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Superfund Record of Decision:

Silver Mountain Mine, WA

50272-101

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16. Abstract (Limit: 200 words)

The five-acre Silver Mountain Mine site is an abandoned mine dump in Okanogan County, north-central Washington. Land in the site vicinity is used primarily for cattle grazing, and the nearest well, two miles away, is used for cattle watering and irrigation. The nearest residence is three miles south of the site. Operations at the mine were initiated in 1902 to extract silver, gold, and copper from soil and ore. From 1980 to 1981, a cyanide leach heap of previously mined material was constructed in an attempt to extract (leach out) silver and gold. The heap consisted of 5,300 tons of ore on top of a 20 ml plastic liner. About 4,400 pounds of sodium cyanide was mixed with water and sprayed on the top of the heap. The cyanide-laden effluent was then collected in a leachate pond at the base of the heap. The heap leaching operation was abandoned in late 1981 without cleanup of contaminated material. In addition, approximately 5,200 tons of unprocessed mixed material (mine dump) lie to the west of the leach heap. In 1982, the State took action to treat the cyanide at the site using sodium hypochlorite to partially neutralize the leachate pond and heap. In 1985, the State conducted a site stabilization effort, which included removal of liquids from the leachate pond and installation of a 33 ml plastic cover over the heap and pond. Empty cyanide drums were also removed, and a fence was installed. The primary contaminants of concern affecting the soil and mined material in the leach heap, mine dump, mine (Continued on next page)

17. Document Analysis a. Descriptors
Record of Decision - Silver Mountain Mine, WA
First Remedial Action - Final
Contaminated Media: soil, mined material
Key Contaminants: metals (arsenic), other inorganics (cyanide)

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5. Abstract (Continued)

drainage area, and bedrock are metals including arsenic (naturally occurring) and other inorganics including cyanide. Ground water beneath the site contains relatively high levels of dissolved anions and cations as well as metals and cyanide associated with the mine dump material, however, low ground water quality and quantity make it an unlikely drinking water source and will not be addressed by this remedial action.

The selected remedial action for this site includes consolidating all contaminated soil and mine dump material with the leach heap, followed by grading and contouring the consolidated 5,740 cubic yards of contaminated materials; capping the heap and consolidated materials with a soil/clay cap; plugging the mine entrance and removing a mine drainage pipe that supplies the animal water supply tank and installing a new well for an alternate animal water supply; implementing institutional controls including deed restrictions; and ground water monitoring. The estimated present worth cost for the remedial action is $635,600, which includes an annual O&M cost of $39,650 for 30 years.

DECLARATION

for the Silver Mountain Mine
Superfund Site

RECORD OF DECISION

SITE NAME AND LOCATION

Silver Mountain Mine
Okanogan County, Washington

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Silver Mountain Mine site, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record for this site. The attached index identifies the items that comprise the Administrative Record upon which the selection of remedial action is based.

The State of Washington has verbally concurred on the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

SELECTED REMEDY DESCRIPTION

This is the first and final Record of Decision, because the entire site is being handled as a single operable unit. The Silver Mountain site is an abandoned mine dump where a heap leaching operation left cyanide and arsenic contamination. The Washington Department of Ecology stabilized the site in 1985, treating the immediate threat of cyanide in the leach heap. The selected remedy will provide long-term environmental protection by:

- consolidating and grading approximately 5740 cubic yards of contaminated materials;
- covering the materials with a soil/clay cap;
- fencing the site and sealing the entrance to the mine;
- disconnecting the mine drainage pipe from the existing stock tank and installing a new well in the Horse Springs Coulee aquifer to provide an alternate water supply for the cattle;
- placing a deed restriction to protect the cap; and
- monitoring the groundwater to assure that it does not become contaminated. If groundwater analyses indicate contamination at a concentration in excess of the U.S. Environmental Protection Agency health-based levels, a contingent groundwater treatment program will be implemented. Notice will be provided to the community of the groundwater sampling and results and any potential contamination.

DECLARATION

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. An early treatment action was conducted at this site. This final remedy, in conjunction with the early treatment action, satisfies the statutory preference for treatment. However, because additional treatment of the wastes at this site was not found to be practicable, this final remedy alone does not satisfy the statutory preference for treatment as a principal element of the remedy. The level of risk remaining at the site and the existing state of technology rendered treatment not feasible for this site.

