous particulates such as asbestos, the parameters become even more complex. The length and diameter of each particle must be measured along with the distribution of complex shapes (such as bundles, clusters and matrices). The concentration of each particle shape must be established, along with the settling velocity of different fiber shapes. Finally, because asbestos analysis involves use of an optical or electron microscope, the relative experience and fatigue of the analyst can influence the ultimate accuracy and precision of a given analysis.

Many of the epidemiology studies which established the link between the inhalation of asbestos and cancer used phase contrast microscopy ("PCM") techniques to measure asbestos concentration. However, PCM is considered inadequate for the analysis of a short fiber mineral such as chrysotile and for the analysis of non-occupational levels of asbestos. Many of these studies were done before TEM techniques were available. Most studies today use TEM as the "state of the art" analytical technique for measuring airborne asbestos concentrations (see Superfund Method for the Determination of Asbestos in Ambient Air, EPA/540/2-90/005a and 005b, May 1990). In the RI, the ambient air samples and surface water samples were measured using TEM while the soil samples were measured using PLM. Limited TEM analyses of the soils samples were used for confirmation. To use TEM data in quantitative risk assessments, one must convert TEM data to PCM Equivalent ("PCME") data using a conversion factor. There are a variety of ways to perform this conversion. Whenever conversions of this type are done, the ability to quantify risks is decreased.

The PHE also discusses the environmental assessment of the JM Mill Area. From an ecological standpoint, although there are significant impacts associated with the destruction of habitats by the mining and milling activities in the JM Mill Area, the direct effects of asbestos on wildlife appear relatively insignificant. These impacts will be partly mitigated by reclamation of the disturbed areas using native vegetation. Three sideslope seeps ("wetlands") were identified at the JM Mill Area. These wetland areas derive their water supply mainly from local groundwater. The selected remedy will not negatively impact the wetlands because groundwater is not being affected. In fact, the selected remedy will be beneficial for one of the wetlands immediately downslope from the main tailings pile, because the selected remedy will minimize the possibility of a slope failure on the tailings pile resulting in movement of the tailings over the wetland area.

7.0 DESCRIPTION OF ALTERNATIVES

EPA evaluated potential remedial action alternatives for the Johns-Manville Coalinga Asbestos Mill Area OU in accordance with CERCLA Section 121, the National Contingency Plan ("NCP"), (in particular, 40 C.F.R. Section 300.68), and the Interim Guidance on Superfund Selection of Remedy, December 24, 1986 (OSWER Direc-

tive No. 9355.0-19). The Resource Conservation and Recovery Act ("RCRA") does not apply to asbestos and its Land Disposal Restrictions do not apply to asbestos mining and milling waste.

The first step in evaluating potential remedial action alternatives was to determine, based upon JM Mill Area OU characteristics, what set of response actions and associated technologies should be considered. An example of this preliminary determination (or "scoping") was the elimination of biological treatment from further consideration because biological processes capable of detoxifying asbestos contaminated soil do not exist. Section 2.4 of the FS discusses the scoping process in more detail.

The next step in the selection of remedy process was assembling the remaining technologies and/or disposal options into general remedial action alternatives. Pursuant to OSWER Directive No. 9355.0-19, remedial action alternatives are to be developed ranging from those that would eliminate the need for long-term management (including monitoring) at the JM Mill Area OU to alternatives involving treatment that would permanently reduce the mobility, toxicity or volume of the hazardous substances(s) as their principal element. In addition, containment options involving little or no treatment and a no action alternative are to be developed. The remedial action alternatives developed in the FS were:

Alternative 1:	**No Action**
Alternative 2:	**Road Paving; Mill Dismantling; Deed Restriction;**
Alternative 3:	**Access Restriction plus Alternative 2;**
Alternative 4:	**Sediment Trapping Dam Upgrade; Additional Sediment Trapping Dams; Stream Diversion Upgrade; Revegetation plus Alternative 3;**
Alternative 5:	**Grading; Cross Canyon Stream Diversion; Sediment Trapping Dam Upgrade; Revegetation plus Alternative 3;**
Alternative 6:	**0.5 Foot Soil Cap plus Alternative 5**
Alternative 7:	**2.0 Foot Soil Cap plus Alternative 5**
Alternative 8:	**Removal of Waste to Off-Site Landfill**
Alternative 9	**Soil Fusion Using Thermal Treatment**

All of the costs and implementation times presented below are estimates. The cost of monitoring is not included in the cost estimates for Alternatives 2 through 7 and Alternative 9. Operation and maintenance estimates are for a 30 year period. Details of how the cost estimates were calculated are included in the FS.

The Proposed Plan did not specifically mention design criteria for the stream diversion structures, sediment trapping dams or protecting the tailings piles. As a result of comments by the California Department of Health Services, some design criteria have been added to this ROD (see Section 10.0). The Proposed Plan also specified that the road through the Mill Area would be paved. The ROD allows appropriate engineering alternatives to

road paving, such as annual road maintenance.

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, no remedial action would be taken but a regular program of site monitoring would be started. This monitoring program would include periodic site inspections, sampling of surface water and airborne asbestos levels in the JM Mill Area, as well as aerial monitoring. Capital, O&M (operation and maintenance) and present worth costs are, respectively, no cost, $93,000 and $93,000. Alternative 1 would require 3 months to implement.

Alternative 2: Road Paving, Mill Dismantling, Deed Restriction

Under this alternative, in addition to monitoring of the JM Mill Area, either the road through the Mill Area would be paved or annual road maintenance will be performed to reduce the generation of airborne asbestos emissions. The mill building would be dismantled to reduce the Mill Area's attraction to the public. A deed restriction would be placed on the property to ensure that monitoring and other operation and maintenance activities are carried out. Capital, O&M and present worth costs are, respectively, $186,000, $171,000 and $357,000. Alternative 2 is estimated to require 6 months to implement.

Alternative 3: Access Restriction plus Alternative 2

In addition to all elements of Alternative 2, the fences currently in place to prevent unauthorized use of the road through the JM Mill Area would be improved. Barriers would be erected around the disturbed areas to discourage access by four-wheel drive vehicles. Signs would be posted throughout the Mill Area area to warn of an asbestos hazard. The property owners have already put up a number of warning signs on the perimeter of the property. Capital, O&M and present worth costs are, respectively, $350,000, $300,000 and $650,000. Alternative 3 is estimated to require 12 months to implement.

Alternative 4: Sediment Trapping Dam Upgrade; Additional Sediment Trapping Dams; Stream Diversion Upgrade; Revegetation plus Alternative 3

In addition to elements of Alternative 3, the existing BLM stream diversion would be improved to protect it against potential failure. The existing sediment trapping dam would be improved by constructing a concrete spillway that would protect the dam against overflow and subsequent failure. Several small sediment trapping dams would be constructed downstream to make the existing dam more effective in reducing the potential for asbestos release into the local drainage. A pilot study would evaluate whether native vegetation could be established on the disturbed

areas. A revegetation project will be implemented if it is found to be technically feasible and cost effective. Capital, O&M and present worth costs are, respectively, $740,000, $598,000 and $1,338,000. Alternative 4 is estimated to require 24 months to implement.

Alternative 5: Grading; Cross Canyon Stream Diversion; Sediment Trapping Dam Upgrade; Revegetation plus Alternative 3

This alternative includes several elements of Alternative 4. A cross canyon stream diversion would be constructed to divert flows away from the tailings pile. This would remove the largest source of water draining through the tailings pile and eliminate the need for additional small sediment trapping dams downstream from the Mill Area. The grading would reduce the slope of the tailings pile and improve its stability. The existing sediment trapping dam would be improved with a concrete spillway and the revegetation pilot study would be started as described in Alternative 4. All other elements of Alternative 3 would be implemented. Capital, O&M and present worth costs are, respectively, $1,130,000, 815,000 and 1,947,000. Alternative 5 is estimated to require 24 months to implement.

Alternative 6: 0.5 Foot Soil Cap plus Alternative 5

In addition to the elements of Alternative 5 that control erosion and run-off, Alternative 6 includes the construction of a vegetated soil cover on the asbestos tailings. This vegetated soil cap would be constructed by first reshaping the tailings piles and then covering them with six inches (15.24 centimeters) of fertile soil cover. (The revegetation proposal in Alternatives 4 and 5 do not include this soil cover.) Vegetation would then be established on the soil cover. Capital, O&M and present worth costs are, respectively, $3,092,000, $1,012,000 and $4,106,000. Alternative 6 is estimated to require 24 months to implement.

Alternative 7: 2.0 Foot Soil Cap plus Alternative 5

In addition to elements of Alternative 5 that control erosion and run-off, Alternative 7 includes the construction of a 2-foot (61 centimeter) vegetated soil cap. Capital, O&M and present worth costs are, respectively, $6,162,000, $1,485,000 and $7,648,000. Alternative 7 is estimated to require 24 months to implement.

Alternative 8: Removal of Waste to an Off-Site Landfill

340,000 cubic meters (450,000 cubic yards) of asbestos contaminated material would be excavated and transported to an off-site landfill permitted to receive asbestos waste. Nearly all of the asbestos would be excavated and the need for long-term monitoring and maintenance of the mines and stockpile areas would be eliminated. Capital, O&M and present worth costs are, respectively, $712,000,000, no cost and $712,000,000. Alternative 8 is

estimated to require 54 months to implement.

Alternative 9: Soil Vitrification using Thermal Treatment

340,000 cubic meters (450,000 cubic yards) of asbestos waste materials would be vitrified using a thermal treatment process. The asbestos material would be converted from a soil into an inert, stable glass product using electrodes which would heat the soil to extremely high temperatures. The soil would be heated above its melting point and eventually converted to the glass product. Capital, O&M and present worth costs are, respectively, $289,000,000, no cost and $289,000,000. Alternative 9 is estimated to require 144 months to implement.

8.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

This section provides an explanation of the nine (9) criteria used to select the remedy, and an analysis of the nine remedial action alternatives in light of those criteria, highlighting the advantages and disadvantages of each of the alternatives.

Criteria

The alternatives were evaluated based on the nine key criteria which directly relate to the factors that CERCLA and the NCP, 40 CFR Section 300.430, mandate that the Agency assess in selecting a remedy. These criteria are:

(1) **overall protection of human health and the environment**, which addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls;

(2) **compliance with applicable or relevant and appropriate requirements (ARARs)**, which addresses whether a remedy will meet all of the applicable or relevant and appropriate Federal and State laws and/or justifies a waiver;

(3) **long-term effectiveness and permanence**, which refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met;

(4) **reduction of toxicity, mobility or volume through treatment, which addresses the anticipated performance of the treatment technologies a remedy may employ;**

(5) **short term effectiveness**, which addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until clean-up goals are achieved;

(6) **implementability**, which is the technical and administrative feasibility of a remedy;

(7) **cost**, which includes estimated capital and O&M costs, as well as present-worth costs;

(8) **state acceptance**, which indicates the support of the State agency for the selected remedy; and

(9) **community acceptance**, which summarizes the public's general response to the RI/FS and Proposed Plan.

Because there is no cost-effective treatment technology for asbestos-containing mining and milling material at this OU, criterion number four is not directly relevant to a choice among alternatives. However, the alternatives were compared with respect to their ability to minimize the mobility (through the air or surface water pathways) of the asbestos-containing material.

Analysis of the Alternatives

Overall Protection. Because Alternative 1, the "no action" alternative, is not protective of human health and the environment, it is not considered further in this analysis as an option for the JM Mill Site. Alternative 2 would be inadequate in protecting human health and the environment since it would not reduce human contact with asbestos. Alternative 3, by restricting access to the JM Mill Area, would be protective of human health at the JM Mill Area, by controlling the significant risk from inhalation of asbestos-contaminated air but would not be protective at the areas downstream from the OU. Alternatives 4 through 7 would all provide adequate protection of human health, both at the JM Mill Area and downstream, by minimizing human contact with asbestos through engineering controls and institutional controls. Alternatives 4 through 9 would also be protective of the environment by preserving the wetlands present at the JM Mill Area. Alternative 9 is the only option that utilizes treatment and would probably provide the most protection to human health and the environment. Alternative 8 would provide protection similar to Alternative 9 but would require off-site transportation and disposal of the asbestos.

Compliance with ARARs. Alternatives 4 through 9 would meet the respective applicable or relevant and appropriate requirements of Federal and State environmental laws. Alternative 3 would comply with the specifications in 40 CFR Section 61.153(b) and Section 61.156(b) but would not comply with the remaining identified ARARs. Alternative 7 would comply with the specifications in 40 CFR Section 61.153(a)(2). Alternatives 1 does not comply with any ARARs. Alternative 2 would comply with the California Health and Safety Code, Section 25232(a)(1) and (2).

Long-term Effectiveness and Permanence. Alternative 5 would reduce the amount of asbestos-contaminated material released into the air and the surface water in the JM Mill Area. By restricting access to the Mill Area, Alternative 3 would reduce the long-term risk of exposure to asbestos-contaminated air only in the Mill Area. For this criterion, Alternative 4 is comparable to Alternative 5. Long term effectiveness will depend on proper maintenance of diversion structures and other engineered elements.

The engineered elements of the preferred alternative will be designed to take maximum advantage of the natural systems and to minimize operation and maintenance needs.

Alternative 9 provides the greatest amount of long-term effectiveness and permanence. Alternative 8 would remove all waste to a landfill permitted to accept asbestos, thereby eliminating the long-term risk of exposure at the JM Mill Area. As with all landfills, the containment system may fail or need to be retrofitted or replaced. Therefore, a risk will remain at the landfill site and long-term effectiveness will be dependent on operation and maintenance at that location.

Alternatives 6 and 7 provide protection to receptors from asbestos exposure that is comparable or slightly greater than Alternatives 4 and 5. Alternative 7 offers a higher degree of permanence because a 2-foot thick cap will provide an increased resistance to erosion. The excavation of soil to construct vegetated caps in Alternatives 6 and 7 could cause significant disruption in the habitat value of nearby areas. Alternative 2 would not provide long-term effectiveness and permanence.

Reduction of Toxicity, Mobility or Volume of the Contaminants Through Treatment. Only Alternative 9 would treat the waste to reduce the toxicity and mobility of the asbestos. Alternatives 2 through 8 rely on institutional controls or engineering controls to reduce the mobility of the asbestos to varying degrees. Technology is not currently available that would reduce the volume of asbestos contaminated soils.

Short-Term Effectiveness. Alternatives 2 and 3 would quickly reduce direct human contact with asbestos at the JM Mill Area and would provide the most effective short-term protection. Alternatives 4 through 7 would have a minor, short term risk of exposure for workers at the JM Mill Area. Alternative 9, because of its greater implementation time, would include a more serious short term risk to on-site workers. Alternative 8 would subject the surrounding community to the possibility of accidental spillage during transport of the contaminant from the JM Mill Area.

Implementability. Alternatives 2, 3, and 8 would have no unusual technical difficulties that could delay implementation. For Alternatives 4 and 5, the implementability of the revegetation component will be tested in a pilot project. The other elements of Alternatives 4 and 5 should not present an implementability problem. Borrow sources are areas where clean soil is removed for use as a cap on the contaminated areas. Alternatives 6 and 7 would face a technical difficulty in finding adequate borrow sources near the site for capping and could face major administrative difficulties in getting permits from local and county development agencies to exploit nearby borrow sources without adversely impacting the Mill Area habitat value. Alternative 9 could face technical difficulties with the process system designed to fix the waste material and would also require a

pilot study prior to implementation. These difficulties would include supplying sufficient electric power to the JM Mill Area and logistical problems related to servicing a complex system in a remote area. Alternative 8 might face administrative difficulties in getting permits from state and federal agencies for transporting the asbestos material on public roads.

Cost. All of the following cost figures are estimates of present worth cost. The cost of Alternative 1 is $93,000 (for continued monitoring). Alternative 2 has a cost of $357,000. The cost of Alternative 3 is $654,000. Alternative 4 has a cost of $1,340,000. Alternative 5 has a cost of $1,950,000. Alternative 6 has a cost of $4,100,000. Alternative 7 has a cost of $7,650,000. The highest cost alternative is Alternative 8 at $712,000,000. The cost of Alternative 9 is $289,000,000. For Alternatives 2 through 5, the costs outlined above do not include the cost of continued monitoring.

State Acceptance. The State of California has concurred in EPA's selection of the preferred alternative.

Community Acceptance. EPA did not receive any comments from community members on the Proposed Plan for the JM Mill Site. The PRP who conducted the RI/FS supports the selected remedy. Marmac, another PRP, has indicated a preference for Alternative 3 plus grading to stabilize the tailings pile.

9.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Under Section 121(d)(1) of CERCLA, 42 U.S.C. Section 9621(d)(1), remedial actions must attain a degree of clean-up which assures protection of human health and the environment. Additionally, remedial actions that leave any hazardous substance, pollutant, or contaminant on-site must meet a level or standard of control that at least attains standards, requirements, limitations, or criteria that are "applicable or relevant and appropriate" under the circumstances of the release. These requirements, known as "ARARs", may be waived in certain instances, as stated in Section 121(d)(4) of CERCLA, 42 U.S.C. Section 9621(d)(4).

"Applicable" requirements are those clean-up standards, standards of control and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant or contaminant, remedial action, location, or other circumstance at a CERCLA site. "Relevant and appropriate" requirements are clean-up standards, standards of control and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. For example, requirements may be

relevant and appropriate if they would be "applicable" but for jurisdictional restrictions associated with the requirement.

The determination of which requirements are "relevant and appropriate" is left to EPA's discretion. EPA may look to the type of remedial actions contemplated, the hazardous substances present, the waste characteristics, the physical characteristics of the site, and other appropriate factors. It is possible for only part of a requirement to be considered relevant and appropriate. Additionally, only substantive requirements need be followed. If no ARAR covers a particular situation, or if an ARAR is not sufficient to protect human health or the environment, then non-promulgated standards, criteria, guidance, and advisories must be used to provide a protective remedy.

Types of ARARs

There are three types of ARARs. The first type includes "contaminant specific" requirements. These ARARs set limits on concentrations of specific hazardous substance, pollutants, and contaminants in the environment. Examples of this type of ARAR are ambient water quality criteria and drinking water standards. The second type of ARAR includes location-specific requirements that set restrictions on certain types of activities based on site characteristics. These include restriction on activities in wetlands, floodplains, and historic sites. The third type of ARAR includes action-specific requirements. These are technology-based restrictions which are triggered by the type of action under consideration. An example of an action-specific ARAR is the Occupational Safety and Health Act ("OSHA") which sets permissible levels of exposure to asbestos for workers.