As mining wastes, the wastes at this site are categorically exempt from classification as hazardous wastes under the Resource Conservation and Recovery Act (RCRA), pursuant to 40 CFR 261.4(b)(7); therefore, the RCRA Land Disposal Restrictions do not apply.

Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

3/27/96

Date

Thomas P. Dunne
Acting Regional Administrator
U.S. Environmental Protection Agency
Region 10

DECISION SUMMARY

for the Silver Mountain Mine
Superfund Site

RECORD OF DECISION

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I. SITE DESCRIPTION

Name and Location

The Silver Mountain Mine site is located in Okanogan County, north-central Washington (southwest quarter of Section 34, T38N, R26E). The site is six air miles northwest of the town of Tonasket (population 1055) and lies in a north-south running valley known as Horse Springs Coulee (see Figure 1).

Description

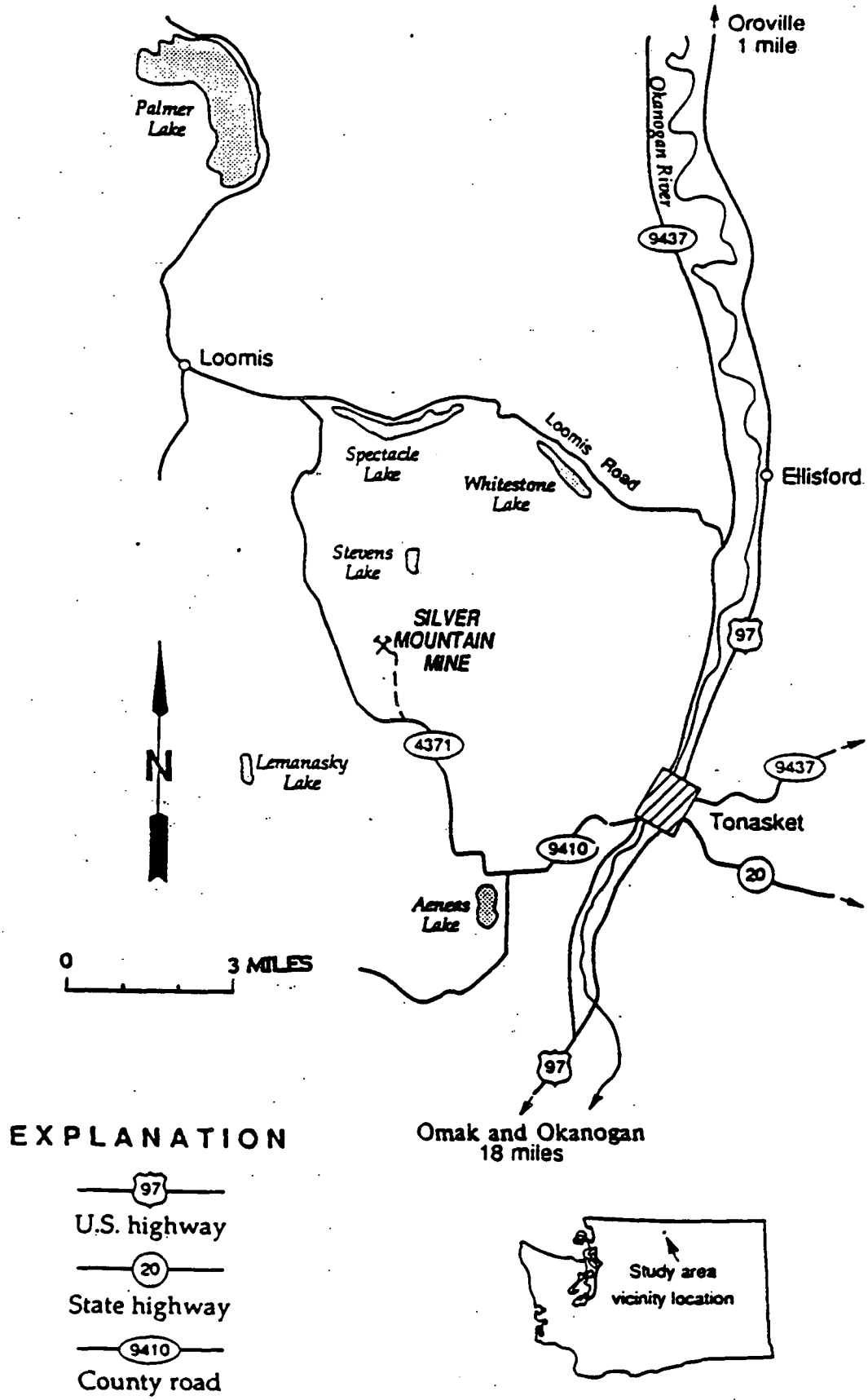
The Silver Mountain Mine site consists of five acres. The area surrounding the site is semi-arid with scrub vegetation and is used primarily for cattle grazing. Sagebrush and bunchgrass characterize the area at and around the site. Typical wildlife in the area include deer, coyote, field mice, snakes, and various birds, including raptors. There is evidence that marmots are also using the site. The Remedial Investigation (RI) report includes a list of the species of concern.