ARAR Identification Process

ARARs must be identified on a site-specific basis from information about specific chemicals at the site, specific features of the site location, and actions that are being considered as remedies.

ARARs identified for the JM Mill Area OU address emission of asbestos fibers from contaminated soils, inhalation of asbestos fibers, disposal of asbestos contaminated soils, protection of endangered species, and protection of wetlands.

Contaminant-Specific ARARs For Asbestos:

1. Clean Air Act, National Emission Standard for Hazardous Air Pollutants (NESHAPs)

Asbestos was first designated as a hazardous air pollutant unde the Clean Air Act in 1971. The National Emission Standard fo Hazardous Air Pollutants ("NESHAPs") for asbestos found at 4 C.F.R. Section 61.152 and 40 C.F.R. Section 61.156 are ARARs fc the implementation of the remedy at this Site. 40 C.F.R. Sectic

61.153 is an ARAR for the completion of the remedy at the Site.

2. California Air Resources Act, Health and Safety Code, Division 26, section 39000 et seq. 17 CCR, Part 3, Chapter 1, Specifically the Fresno County Air Pollution Control District PM 10 standard

The Fresno County Air Pollution Control District has adopted PM 10 as a particulate matter standard. This PM 10 standard means that ambient levels of particulate matter greater than 10 microns in length shall not exceed 30 micrograms per cubic meter (annual average) or 50 microgramsper cubic meter over a 24 hour period.

Location-Specific ARARs:

Because the Site is located in an area that contains endangered species (i.e., the kit fox and the blunt-nosed leopard lizard), the following requirements are ARARs for the Site:

1. The Endangered Species Act of 1973, 16 U.S.C. Section 1536(a-d)

Generally, when a project potentially impacts an endangered species or critical habitat, activities carried out by Federal agencies should not jeopardize the continued existence of an endangered species or cause adverse modifications of critical habitat.

2. USFWS Mitigation Policy (FR 7644-7663, Vol 46, No. 15, January 1981).

This policy is triggered in accordance with the Fish and Wildlife Act of 1956, Fish and Wildlife Coordination Act, Watershed Protection and Flood Prevention Act and the National Environmental Policy Act. The mitigation policy defines resource categories and establishes mitigation goals and guidelines for each. Guidelines to achieve the goal include avoiding or minimizing habitat loss, immediate rectification or reduction of habitat loss or replacement of habitat in kind.

3. Federal Water Pollution Control Act, Section 404(b)(1), 33 U.S.C. Section 1344(b)(1).

This statute is designed to ensure that if no practicable alternative to impacting waters of the United States including wetlands exists, any unavoidable, adverse impact on the wetlands must be mitigated.

4. California Hazardous Waste Control Laws, Health and Safety Code, Div. 20, Chapter 6.5, Section 25220-25241 et seq. and 22 CCR, Div. 4, Chapter 30, Section 66001 et seq

The actual substantive restrictions contained in Section 25232(a)(1) and (2) are an ARAR. However, the procedural re-

quirements related to notice, hearing and the mechanisms for implementing deed restrictions do not fall within the definition of an ARAR. CERCLA Section 121, 42 U.S.C. 9621.

Action Specific ARARs:

1. Occupational Safety and Health Act ("OSHA")

OSHA has set a permissible exposure limit ("PEL") for all asbestos fibers at 0.2 fiber per cc ("f/cc") for occupationally exposed workers and an "action level" (the level above which employers must initiate compliance activities) of 0.1 f/cc as an 8-hour time weighted average (51 C.F.R. Section 22612 (1986)). While this standard was meant for occupational exposure (8 hours per day, 40 hours per week, 52 weeks per year) and not for continuous ambient exposure, it provides an upper threshold for evaluating permissible ambient exposure limits. In other words, a concentration of .2 PCM fibers per cc of respirable air or less is not permissible for ambient exposure, since this requirement is applicable or relevant and appropriate for exposure during the cleanup of this Site.

2. California Porter Cologne Water Quality Act, 23 CCR, Chapter 3: Subchapter 15, Article 7 - Mining Waste Management, Section 2570-2574, Specifically 23 CCR Section 2572(b), 23 CCR Section 2572(h)(1)(A), 23 CCR Section 2572(h)(3), 23 CCR Section 2546(d) and 23 CCR Section 2546(e)

This state act contains regulations establishing waste management requirements for all mining waste. The act's construction standards require accommodation of 25-year, 24-hour storm run-off controls in design criteria for the drainage and diversion structures at the Mill Area as well as 100 year peak stream flow protection for all waste piles at this site. These requirements are applicable and relevant and appropriate for remedial action at this site.

10.0 THE SELECTED REMEDY

Alternative 5, consisting of grading, cross canyon stream diversion, improvements to the existing sediment trapping dam, access restrictions, deed restrictions, revegetation pilot study, road paving or an engineering alternative, and mill dismantling, is the selected remedy for the JM Mill Area OU. The grading will reduce the slope of the tailings pile and improve its stability. A stream diversion will be built to channel surface water away from the tailings piles, thereby reducing erosion and transport of asbestos into Pine Canyon Creek. An existing stream diversion upslope from the main tailings pile will be improved. The existing sediment retention dam will be improved with a concrete spillway. A pilot study will evaluate if native vegetation could be established on the disturbed areas. If revegetation is found to be technically feasible, the disturbed areas will be reclaimed with vegetation. The disturbed areas will be fenced off. The

mill building will be dismantled and disposed of along with other debris in the mill area. The road through the Mill Area will be paved or an alternative will be adopted to suppress dust. A deed restriction will limit land use and prevent disturbance of the contaminated material left at the Mill Area. Visual inspections, both on the ground and from the air, will be required to ensure the integrity of the engineering and institutional controls.

The goal of the selected remedy is to maintain the current effectiveness of the existing sediment trapping dam in minimizing the hydraulic transport rate of asbestos waste material into Pine Canyon Creek. Because asbestos from natural and disturbed areas is already present in and will continue to enter the surface water pathway, it is not possible to quantify a reduction in risk that this remedy will achieve. However, it is believed that minimizing the asbestos entering Pine Canyon Creek will decrease the downstream human health risk due to both inhalation of resuspended asbestos fibers. Entry into the JM Mill Area OU is controlled by locked gates. By restricting access to the JM Mill Area OU, the generation of airborne asbestos emissions will be minimized, reducing the risk from inhaling asbestos fibers for persons in the immediate area.

The major features of the selected remedy are engineering controls designed to reduce hydraulic transport of asbestos into local drainages. These controls include: i) a cross canyon diversion system; ii) a run-off management system; and iii) grading. These engineering controls consist of the following components:

Cross Canyon Diversion System:
- --Diversion ditch;
- --Improvement to existing upslope diversion;

Run-off Management System:
- --Improvement to existing sediment trapping dam;
- --Reclamation of disturbed areas with native vegetation if the revegetation pilot project is successful;

Grading:
- --Grading benches perpendicular to the slope;
- --Consolidation of asbestos-containing site soils;

All diversion and drainage facilities shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows from surface run-off in a 25-year, 24 hour storm. All tailings piles shall be protected from 100-year peak stream flows.

All containment structures shall be designed by a registered civil engineer and construction shall be supervised and certified by a registered civil engineer or certified engineering geologist.

A verification sampling plan ("VSP") will be instituted to confirm that an appropriate reduction in hydraulic transport rate of asbestos is achieved. The VSP will include surface water modeling and surface water sampling as necessary.

Operation and maintenance activities will be required to ensure the effectiveness of the stream diversions and sediment retention structures. These activities will include: (1) inspection of engineering systems to ensure integrity and performance, (2) removal of sediments from retention dams, (3) any repair work necessary to maintain the integrity of the remedial systems, and (4) maintenance of the vegetation. EPA will review the remedial actions effectiveness pursuant to CERCLA Section 121(c), 42 U.S.C. Section 9621(c).

The total capital cost for the selected alternative is estimated at $1.1 million. Annual operation and maintenance activities are estimated at $815,000. The total present worth cost for the selected alternative is estimated to be $1.9 million. Table 2 summarizes costs for the selected alternative.

During the remedial design and construction process that follows this ROD, some changes to the selected remedy may be required and will be made in accordance with CERCLA Section 117, 42 U.S.C. Section 9617, and 40 C.F.R. Section 300.435.

11.0 DOCUMENTATION of SIGNIFICANT CHANGES

The selected alternative for the JM Mill Site is construction of engineering systems to control the release of airborne and waterborne asbestos from the JM Mill Area and accompanying measures, as detailed in Section 10, above. At this time no significant changes from the Proposed Plan have occurred.

12.0 STATUTORY DETERMINATIONS

Overall Protection of Human Health and the Environment

The selected remedy protects human health and the environment by minimizing exposure to asbestos-contaminated materials. Proper operation and maintenance practices will ensure the integrity of the stream diversions, sediment trapping dams, vegetation and fencing. Strict dust control procedures will be followed during construction. Proper health and safety measures, including ambient air monitoring and personnel monitoring during implementation, will ensure that the health of on-site workers and the local population is protected.

Cost-Effectiveness

The selected remedy is cost-effective in that it provides overall effectiveness commensurate to its costs. The estimated costs of the selected remedy are approximately one half the costs associated with a 15.24 centimeter (6 inch) vegetated cap

TABLE 2

SUMMARY OF COSTS

PREFERRED ALTERNATIVE

Capital Cost (per cubic meter)	O&M (per yr)	Present Worth Cost	O&M (Present Worth)
$3.30	$27,000	$1,900,000	$815,000

O&M = Operation and Maintenance

(Alternative 6), and yet the selected remedy and Alternative 5 are similar in terms of the level of public health and environmental protection provided, except that construction of a vegetated cap would involve a slightly greater exposure risk during implementation.

Compliance with ARARs

The selected remedy will comply with all applicable or relevant and appropriate requirements that have not been waived.

Utilization of Permanent Solutions to the Maximum Extent Practicable

Currently there is no known permanent treatment or resource technology which would control release of asbestos from the soil at the JM Mill Area OU. A thermal treatment alternative was identified, but it was eliminated from further consideration due to difficulties associated with implementation and very high cost. Of those alternatives that are protective of human health and the environment, comply with ARARs and are cost effective, EPA has determined, and the State has concurred, that the selected remedy provides the best balance of the various factors that CERCLA requires be considered in remedy selection.

The JM Mill Area OU is located in a largely rural area, remote from any population centers and just downslope from a large area of serpentine which is a source of naturally occurring asbestos. Off-site disposal of the mining and milling waste would be prohibitively expensive and would have a significant short term risk associated with transport of the asbestos to a landfill licensed to accept asbestos waste.

Preference for Treatment as a Principal Element

Currently there is no proven, cost-effective treatment technology that would permanently and significantly reduce the mobility, toxicity or volume of asbestos at the JM Mill Site. Since no cost-effective treatment alternative exists for this OU, treatment was not selected as a remedy. Although several treatment technologies were investigated during the feasibility study, it was determined that no technology presently exists that would result in a permanent and significant decrease in the toxicity, mobility or volume of asbestos at the JM Mill Area OU in a cost effective manner. Alternative 5 was found to be the best method for addressing the threats posed by the JM Mill Area OU, taking into account all of the statutory requirements and preferences.

APPENDIX 1

REVIEW OF ASBESTOS ANALYTICAL METHODS

I. Asbestos Analytical Techniques

There are three commonly accepted analytical techniques used to measure asbestos. They are:

1) Phase Contrast Microscopy ("PCM"): An optical technique useful in examining minute particles.

2) Polarized Light Microscopy ("PLM"): An optical technique that uses polarized light to identify minerals.

3) Transmission Electron Microscopy ("TEM"): A technique using an electron microscope to achieve extremely high resolution of asbestos fibers too small to be resolved using optical methods.

A brief description, including the advantages and disadvantages of each technique, is presented below.

A. Phase Contrast Microscopy

Phase contrast microscopy ("PCM") is a technique of optical microscopy that is commonly used to analyze air samples collected in the work place (e.g. in enclosed spaces). PCM translates differences in the phase of light transmitted or reflected by the object into differences of intensity in the image. The method is better suited to analysis of work place air than ambient air because in the work place, asbestos accounts for a high fraction of total particulates as opposed to in an environmental setting, where the situation is normally reversed. Most of the available medical studies of asbestos diseases have measured asbestos using PCM. This is because PCM was the only technique available when most of the occupational studies were done.

The PCM technique has three major limitations concerning its use in the ambient environment: i) the method cannot detect fibers with diameters of less than 0.2 micrometers. Many fibers in the environment are much smaller than this; ii) PCM does not distinguish between asbestos fibers and other types of fibers. Therefore, in the environment, the PCM fiber count may be completely unrelated to the asbestos fiber content; and iii) PCM is also very sensitive to the ratio of total particulates to fibrous dust. In environmental samples this ratio is sufficiently high that fibers may be effectively obscured so that PCM counts may severely underestimate fiber concentrations.
For these reasons, it is widely accepted that the PCM method is totally unsuitable for measurement of asbestos fibers in ambient atmospheres.

The major advantages of PCM are that it is a quick, cheap, well established technique for measuring occupational levels of exposure.

B. Polarized Light Microscopy

Polarized Light Microscopy ("PLM") is the preferred technique for analysis of bulk insulation samples. The PLM technique is relatively inexpensive, quick (1/2 hour/sample) and allows: (1) identification all asbestos types, (2) distinguish between asbestos and other fibrous and non-fibrous minerals and (3) identify most non-asbestos components of samples. The resolution capacity of PLM is 200x to 400x magnification.

There are two counting procedures that have been adopted for use with PLM analysis, the point counting method and the field comparison or visual estimation method. The point counting method uses a superimposed grid (graticule) with 100 points. The operator counts the points where asbestos is present. The method (point count) involves the preparation of eight slides, each of which can be viewed at 100 possible points, to establish the presence or absence of asbestos at 50 points on each slide. The result is recorded and reported as area percent based on the number of positive points. The following format is used for determination:

Area percent = a/n (100)

where:

a = number of points with asbestos fibers present
n = number of non-empty points counted.

The field comparison method, also called the 2-minute method, with the stereobinocular light microscope, is used to quantify a large sample (e.g., 1 ounce) using the microscope at 30-40x. The operator estimates the homogeneity of the mixture and estimates the percentage of each individual fibrous component.

The disadvantages associated with PLM include:

- Asbestos content determination is usually done by visual estimate (field comparison) or point counting, and is thus qualitative; concentration is expressed as the ratio of asbestos to non-asbestos particles or percent by area.
- Small fiber identification is difficult because certain optical properties (birefringence and the angle of extinction) are hard to determine in small fibers.
- The thinnest fibers that can be observed are approximately 0.4 micrometers in diameter; fibers this small, though observable, cannot usually be identified for mineral type.

- Highly skilled analysts are required, particularly in view of the subjective nature of the determinations.

- The detection limit is 1 area percent. Samples may still contain asbestos in quantities below the PLM detection limit.

- A precise procedure for sample preparation has not been developed. Therefore, PLM suffers from the variation introduced during sample grinding and preparation. It is very difficult to standardize the preparation of bulk samples, especially soil samples.

Using PLM to identify asbestos in soils can be difficult because soils are subjected to erosion and weathering; asbestos bundles become separated and broken into smaller, possibly sub-optical, sizes much more quickly than fiber bundles in relatively undisturbed insulating materials. Asbestos fibers may also be dispersed by wind and by seasonal flooding. Therefore, a sizeable fraction of the asbestos fibers in soil could be below optical resolution. On the other hand, PLM is the only method of measuring asbestos with an EPA approved methodology for sampling and analysis, even though this methodology is specifically for bulk insulation samples. Therefore, it is the one analytical method that can be controlled, to a limited extent, in a quality assurance/quality control plan.

C. Transmission Electron Microscopy

Transmission electron microscopy ("TEM") is the most powerful analytical technique available for measuring asbestos. TEM has been used for air, water, or soil analysis. It is the preferred instrumental technique for measuring asbestos in ambient atmosphere since it incorporates the most powerful combinations of identification methods. TEM analysis uses electron microscopy, at magnifications of 10,000 to 50,000 times, to detect asbestos structures as thin as 0.2 nanometers in diameter. This is sufficient to identify the thinnest asbestos fibrils under most circumstances. Besides the transmission electron microscope, which allows the operator to locate very small fibers, this technique can also utilize two mineral identification tools. These are Selected Area Electron Diffraction ("SAED") and Energy Dispersive X-ray Analyzer ("EDXA"). Using these tools, the operator can identify the mineral type from a single point on the specimen.

The disadvantages associated with TEM include the following:

- No widely accepted TEM method is available for the analysis of asbestos in soils, making it difficult to correlate interlaboratory data. Sample preparation methods are not standard among workers, making the comparison of results between sites or laboratories

very difficult or meaningless.

- Analysis requires a minimum of 6 to 8 hours over 2 to 3 days. Highly skilled analysts are required and large differences in results can occur due to operator variance. TEM analysis is extremely expensive, over 20 times the per sample cost of optical methods.

- TEM analysis is performed on a much smaller sample than PLM so that obtaining homogeneity during sample preparation is more critical.

- Typically, total structures are counted. Sample preparation (i.e., grinding) destroys the structure size distribution.

TEM sample preparation alters the soil matrix. This is significant because the sample is dispersed into very fine particles before it is put onto a filter for analysis. Since asbestos occurs in clusters and bundles as well as fibers, the sample preparation process (in the case of soil) can destroy the structure of those forms and produce a very large number of individual fibers of small size. Although total fibers are counted as part of the TEM analysis, these results must be converted to weight percent, using data on length, width, and density. This conversion to mass is necessary due to the sample preparation grinding process, which artificially increases the fiber count. How the TEM weight percent compares with air emissions and risk tables has not been standardized by government or industry. Therefore, interpretation of soil data results relative to air samples and/or risk charts is very difficult, at best.