From county road 9410, an unpaved access road leads 1.5 miles to the site, part of which is surrounded by a barbed-wire fence. The nearest residence is a single family dwelling on a farm three miles south of the site. At this location a domestic well (sampled during the Remedial Investigation) serves the residence, and a larger well supplies water for irrigation. The nearest well to the site is approximately two miles from the site and is used for cattle watering and irrigation.

The main features of interest at the site are a heap of mined material ("leach heap") and a trench remaining from an abandoned cyanide heap leaching operation ("leachate pond"). Both the heap and the pond are presently covered with a scrim-reinforced hypalon liner (the "cover"). Directly west of the leach heap is a larger pile of unprocessed mined material (the "mine dump").

The foundations of a former mill building are about 250 feet southwest of the heap. A mine entrance is located approximately 200 feet west of the heap, and water from saturated mine workings is piped from within the portal to a cattle watering trough outside the fenced area. Approximately 75 feet south of the heap was a shallow well, now sealed and abandoned. A small freshwater seep northwest of the heap creates a small shallow pool of standing water.

Figure 1. Site Location Map



II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

History

Historical records for this site are sparse. Silver Mountain Mine was originally opened as the Silver Star in 1902 by the Silver Star Mining Corporation, Tonasket, Washington. Silver, gold, and copper were all extracted from the mine, which went through several changes in ownership before the Silver Mountain Mining Company of Tacoma, Washington, acquired the mineral rights to the property in 1951. By 1956, the mine workings totalled 2000 feet. A 400-ton-per-day capacity mill was constructed on the site in 1952 and dismantled by 1977; observations made in the course of the RI at this site indicate that little if any ore was ever processed at the mill.

In 1979, the Silver Mountain Mining Company, Inc., changed its name to Lead Point Consolidated Mines Company. In February 1980, Lead Point Consolidated Mines leased the mineral rights to a limited partnership of J. Wayne Tatman and G. Patrick Morris, or J.W.T. and G.P.M., Ltd., who operated the property as Precious Metals Extractions, Ltd. (PME). In 1985, both Lead Point Consolidated Mines and PME were owned in partnership by J. Wayne Tatman and G. Patrick Morris.

From 1980 to 1981, PME constructed and operated a cyanide leach heap of previously mined material in an attempt to extract silver and gold. The heap consisted of about 5300 tons of ore in a 100' x 105' x 14' pile on top of a 20 ml plastic liner. About 4400 pounds of sodium cyanide was mixed with water and sprayed on the top of the heap. The cyanide-laden effluent was then collected in a leachate pond at the base of the heap. The leach heap operation was abandoned in late 1981 without cleanup of contaminated material.

In June 1981, the owner of the surface rights to the property informed Okanogan County Health Department officials of the heap leaching operation. The Health Department collected samples from the site, and the Washington Department of Ecology (Ecology) also investigated the site. In 1982, Ecology took an early action to treat the cyanide at the site by using sodium hypochlorite to partially neutralize the leachate pond and heap. EPA conducted a Preliminary Assessment and Site Inspection in 1984; the site was added to the National Priorities List the same year. In 1985, Ecology conducted a site stabilization effort which included removal of liquids from the leachate pond and installation of a 33 ml plastic cover over the heap and pond to reduce infiltration. Empty cyanide drums were also removed, a fence was installed, and the site was posted. The U.S. Bureau of Mines, under an

Interagency Agreement with EPA, performed a Remedial Investigation/Feasibility Study (RI/FS) at the site in 1988 and 1989.

Enforcement Activities

No enforcement actions have been taken thus far. Special notice letters were issued to the identified Potentially Responsible Parties (PRPs): James E. Brosseau; Norman A. Lamb; M. Blair Ogden; G. Patrick Morris; J. Wayne Tatman, who cannot be located and apparently has left the country; and James McDaniel, the owner of the surface rights to the site. The Special Notice letters informed the PRPs of the need for an RI/FS at this site and sought their participation. All of the recipients of the Special Notice letters declined to participate in the RI/FS.

III. COMMUNITY RELATIONS HISTORY

The CERCLA requirements (as amended by SARA) for public participation include releasing the Remedial Investigation and Feasibility Study Reports and the proposed plan to the public. EPA did this in January 1990 by placing both of the documents in the information repositories and mailing copies of the proposed plan to individuals on the mailing list. EPA published a notice of the release of the RI/FS and proposed plan in the North Okanogan County Gazette Tribune on January 25, 1990 and the Wenatchee World on January 28, 1990. Notice of the public comment period and the public meeting discussing the proposed plan were both included in the newspaper notices. The public meeting was cancelled due to severe weather conditions. Local newspapers were notified and signs were posted at the meeting hall to notify the public of the cancelled meeting. Newpaper notices indicating that comments were still desired from the public were published in the Wenatchee World on February 11, 1990 and the Gazette Tribune on February 15, 1990. EPA received comments, which are summarized in the Responsiveness Summary portion of this document.

To date, the following community relations activities have been conducted by EPA at the Silver Mountain Mine site:

- September 1987 - EPA's contractor, Woodward-Clyde Consultants, interviewed local residents and officials during preparation of the Community Relations Plan.
- December 1987 - Community Relations Plan was published.
- October 12, 1988 - EPA distributed a fact sheet announcing the startup of the Remedial Investigation.

- March 1989 - information repository established at Okanogan County Courthouse.

- April 28, 1989 - EPA distributed a second fact sheet explaining the RI work being conducted at the site. The fact sheet was in response to inquiries from the public to Bureau of Mines personnel working at the site.

- January 25, 1990 - A public notice in the Gazette Tribune described the availability of the proposed plan and the RI/FS, and announced the dates of the public meeting and public comment period.

- January 26, 1990 - EPA released the proposed plan fact sheet, which explains the results of the RI/FS and EPA's preferred plan, to persons on the mailing list for public comment. The fact sheet announced a public meeting for February 8, 1990, and gave the dates of the public comment period.

- January 28, 1990 - A public notice in the Wenatchee World described the availability of the proposed plan and the RI/FS, and announced the dates of the public meeting and public comment period.

- January 29-February 28, 1990 - Public comment period for proposed plan and RI/FS.

- February 8, 1990 - Public meeting in Okanogan scheduled, but cancelled due to snow.