II. Problems with Using Asbestos Data in Quantifying Risk

Although the role of asbestos as a cause of cancer is clear, the ways in which fibers cause disease are not well understood, and this has complicated efforts to measure asbestos successfully. Asbestos researchers have not agreed upon which attributes of asbestos are important to measure to assess risk, including size and shape of individual fibers, number of fibers, total mass of fibers, inclusion of asbestos bundles, clusters, and matrix debris in the fiber count, and asbestos mineralogical type. For example, most researchers think that longer, thinner asbestos fibers (those longer than 8 micrometers and thinner than 1.25 micrometers) are more carcinogenic, i.e., The "Stanton Hypothesis". However, other researchers question this approach, suggesting that both long and short fibers may be biologically active. In addition to fiber dimension, surface chemistry of the asbestos fibers may play a role in causing disease. Further, there is disagreement whether mineral type is a factor in disease causation. Some would argue that chrysotile asbestos may partially dissolve in weakly acidic environments, facilitating fiber clearance from the lung. However, EPA policy is that all asbestos mineral types are equally carcinogenic.

To compound the problem, analysis of ambient samples for asbestos is much more difficult than occupational or work place samples, because the concentration of asbestos in the environment is typically much lower. It should be noted that there are areas, such as in the New Idria Formation in central California's Diablo Mountains, where environmental levels have equaled work place levels when asbestos bearing soils have been disturbed. Asbestos fibers found in ambient air are typically too short and thin to be detected by conventional microscopes, and may be agglomerated with other particulate matter so that they are masked or hidden. Further, although EPA has attempted to standardize asbestos analytical techniques, differences in sample handling, preparation, instrument capabilities, operator proficiency, and counting procedures make it extremely difficult to compare results from different laboratories. In short, accurate measurement of asbestos is impeded by many factors, greatly complicating any estimates of environmental risk.

JOHNS-MANVILLE COALINGA ASBESTOS MILL AREA OPERABLE UNIT
RESPONSIVENESS SUMMARY
FOR THE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY AND PROPOSED PLAN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY RESPONSE TO COMMENTS ON THE PROPOSED PLAN FOR THE JOHNS-MANVILLE COALINGA ASBESTOS MILL AREA OPERABLE UNIT OF THE JOHNS-MANVILLE COALINGA ASBESTOS MILL SUPERFUND SITE

I. INTRODUCTION

The United States Environmental Protection Agency ("EPA") held a public comment period from May 25, 1990 through June 25, 1990 on EPA's Remedial Investigation/Feasibility Study ("RI/FS") and Proposed Plan for the asbestos contamination at the Johns-Manville Coalinga Asbestos Mill Area operable Unit ("JM Mill Area OU") in Fresno County, California. The purpose of the public comment period was to provide interested parties with the opportunity to comment on the RI/FS and Proposed Plan. The RI/FS, the Proposed Plan and the complete Administrative Record were made available on May 25, 1990 at the Coalinga Public Library, the designated information repository for the JM Mill Site. By May 25, 1990, fact sheets containing EPA's Proposed Plan had been mailed to all interested parties and notification of the public comment period was published in Coalinga and Hanford area newspapers.

Section 113(k)(2)(B)(iv) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requires that EPA respond to significant comments on EPA's Proposed Plan. This responsiveness summary provides a review and summary of significant public comments on the RI/FS and the Proposed Plan. In addition to summarizing significant comments and questions, the Responsiveness Summary presents EPA's responses to those concerns.

II. OVERVIEW OF THE RECORD OF DECISION

EPA's selected remedy is Alternative 5 in the Proposed Plan with minor modifications which are described in Section 10.0 of the Record of Decision ("ROD"). It includes engineering controls designed to minimize the release of asbestos from the JM Mill Area OU into Pine Canyon Creek and institutional controls designed to minimize exposure of persons on or near the mill area to airborne asbestos emissions. The selected remedy includes the following elements: i) grading; ii) cross canyon stream diversion; iii) improvements to the existing sediment trapping dam; iv) revegetation pilot project; v) access restrictions; vi) deed restrictions; and vii) dismantling and disposal of the mill building and associated debris.

Other alternatives fully analyzed in the FS included: 1) no action; 2) road paving, deed restriction and mill dismantling; 3) access restrictions; 4) capping the asbestos in-place with

either a .5 foot or a 2-foot soil covering; 5) removal of the contaminated material to an approved, off-site landfill; and 6) thermal treatment of the contaminated material.

III. SUMMARY OF SIGNIFICANT COMMENTS AND AGENCY RESPONSES

The following section summarizes the major comments and responses received on EPA's Proposed Plan for the Johns-Manville Coalinga Asbestos Mill Area OU. A detailed section of comments and responses can be found in Section IV. If any conflicts or ambiguity appear between the two sections, follow Section IV.

The only comments received on the JM Mill Area OU were sent to EPA by two potentially responsible parties, the Santa Fe Pacific Railroad Corporation (SFPRC) and Marmac Resource Company/Mareco, and by the California Department of Health Services.

Comments By Santa Fe Pacific Railroad Corporation

While SFPRC states that they approve of EPA's preferred alternative, they had several comments concerning what they believe are mistakes in the Proposed Plan Fact Sheet that EPA issued to the public. For example, SFPRC believes that the Ponding Basin is not part of this Superfund site and that the Mill site does not significantly impact the California Aqueduct. They also believe that the Remedial Investigation was not properly summarized in the fact sheet. Because asbestos from the Mill Area was transported to the Ponding Basin, EPA can consider it part of the Superfund site. During heavy flooding, asbestos from the Mill Area has been carried by streams onto the Arroyo Pasajero Alluvial Fan.

SFPRC also claims that the JM Mill Site is not similar to the Atlas Asbestos Site as stated in the Proposed Plan. EPA responds that although the two sites are different in size and impact, they are similar in that both contain asbestos ore and tailings and abandoned mill facilities. The two site are located in adjacent drainage basins about three miles apart.

SFPRC questioned why two sets of soil sampling data were used in the Public Health Evaluation which determines the health risk from the asbestos. One set of data was collected by EPA and the other was collected by SFPRC. EPA notes that both sets of samples were collected and analyzed with EPA approved methods and were checked to ensure quality. The samples were taken from different areas at different times which accounts for some of the discrepancies between the two sets.

SFPRC requested that EPA clarify that stream diversions would minimize the potential for releases of asbestos into local creeks and that actual releases are not currently occurring. EPA acknowledges that releases are not occurring

presently because the last few years have been very dry. EPA's selected remedy will protect local streams in the event of heavy rainfall or seismic activity in the future.

SFPRC also made several comments regarding the watershed modeling done by EPA and by SFPRC. They also commented on the way that EPA measured asbestos in the California Aqueduct. EPA believes that both watershed models are valid.

EPA notes that SFPRC's detailed comments on EPA's soil sampling and watershed modeling are not significant because EPA would select the same remedy based on SFPRC's data alone.

Comments By Marmac Resource Company/Mareco

Marmac's comments concern what they believe are mistakes in the Feasibility Study. Most of these statements are taken from the Site Description and History section of the Feasibility Study. Because the comments are not relevant to selecting a remedy for the site, EPA is not responding to those concerns at this time.

Marmac requested that EPA clarify that metals are not contaminants of concern at the site and that serpentine, not asbestos, was found in the chromite ore that Marmac transported. While EPA can confirm that metals are not contaminants of concern at the site, EPA's analysis of the chromite ore transported by Marmac did show asbestos in the ore.

Marmac prefers Alternative 3 in the Proposed Plan plus grading. EPA believes that Alternative 3 plus grading does not adequately protect human health and the environment.

Comments By The State Of California

The State of California has concurred in the selected remedy and has identified several California laws which it states are applicable or relevant and appropriate. EPA has analyzed the applicability and the relevance and appropriateness of applying these laws to the JM Mill Area OU in its response.

IV. PUBLIC COMMENTS RECEIVED AND AGENCY RESPONSES

This section includes EPA's response to significant public comments on the RI/FS and the Proposed Plan received during the public comment period. The only public comments received were letters from two potentially responsible parties (PRPs) and a letter from the State of California.

The comments responded to herein have been summarized or paraphrased as appropriate.

A. COMMENTS BY SANTA FE PACIFIC RAILROAD CORPORATION ("SFPRC")

A.1 Letter from Charles Robinson of Levine-Fricke, Inc., consultants for SFPRC, dated June 25, 1990:

A.1. Comment: The Proposed Plan implies that the Ponding Basin is part of the Site. The Ponding Basin is not part of the Site. This is confirmed by the specific description of the Site in numerous official documents either signed or approved by EPA. For example, the Administrative Order on Consent signed by EPA on November 16, 1987, contains the following description:

The Site covers approximately 557 acres of land.... The Site is located within the Pine Canyon Creek drainage basin.... The Site is located immediately adjacent to the New Idria Formation and ranges in elevation from 2,800 to 3,000 feet.

SFPRC requests that EPA clarify that the Ponding Basin is not part of the Site.

A.1. Response: CERCLA Section 101(9)(B) defines the term "facility" as "any site or area where a hazardous substance has been deposited, stored, disposed of, or placed or otherwise come to be located..." Contamination from the JM Mill Area OU has been transported via surface streams to the Ponding Basin of the California Aqueduct near Gale Avenue. Therefore, the Ponding Basin can be included as part of the JM Mill Site because contamination from the Mill Area has come to be located in the Ponding Basin. The "site" as defined in the Administrative Order on Consent referred only to the area on which the RI/FS was to be performed by SFPRC. This site definition did not restrict EPA's discretion to address any other areas where contaminant from the JM Mill Site has come to be located as part of that site. It should be noted that EPA is not taking any action in the Ponding Basin at this time and that the Ponding Basin is not part of the operable unit addressed by this ROD.