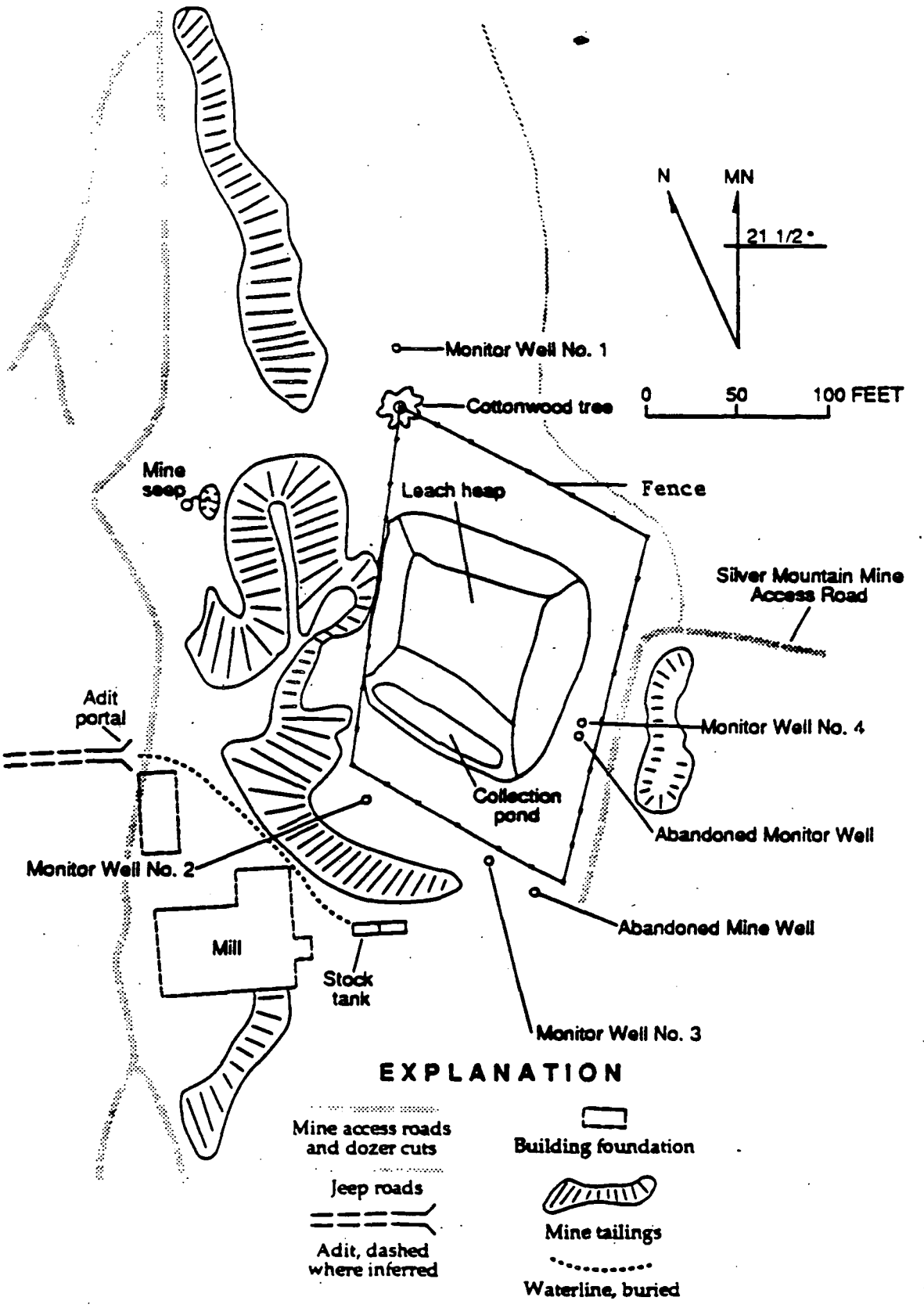
- February 11 and 15, 1990 - Newspapers published notices indicating that comments were still desired from the public, and that EPA would reschedule the public meeting if requested. No requests were received.

- March 1990 - Responsiveness Summary prepared.

IV. SCOPE AND ROLE OF RESPONSE ACTION

Some CERCLA sites are separated into distinct "operable units," such as the groundwater unit and the soils unit, in order to most efficiently remediate the contamination and reduce exposures. The Silver Mountain Mine site is not separated into operable units; the entire site was addressed in the early actions at this site or in this Record of Decision.

Figure 2. Detailed Features of the Silver Mountain Mine Site



V. SITE CHARACTERISTICS

Leach Heap

The leach heap (see Figure 2) is approximately 180 feet by 140 feet by 14 feet high. It contains about 5300 tons of soils and rock taken from the mine. The contaminants of concern in the heap are arsenic and cyanide. The arsenic is naturally occurring, being an element common to hydrothermal mineral deposits in the northwestern United States. In order to determine the mobility of the arsenic, a petrographic analysis was done. This analysis determined that the arsenic is predominantly in the forms of arsenopyrite and arsenic-bearing pyrite, which are stable (relatively immobile) compounds. However, over time, the sulphur in arsenopyrite and pyrite can be oxidized, allowing the arsenic to become more mobile in the environment.

Cyanide in the heap is a result of the leaching operations conducted in 1980 and 1981. Most of the cyanide used has been removed during the original operations, through natural degradation, or during treatment operations carried out by the Washington Department of Ecology. Concentrations of total cyanide remaining in the heap range up to 173 mg/kg. Approximately 10% of the cyanide in the heap is in the weak acid dissociable form, meaning it is readily soluble. The remainder is less mobile, although it could become more mobile under weathering conditions.

Mine Dump

Approximately 5200 tons of "mine dump" material was placed in four piles on the site (see Figure 2). This is rock and soil that was excavated during mining operations but was never processed. About 40% of the mine dump material was mineralized by natural hydrothermal solutions and contains elevated concentrations of arsenic ranging up to 1080 mg/kg. The remaining 60% is similar to the overburden of a surface mine. The form and mobility of the arsenic in the mine dump material is the same as that of the arsenic in the leach heap.

Soil

Soil around the site was sampled to determine the extent of effects from mining or leaching operations. Soil samples were analyzed for the same inorganic parameters as heap and mine dump materials. With the exception of arsenic, the soil samples beneath the pond liner were found to have concentrations of major and minor constituents similar to those found in the heap and mine dump. Concentrations of arsenic were appreciably lower, with a maximum arsenic concentration of 274 mg/kg beneath the pond liner.

Concentrations of several trace elements in soils beneath the liner were also less than those in the heap and dump, especially zinc, copper, and lead. One sample, however, showed very high values, indicating the presence of some heap-type material, as well as leakage of cyanide (101 mg/kg) beneath the pond liner.

Nearby soils samples were also similar in major and minor elemental composition to the leach heap, with the exception of appreciably lower levels of arsenic, sodium, and several trace elements. Cyanide was not found in soil samples. The two background samples differed in most constituents from both the heap material and the nearby soil samples; all trace elements except barium occurred at lower levels.

Soil samples were also analyzed for organic chemicals. However, none of the field samples had results appreciably different from the blank samples, indicating that past operations have not resulted in organic contamination at the site.

Groundwater

The shallow aquifer under the site ranges from a few inches thick to 31 feet thick, and groundwater velocity is estimated to be 1.3 feet per year. Due to its contact with mineralized bedrock or mine dump material, groundwater contains relatively high concentrations of dissolved anions and cations (chloride, sulfate, calcium, and magnesium) as well as metals, such as arsenic, antimony, copper, iron, silver, and zinc. The low quantity and relative quality of the groundwater make it an unlikely source of drinking water. Cyanide was detected under the heap in concentrations ranging from 31 to 281 ug/l.

The shallow aquifer under the site is thought to join the main part of the Horse Springs Coulee aquifer downgradient of the site. A domestic well and two irrigation wells in the Horse Springs Coulee aquifer and downgradient of the site were sampled and no elevated levels of contaminants were found.

Surface Water

Surface water at the site consists of a small seep with minimal flow and mine drainage which is piped to a stock watering tank (see Figure 2). Surface water does not travel from onsite to offsite streams, lakes, or other open water. Arsenic is the major contaminant found in surface water onsite. Dissolved arsenic concentration in the stock tank was 91 ug/l, the highest of any water sample taken during the field investigation.

Migration Pathways

Contamination is believed to originate from four main sources: the leach heap, mine dump, mine drainage, and bedrock. Leaching, weathering, erosion, infiltration and other processes and mechanisms have intermixed contamination from man-made and natural sources, and transported it to other media. The potential exposure pathways are through groundwater, air, surface water and soil contact.

The potential for airborne migration of arsenic or cyanide is minimal. The heap is presently covered with a 33-mil hypalon liner. Should the liner fail, the top layer of the heap is so course that very little contaminated soil would blow from the heap, as estimated by worst case modelling.

Likewise, the potential for transport of contaminants from the site via surface water is minimal. The topography at the site is relatively flat and there is no connection with surface water bodies in the area. The closest surface water is approximately two miles from the site.

The main potential pathway of off-site contaminant migration identified for this site is the regional groundwater system (the Horse Springs Coulee aquifer). As stated above, cyanide and arsenic were detected in the shallow aquifer under the site during the remedial investigation. The quantity of water flowing through the shallow aquifer is very low (with an estimated specific discharge of 0.1 ft/yr), and it currently is not used as a source of drinking water, rather it connects with the regional aquifer downgradient of the site. Groundwater sampling will continue to confirm whether elevated concentrations of contaminants from the site are affecting the Horse Springs Coulee aquifer.

Potential exposure pathways for contaminants in soil include inadvertent ingestion (e.g., while eating or smoking), direct dermal contact, and inhalation of suspended particulates. The last of these is not considered significant, since it is unlikely that contaminated soil particles will be inhaled unless the heap is disturbed.

VI. SUMMARY OF SITE RISKS

Introduction

A baseline risk assessment was conducted as part of the Remedial Investigation to estimate the risks to human health and the environment that are posed by the existing conditions at the Silver Mountain Mine site. The baseline risk assessment estimated that there are unacceptable potential

risks to human health, in particular, to future workers at the site. Risks to human health and the environment are summarized below.