A.2. Comment: The Proposed Plan implies that the Site has significantly impacted the Ponding Basin. This is not consistent with the findings of the Remedial Investigation, Feasibility Study, and Regional Report which EPA has contributed to, reviewed, and approved. For example, EPA required that SFPRC insert the following statement into the Feasibility Study: (Page 4, Paragraph 4, 3rd sentence) "As previously mentioned, given the widespread occurrence of naturally occurring asbestos in the vicinity, the potential additional health risk from asbestos being transported off-site by wind and water is extremely slight in absolute terms and negligible in comparison to the health risks posed by naturally occurring sources." Thus, EPA has determined that the Site's contribution to the Ponding Basin is, at most, negligible. In addition, EPA should explain in this discussion that the asbestos in the Ponding

Basin originated primarily from natural sources with minor contributions from anthropic sources.

A.2. Response: EPA's Proposed Plan for the JM Mill Area OU states: "During heavy rains, asbestos can be transported from the Mill Site down Pine Canyon Creek and eventually onto the Arroyo Pasajero. During heavy flooding, asbestos-laden water fills the ponding basin and can be released into the California Aqueduct (see discussion on the Ponding Basin on page 7)." The sediment trapping dam below the tailings pile at the JM Mill Site has been breached at least once since 1980. This breach occurred in 1983. EPA agrees that during dry conditions and minor rainfall events, the amount of asbestos transported into Pine Canyon Creek from the JM Mill Area has been minimal.

EPA did not require that SFPRC insert the above-mentioned sentence into the Feasibility Study. The language in this sentence was written by SFPRC and included in a draft FS submitted to EPA as required by the Consent Order. At a meeting between EPA and SFPRC after the draft FS was submitted, EPA and SFPRC agreed to edit the sentence as follows: "As previously mentioned, given the widespread occurrence of naturally occurring asbestos in the vicinity, the ~~potential~~ additional health risk from asbestos currently being transported off-site by wind and water is extremely slight in absolute terms and is negligible in comparison to the health risks posed by naturally occurring sources." This latter sentence is what appears in the final, EPA approved FS.

A.3. Comment: The Proposed Plan states that the Atlas Site is "similar" to the JM Site. This is not true. Although both sites contain asbestos, the Atlas Site is vastly larger than the JM Mill Site, and contains vastly greater quantities of asbestos.

A.3. Response: The JM Mill Site is similar to the Atlas Mine Site in terms of the presence of asbestos ore and asbestos mill tailings at both sites and the presence of an abandoned mill facility on both sites. The sites are located in adjacent drainage basins approximately three miles apart. EPA agrees that the Atlas Site is larger and contains a greater amount of asbestos contamination. The similarities and differences between the two sites are described in the RIs for the sites.

A.4. Comment: The description of the tailings pile in the Proposed Plan should indicate that the concentration of asbestos in the tailings piles (64%) is significantly less than that in the naturally occurring asbestos-containing soils adjacent to the Site (84%). This point is important to understanding a unique characteristic of the Site: the Site is located within an area of very high concentrations of naturally occurring asbestos.

A.4. Response: In the Site Background Section of the Proposed Plan, page 2, paragraph 2, EPA notes that: "The Mill Site is approximately one half mile below a 48 square mile area of serpentine rock (the New Idria Formation) that contains large amounts of naturally occurring asbestos." EPA agrees that the asbestos content of adjacent serpentinite soils is high. However, the results of asbestos analytical techniques are subject to considerable uncertainty and the asbestos concentration of serpentinite soils is highly variable. In addition, EPA's investigation suggests that the tailings piles are approximately three times as erodible as the surrounding natural areas. The evidence concerning the differences in asbestos concentration of the tailings pile and the serpentinite soils in the JM Mill Area are documented in the RI.

A.5. Comment: EPA's revised PHE uses EPA's soil sampling results despite the limited value of this data. EPA's data does not agree with other sources in its reported asbestos content nor is it consistent with SFPRC's approved data. SFPRC's soil sampling data is sufficient for estimating potential risks due to asbestos exposure. Therefore, EPA's data is inappropriate for use or consideration in the PHE for the Johns-Manville Coalinga Asbestos Mill Site. Our letter to EPA dated April 11, 1989, explains our concerns regarding EPA's data. In response to our concerns, EPA's April 28 letter offers two reasons for the use of its own soil sampling data.

The first reason given by EPA was that "[a] significant amount of field work, sampling, and laboratory analyses were completed by EPA prior to SFPRC's involvement in the Remedial Investigation/Feasibility Study process."

This statement distorts the record. EPA first notified SFPRC's predecessor, the Southern Pacific Land Company (SPLC), that SPLC was a potentially responsible party for the Site in a letter dated June 18, 1986. At that time, EPA advised SPLC of EPA's intention to complete the Remedial Investigation/Feasibility Study for the Site. After meeting with EPA, SPLC completed a soil sampling program and provided EPA with a Draft Remedial Investigation report dated November 17, 1986. EPA did not begin its own soil sampling until the summer of 1987, about eight months later. At approximately that same time, SPLC submitted a Soil Sampling and Analyses Plan to EPA, in response to EPA's comments that the Remedial Investigation needed to evaluate the regional occurrence of asbestos. SPLC's additional soil sampling activities were conducted in accordance with the Administrative Order on Consent (Consent Order) executed by EPA and SPLC on November 16, 1987. Thus, EPA's soil sampling program, and subsequent use of that data in the PHE constitutes unnecessary and inappropriate duplication of our sampling efforts.

EPA's second reason for using both sets of data was that all of the data collected by both EPA and SFPRC are "appropriate" for

use in the PHE without providing any justification. In particular, EPA offered no analyses, reasons, or data which refuted the specific, factual SFPRC concerns regarding EPA's data. We have documented our concerns with the methodology and quality of EPA's asbestos analyses on numerous occasions. In lieu of repeating those concerns here, please refer to our letters to EPA dated May 19, 1988; June 10, 1988; August 11, 1988; September 16, 1988; and February 27, 1989. Although EPA's April 28, 1989, letter noted that its soil sampling data had technical problems, EPA did not specifically respond to these letters. Accordingly, EPA's second statement is not supported by the record. Please consider these letters (attached) resubmitted for the record.

Given the problems with EPA's data, and the fact that SFPRC conducted an extensive regional soil sampling program under EPA oversight in accordance with the Consent Order and approved by EPA with no significant problems identified, we continue to maintain that the PHE for the Johns-Manville Coalinga Asbestos Mill Site should be based on SFPRC's data alone.

A.5. Response: EPA's soil sampling for the Atlas Mine Site and the JM Mill Site was performed in 1987 between August 24 and October 9, prior to SPLC's signing of the Consent Order that specified how SPLC would perform the RI/FS for the JM Mill Site. SPLC's draft RI report dated November 17, 1986 had significant technical problems and was not accepted by EPA. SPLC subsequently signed the Consent Order on November 16, 1987.

EPA's PHE uses both EPA soil data and SFPRC soil data in calculating cancer risk values. Both EPA and SFPRC samples were collected and analyzed using an EPA approved sampling and analysis plan. EPA and SFPRC data were validated using EPA approved quality assurance/quality control plans. Discrepancies between the two data sets do not justify discarding either one. EPA has discretion to use any validated data that was produced in the study of the JM Mill Area in the PHE, before or after SFPRC signed the Consent Order to conduct an RI/FS. In this case these data include both EPA and SFPRC data. EPA deliberately separated out cancer risk calculations using EPA and SFPRC data in the PHE, where possible, to address SFPRC concerns that the cancer risk calculations in the PHE using EPA data were not appropriate for the JM Mill Site. Even considering the cancer risk derived from SFPRC data alone, EPA has determined that the selected remedy is appropriate and necessary to protect public health.

SFPRC's detailed comments on EPA's soil sampling and watershed modeling contained in its resubmitted letters are not significant because EPA would select the same remedy based on SFPRC's data alone. Asbestos is a known human carcinogen for which no level of exposure is known to be safe. The asbestos tailings at the Mill Area are more erodible than naturally occurring asbestos outcrops. Significant uncertainty in asbestos

soil sampling, watershed modeling and risk assessment also support EPA's remedy selection. The selected remedy is consistent with standard mining practices and applicable portions of California's Porter-Cologne Act concerning mining wastes.

Nevertheless, EPA notes that EPA's and SFPRC's soil samples were not split samples taken at the same time from the same area, but rather were samples taken from different areas. This, in combination with the difficulties with asbestos analytical techniques, explains some of the discrepancy.

Both EPA's and SFPRC's watershed modeling reports used a range of values for the asbestos content of tailings, mine surfaces and surrounding soils. EPA's watershed model estimated that the Atlas Mine Site contributes between five percent (5%) and thirty six percent (36%) of the asbestos being deposited on the Arroyo Pasajero alluvial fan. EPA's watershed model estimated that the JM Mill Site contributes between two percent (2%) and five percent (5%) of the asbestos being deposited on the Arroyo Pasajero alluvial fan. SFPRC's watershed model estimated that the Atlas Mine Site contributes 1.6% of the asbestos being deposited on the Arroyo Pasajero alluvial fan. SFPRC's watershed model estimates that the JM Mill Site contributes 0.3% of the asbestos being deposited on the Arroyo Pasajero alluvial fan. The PHE used data generated by both models to estimate risk from ingestion from of California Aqueduct water.

A.6. Comment: As explained in the Regional Report and Remedial Investigation, the SFPRC's data suggest separate 95% confidence intervals for the mean asbestos concentrations of materials and soils identified by our geological interpretations found in the region's asbestos source areas. This demonstrates that Remedial Investigation and Regional Report geologic interpretations and analytical results are valid and useful for purposes of representing the region for the PHE.

A.6. Response: EPA agrees and has used these data, where appropriate, in the PHE.

A.7. Comment: The Proposed Plan should make clear that the stream diversion will minimize the potential for release of asbestos into local creeks. As written, the Proposed Plan infers that asbestos is presently being released into local creeks. Although a potential for such a release does exist, there is no evidence that such releases are presently occurring.

A.7. Response: The selected remedy seeks to minimize future releases of asbestos into Pine Canyon Creek in the event of significant rainfall or other disturbance. Although releases of asbestos from the Site into Pine Canyon Creek are not currently occurring because there has been very little rain in this area for at least four years and the creek bed is dry, releases of asbestos have occurred from the JM Mill Area OU in the past. EPA must take into account past, present and future

conditions at the JM Mill Site in its selection of an appropriate remedy.

A.8. Comment: SFPRC questions the validity of many assumptions used in EPA's watershed model. EPA's April 28, 1989, letter noted that, "EPA views both [EPA's and SFPRC's watershed] models as important inputs towards achieving the ultimate goal of a reasonable and cost-effective remedy in the Atlas/Coalinga area...both models were used in evaluating risks from both the Atlas Site and the Johns-Manville Site." As we have stated before, we believe that EPA's watershed model has significant problems. SFPRC discussed these problems at length in our letter to EPA, dated September 16, 1988, to which EPA never responded. This letter is attached for the purpose of resubmitting those comments.

EPA conducted additional modeling and included this modeling in the Atlas Remedial Investigation. This modeling evaluated the sensitivity of EPA's model to variations in asbestos content. These evaluations indicated that this parameter appears to significantly alter EPA's initial modeling results. We do not understand why this modeling has not conclusively demonstrated to EPA the arbitrary and inaccurate nature of the earlier modeling on which the PHE is, in part, based. EPA's April 28 letter defends EPA's watershed model by noting that it is based on conservative assumptions in order to protect health and the environment.

A.8. Response: EPA's position on the validity and usefulness of EPA's and SFPRC'S watershed model results, expressed in its letter of April 28, 1990, has not changed. EPA's sensitivity analysis was designed to measure the sensitivity of the model to changes in the asbestos concentration of the serpentinite soils. The results indicate that, as expected, the model is sensitive to changes in soil asbestos concentrations. The differences in results of EPA's and SFPRC's models are the result of the different input parameters and different mathematical approaches used. The discrepancy between the asbestos concentration in soils, tailings and asbestos ore as measured by EPA and SFPRC can be attributed, in part, to difficulties with asbestos analytical methods (see Appendix 1). Both data sets were fully validated by EPA. EPA concludes in the PHE that: "Considering the the major conceptual and mathematical differences between the two (watershed) models, there is relatively good agreement between them." All models are subject to considerable uncertainty. Given that uncertainty, EPA has determined that the selected remedy is appropriate and necessary to protect public health. Because SFPRC's watershed modeling results are sufficient to justify the remedy selected by EPA, the comments contained in SFPRC's letter are not significant.

A.9. Comment: SFPRC defends SFPRC's watershed modeling results: EPA's April 28 letter also states that many of the

assumptions made in SFPRC's watershed model are subject to considerable uncertainty. As an example, EPA states that SFPRC assumed that "50% of the sediment delivered to the settling basin is derived from channel entrenchment on the alluvial fan." In fact, SFPRC did not make that assumption. As discussed in Chapter 3, Section 4.1, of SFPRC's Regional Report, SFPRC reviewed published data from previous studies by the California Department of Water Resources and the U.S. Bureau of Land Management to estimate the origin of sediments being deposited in the settling basin area. These data indicate that 37% to 62% of the sediments deposited in the Arroyo Pasajero settling basin originate from streambed and streambank erosion of the entrenched Los Gatos Creek and Arroyo Pasajero channel. SFPRC used that data to calculate a range of feasible estimates in its watershed model.

SFPRC's watershed model consistently used conservative and defendable input values to maximize the potential asbestos erosion from the study area. In contrast to SFPRC's watershed model, we have stated previously, we believe that EPA's watershed model is not well documented and uses many technically indefensible input parameters.

A.9. Response: EPA has reviewed and approved SFPRC's watershed modeling results. As noted above, EPA does not agree with SFPRC's assessment of EPA's watershed modeling results. The published data referred to in the above comment is subject to the same uncertainty as all other asbestos data (see Appendix 1 of the ROD for a more detailed discussion).

A.10. Comment: SFPRC does not completely understand nor agree with EPA's methodology for calculating asbestos concentrations in the Aqueduct. For at least two parameters, EPA's assumptions are not accurate. First, EPA's model assumed that the natural serpentine soils contain 1% asbestos, whereas SFPRC's laboratories actually measured asbestos concentrations of 85% in samples of these soils. (See Comment 4-1 in our September 16, 1988, letter to EPA.) In addition, EPA used rainfall data which substantially underestimated the precipitation intensity duration expected in the vicinity of the Site. (See Comment 4.2 in our letter to EPA dated September 16, 1988.)

Consequently, EPA's original model assumptions underestimate the amount of asbestos potentially eroded from the area of the Atlas and Coalinga Sites. This effect is demonstrated in Table 6-8 of Draft PHE, which presents predicted asbestos concentrations in the California Aqueduct, based on EPA's and SFPRC's watershed models. EPA's model estimates that serpentine soils contribute one million fibers per liter (MFL), whereas our model estimates that this source contributes 38.2 MFL to the Aqueduct. Similarly, EPA's model estimates that the entire subbasin contributes 12 MFL to the Aqueduct, whereas our model estimates that the subbasin contributes 39 MFL.

A.10. Response: In addition to problems with the accuracy and precision of asbestos analytical methods for measuring soils, the discrepancy between EPA's and SFPRC's results for asbestos concentration in the serpentinite soils can be explained in part as a result of sample variation. As noted in Response A.9, above, EPA has determined that for the purposes of the PHE, there is relatively good agreement between the two watershed models, despite the major conceptual and mathematical differences between them.

A.11. Comment: SFPRC disagrees with the Proposed Plan's summary of the Remedial Investigation results. The first sentence of the second paragraph of the Proposed Plan's "Investigation Results" section on page 3 reads as though that statement is a fact: "High winds and driving vehicles over the area can cause the asbestos to be released into the air." However, the statement is not based upon scientific or factual data and is not a conclusion reached by SFPRC in the Remedial Investigation/Feasibility Study. Instead, this is a speculative conclusion drawn by EPA. The statement should be clarified to indicate that it is an estimate made by EPA, not fact determined through the Remedial Investigation/Feasibility Study. EPA's description of the "protective crust" on the tailings pile should indicate that EPA has estimated that winds of sufficient force to cause airborne emissions of asbestos occur for only two hours per year.

A.11. Response: The comment is confusing because it indicates that the quoted statement contains an estimate, although it plainly does not. Air dispersion modeling by the California Department of Health Services found that disturbances of soil by motorized vehicles and winds that exceed the threshold velocity can cause airborne asbestos emissions. The Proposed Plan does not specify that any particular period of time or amount of asbestos may be released. The RI documents an estimate of two hours per year of wind sufficient to cause visible emissions. In addition, vehicles do have access to the JM Mill Site. Therefore, the statement in the Proposed Plan is accurate.

A.12. Comment: Thermal destruction does not "chemically fix" asbestos materials as indicated. A better description of this process would be that thermal destruction "destroys" or "fuses" the asbestos. In the chart on page 4 of the Proposed Plan, the name for Alternative 9 should be "Thermal Destruction" rather than "Vitrification."

A.12. Response: The ROD describes Alternative 9 as "Soil Fusion Using Thermal Treatment". Alternative 9 would result in the fusion of the asbestos tailings into a glass like substance.

A.13. Comment: SFPRC supports EPA's selection of Alternative 5 as the preferred remedy and recommends its implementation

without delay. SFPRC finds that the Proposed Plan contains a number of inaccuracies which SFPRC recommends that EPA correct. Attached to this letter is a copy of the Proposed Plan containing SFPRC's handwritten suggested changes to implement these recommendations.

A.13. Response: The substance of SFPRC's comments on the Proposed Plan are responded to in this document.

B. COMMENTS BY MARMAC RESOURCE COMPANY/MARECO ("MARMAC")

B.1 Letter from Carla J. Feldman of Shield & Smith, counsel for Marmac, dated June 25, 1990.

B.1. Comment: The FS, at Chapter 1, page 2, section 1.3 states that Marmac transported "asbestos-containing chromite ore" to the Site. It should be noted that chromite ore does not contain asbestos, rather, serpentine is typically found in conjunction with chromite ore.