Contaminants of Concern

Inorganic contaminants are the most prevalent ones at Silver Mountain Mine. Soils sampling conducted in the areas most likely to be contaminated with organic chemicals (fuels, solvents, etc.) identified few organics. Low levels of methylene chloride, benzoic acid, bis (2 ethylhexyl) phthalate, benzyl alcohol, and acetone were found in some samples, but are believed to be laboratory contaminants based on quality assurance of the data.

The contaminants that were considered of potential concern in the risk assessment are listed in Table 1, along with their average, highest (upper bound), and "reasonable maximum exposure" concentrations. To establish the reasonable maximum exposure concentration, the upper 95% confidence limit on the average was used, unless it exceeded the maximum value, in which case the maximum was used. The risk assessment determined that the media of concern are limited to soil and groundwater.

Exposure Assessment

a. Population at Risk (Present and Future)

The land immediately surrounding the site is owned by a Loomis resident who uses the land for cattle grazing. The nearest residence is three miles away; the nearest towns (Loomis and Tonasket) are approximately six miles away.

It has been reported that local teenagers frequent the site. Early reports indicate that warning signs posted around the site were removed more than once, and Department of Ecology records document that after the placement of the pond and heap cover, much of the rope used to hold this down was removed. Based on this information, only visitors to the site are thought to be currently exposed.

In the baseline risk assessment (which assumes no cleanup of the site), it is expected that the site will continue to be accessible to visitors. Others who could be exposed in the future include workers at the site, or residents if people choose to live there. If it becomes profitable to continue the original mining activity, exposure to mine workers would be a distinct possibility. Workers and residents are expected to spend far more time at the site than infrequent visitors, and as a result would be at greater risk.

Table 1. Contaminant Concentrations Used to Estimate Risk

CONTAMINANT	SOIL (mg/kg)			WATER (ug/l)		
	AVE.	U.B.	RME	AVE.	U.B.	RME
Antimony	3.0	9.1	4.9	14.7	40.4	40.4
Arsenic	342.5	631.6	420.8	10.7	14.3	14.3
Barium	53.2	109.5	60.9	61.0	136.0	136.0
Beryllium	0.3	0.7	0.4	0.9	1.5	1.5
Cadmium	2.0	4.2	2.4	1.5	2.9	2.9
Chromium	10.4	16.0	11.8	11.1	31.6	31.6
Copper	134.7	510.4	185.6	20.2	56.7	56.7
Cyanide	21.9	96.3	35.1	40.8	281.0	122.3
Fluoride *	0.0	0.0	0.0	0.4	0.7	0.5
Lead	82.4	193.9	103.5	8.7	23.2	23.2
Manganese	576.7	938.0	630.9	166.0	421.0	421.0
Mercury	0.2	0.6	0.3	0.1	0.1	0.1
Nickel	29.6	48.8	33.3	15.6	38.4	38.4
Nitrate *	0.0	0.0	0.0	37.1	120.8	76.3
Nitrite *	0.0	0.0	0.0	0.3	1.3	1.3
Selenium	0.8	1.6	1.0	1.7	3.9	3.9
Silver	8.4	33.8	11.9	2.5	2.5	2.5
Thallium	0.2	0.9	0.3	0.1	0.1	0.1
Tin	0.0	0.0	0.0	15.4	31.5	31.5
Vanadium	18.8	30.6	21.8	11.5	40.7	40.7
Zinc	224.3	554.1	274.9	42.1	129.0	129.0

* Water concentrations are in mg/l.
RME = Reasonable maximum exposure
Ave. = Average
U.B. = Upperbound

As far as could be determined from available records, there has never been residential occupation at the Silver Mountain Mine site. Nor does residential growth into the immediate vicinity appear likely in the near future, due to the area's sparse population and the low availability of groundwater in the vicinity of the mine as compared with the central part of the Coulee.

Given the above conditions, a future industrial (i.e., mine worker) exposure was chosen as the reasonable maximum exposure, in accordance with the National Contingency Plan, and was used as a basis for the following risk assessment.

b. - Exposure Pathways and Scenarios

The main pathways of concern are:
Ingestion of contaminated groundwater,
Ingestion of soil, and
Dermal contact with soil.