B.1. Response: The chromite ore mined in the New Idria Formation contains significant amounts of chrysotile asbestos because the serpentine matrix in which the chromite is found contains high concentrations of that type of asbestos. EPA analyzed samples of chromite ore transported from the JM Mill Site to Marmac's warehouse in the City of Coalinga and confirmed the presence of asbestos.

B.2. Comment: Marmac cites a number of statements in the FS which they believe are inaccurate. These statements are summarized as follows:

1) Marmac is believed to have excavated two retention ponds in the eastern fork tailings pile to trap surface water for use in Marmac's milling operation.

2) Marmac discharged chromite tailings as a water slurry to a series of additional settling ponds located on the southern portion of the Site. After the solids settled out of the water, the water was reused for processing more ore and the ponds eventually became filled with chromite mill tailings.

3) Marmac is believed to have conducted milling operations at the Site for about two years.

4) Chromite ore was reportedly mined from a 5-acre portion of the Site known as the Railroad Mine.

B.2. Response: None of the statements which Marmac disputes are relevant to EPA's remedy selection. They appear in the Site Description and History Section of the FS. Because these statements are only potentially relevant to future disputes concerning liability, EPA will not respond to Marmac's objections to these statements at this time.

B.3. Comment: Marmac requests confirmation in writing that asbestos is the only chemical of concern at the JM Mill Site, that metal concentrations are within the range of naturally occurring soil concentrations and that the presence of metals will not be considered a human health concern at the JM Mill Site.

B.3. Response: EPA has determined that metals are not a contaminant of concern at the JM Mill Site and that the metals present were within the range of naturally occurring soil concentrations. The PHE, which is appended to the RI, provides a discussion of metals concentrations and their effect on human health and the environment.

B.4. Comment: Marmac comments that Alternative 3, with the addition of grading to stabilize the tailings pile, would be as protective as the preferred alternative and would cost less. Therefore a modified Alternative 3 should be considered as the selected remedy.

B.4. Response: EPA has determined that the selected remedy, which utilizes a combination of stream diversions, sediment trapping dams and grading, is the most cost effective way to minimize the release of asbestos downstream of the JM Mill Area via Pine Canyon Creek. Alternative 3 plus grading would not mitigate the release of asbestos into Pine Canyon Creek because the existing sediment trapping dam could be breached during a heavy flood, leading to the transport of significant amounts of asbestos. The fact that catastrophic floods do not occur often in this area is not a rationale for ignoring the possibility of such flooding. The existing sediment trapping dam has been breached at least once since 1980 and very serious flooding occurred in 1969. Therefore, Alternative 3 plus grading is not protective of human health for people living downstream of the JM Mill Area.

C. COMMENTS OF THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES ("DOHS").

C.1 Letter from Anthony J. Landis, Chief of the Site Mitigation Unit, dated September 7, 1990.

C.1. Comment: DOHS stated that it concurs in the selected remedy, and that the remedy contains "appropriate management components to reduce asbestos releases from this site due to erosion and man-made air emissions."

C.1. Response: EPA notes that the comment demonstrates state acceptance of the remedy.

C.2. Comment: DOHS stated that several state laws are considered by DOHS to be ARARS, including:

California Air Resources Act
Health and Safety Code, Div. 26
Section 39000 et seq.
17 CCR, Part 3, Chapter 1

This state act has identified asbestos as a toxic air contaminant but has not established a state-wide ambient standard. However, the act has established an ambient air quality standard for particulate matter which is enforced by the Fresno County Air Pollution Control District. While it is understood that EPA's permit exemption applies, the substantive requirements of this ambient requirement should be met by cited federal ARARs.

C.2. Response: The Fresno County Air Pollution Control District has adopted PM 10 as a particulate matter standard for Fresno County, pursuant to delegated authority under the California Air Resources Act, Health and Safety Code Section 39000 et. seq. This standard is an ARAR for the Atlas Mine Area Operable Unit. As noted in the DOHS comment, this standard will be met by the same measures which will ensure that the applicable federal NESHAPs for asbestos are met (i.e,, misting measures during construction and access restrictions and other controls after construction). The state's identification of asbestos as a toxic contaminant is not an ARAR because, as recognized by DOHS, the state has not promulgated a standard or level of control for this contaminant. EPA has determined that compliance with the federal asbestos NESHAPs found at 40 C.F.R. § 61.147 and 40 C.F.R. § 61.153 will provide adequate protection of public health and the environment.

C.3. Comment: In identifying ARARs to EPA, DOHS also cited and stated the following:

Porter Cologne Water Quality Act
23 CCR, Chapter 3: Subchapter 15
Article 7 - Mining Waste Management
Section 2570-2574

This state act contains regulations establishing waste and site classifications and waste management requirements for all mining waste. While included exemptions for liners and leachate collection appear appropriate for this site, other construction standards which require accommodation of 10-year, 24-hour storm runoff controls in design criteria for drainage and diversion structures as well as 100 year peak stream flow protection for all waste piles are applicable and relevant and appropriate for remedial action at these sites.

C.3. Response: For existing units such as the JM Mill Area, a determination of what requirements of Article 7 of the 23 CCR should be complied with must be made on a case by case basis. See Title 23, Section 2570. EPA agrees that the construction

standard which requires accommodation of a 100 year peak stream flow, found at Title 23, Section 2572(b), is an ARAR for this operable unit. EPA also agrees that the requirement of construction standards which require accommodation of storm runoff controls in design criteria for drainage and diversion structures are ARAR. However, after reviewing Article 7 and the other Sections of Title 23 referenced therein, EPA has determined that the correct ARAR requires that the construction standards incorporate storm runoff controls designed to control a 25-year, 24-hour storm event, not a 10-year, 24-hour storm event. This is because the Atlas Mine Area Operable Unit is classified as a Group A mining waste, not a Group B mining waste. See Title 23, Section 2571(b)(1) and Section 2572(h)(1); see also, Title 22, Section 66300 and Section 66310. Therefore, EPA identified as an ARAR Title 23, Section 2572(h)(1)(A) and Section 2572(h)(3). This latter Section incorporates by reference Title 23, Section 2546(d) and (e), so the requirements of these two subsections are also ARAR. They deal with measures required to ensure the adequacy of the precipitation and drainage control systems.

C.4. Comment: In identifying ARARs to the EPA, DOHS also cited and stated the following:

> California Hazardous Waste Control Laws
> Health & Safety Code, Div. 20, Chapter 6.5
> Section 25220-25241 et seq. and 22 CCR, Div. 4,
> Chapter 30, Section 66001 et seq.
>
> These laws provide minimum standards for the determination and management of hazardous waste. Most proposed actions on site will meet the standards of these laws or will be exempt. One aspect which continues to be applicable to and recommended for these sites is the deed restriction and land use constraints for permitted facilities. At a minimum, the 10 acres of privately held land at the Atlas site and the entire Coalinga Mill site should be deed restricted as detailed in the Health & Safety Code. Additionally, the SARA amendments recognize the need for similar institutional controls on federal lands. Therefore, it is further recommended that the public lands with asbestos containing soils and waste piles be deed restricted also.

C.4. Response: EPA agrees that the substantive portions of California Health and Safety Code Section 25232 are an ARAR for this operable unit. Any requirements related to notice, hearing and other procedural mechanisms for implementing the deed restrictions do not fall within the the definition of an ARAR; however, the actual substantive restrictions contained in Section 25232(a)(1) and (2) are an ARAR. EPA has determined that all of the private property at this operable unit should be deed restricted to prohibit the uses described in the California Health and Safety Code Section 25232(a)(1) and (2). EPA shall determine the appropriate

manner for implementation of this requirement during the enforcement and implementation process for the remedial action.

C.5 Comment: In identifying ARARs to EPA, DOHS also cited and stated the following:

> California Drinking Water and Toxic Enforcement Ac
> Health and Safety Code, Div. 20, Chapter 6.6
> Section 25249.5 et seq
>
> This act sets prohibitions on contaminated drinking water with specific carcinogens and reproductive toxins. Asbestos has been identified under this act as a carcinogen. While insufficient design detail exists at this time to determine if the discharge prohibitions of this law are applicable, the notice and warning requirements are relevant. This notice and warning requirement appears to be met by EPA's public participation requirements and application of requirements listed in 40 C.F.R. 61.156.

C.5. Response: The notice and warning requirements of this law would not be an ARAR because they are not substantive standards or levels of control. See CERCLA Section 121(d), 96 U.S.C. § 9621(d). Furthermore, these requirements only apply to a "person in the course of doing business" who knowingly and intentionally exposes an individual to a covered chemical. CH&S Code, § 25249.6. The operable unit is an abandoned mill. No business is or will be operated there; therefore, this law does not apply.

Furthermore, the exemption in CH&S Code § 25249.10(c) would be applicable to any releases expected to occur from this operable unit.

While DOHS states that insufficient detail exits to determine whether the waste discharge prohibition in Health and Safety Code Chapter 6.6 apply, in fact this requirement would not apply, for the reason that the prohibition only applies to "people in the course of doing business." See CH&S Code § 25249.5. As explained above, no one is or will be doing business at this abandoned mill site.

EPA has also determined that no part of this law is relevant and appropriate at this operable unit.