Parameters used to estimate the reasonable maximum exposure are a combination of average and upper-bound industrial scenario parameters. Doses were calculated separately to estimate noncarcinogenic and cancer risks using two models developed by EPA Region 10. Using the first model, dose is estimated for noncarcinogenic endpoints by averaging chemical intake over the critical period of exposure for each pathway. For chemicals other than copper, nitrate and nitrite, long-term (chronic) exposure is the most critical, and chemical intake was averaged over 7 years. This is the shortest period to which the chronic oral reference dose may appropriately be applied. Adverse effects of copper, nitrate and nitrite result principally from short term (acute) exposure; therefore, average intakes were calculated separately for these using a 6-month averaging period.

The second model is used to estimate dose for each pathway for cancer risk estimation. Current scientific opinion is that an increase in cancer risk from chemical exposure is a function of the average lifetime intake, or dose. Dose received is summed over the exposure period and then averaged over a person's life.

To determine the overall chemical intake, doses must be summed across all relevant pathways. In this case, it is reasonable to assume that a person will be concurrently exposed to contaminants by three routes: soil ingestion, dermal contact with soil, and ingestion of drinking water. Therefore, doses from these pathways have been added to determine the cumulative dose.

Toxicity Assessment

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects a conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and mathematical extrapolation models have been applied.

Reference doses (RfDs) have been developed by EPA for evaluating the potential for adverse noncarcinogenic health effects resulting from chemical exposure. RfDs, which are expressed in units of mg/kg/day, are estimates of daily exposure levels for humans, including sensitive individuals, below which noncarcinogenic effects are not expected to occur. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty and modifying factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfD will not underestimate the potential for adverse noncarcinogenic effects to occur.

Table 2 lists cancer potency factors and reference doses for contaminants of concern identified in the baseline risk assessment.

Table 2. Cancer Potency Factors & Reference Doses

Contaminant	Oral CPF (mg/kg/day)	Chronic Oral Reference Dose (mg/kg/day)	Level of Confidence
Arsenic	50	1 E-03*	not established
Cyanide	none	2 E-02	medium
Antimony	none	4 E-04	low
Lead	none	none devel'd	not applicable
Nitrate	none	1 E+00	high
Nitrite	none	1 E-01	high

* 1 E-03 = 1×10^{-3}

Risk Characterization

Excess lifetime cancer risks are determined by multiplying the average daily dose with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1 E-06). An excess lifetime cancer risk of 1 E-06 indicates that, as an upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a lifetime under the specific exposure conditions at the site. Because these are upper bound estimates, it is likely that the actual risk is less than the estimated excess cancer risk.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

a. Excess Lifetime Cancer Risks

Future lifetime cancer estimates are based entirely on exposure to arsenic assuming industrial site usage and reasonable maximum exposure arsenic concentrations. In addition to arsenic, other contaminants at the Silver Mountain Mine site that are known or probable human carcinogens are beryllium, cadmium, chromium, nickel, and lead. However, beryllium, cadmium, chromium, and nickel have only been found to be carcinogenic via inhalation. As stated above, inhalation of particulates and volatiles is not a significant pathway for this site. The carcinogenicity of lead could not be evaluated because a cancer potency factor has not been established at this time. The carcinogenic risk from exposure to arsenic is shown in Table 3 for each exposure pathway.

b. Noncarcinogenic Effects

Risks of developing noncarcinogenic effects are presented in terms of a hazard quotient and hazard index. If the exposure is equal to or less than the RfD--a hazard quotient of 1.0 or less--then adverse effects are not expected. If the hazard quotient is greater than 1.0, there is an increasing chance that adverse effects will occur. The hazard indices, summed across each exposure pathway, are shown in Table 3. Table 4 shows the noncarcinogenic and carcinogenic risks broken down by contaminant and medium.

Table 3. Carcinogenic & Noncarcinogenic Risks

Pathway/Medium	Arsenic Carcinogenic Risk	Hazard Quotient
Soil ingestion	2.3 E-04	2.7 E-01
Water ingestion	2.4 E-04	3.1 E+00
Dermal contact	1.9 E-03	2.2 E+00
Particulate inhalation	0.0 E+00	0.0 E+00
Vapor inhalation	0.0 E+00	0.0 E+00
Total Risk	2.3 E-03	5.5

Table 4. Reasonable Maximum Exposure Risks by Medium

A. NONCARCINOGENIC

	Rfd Ratio	
	Water	Soil
Antimony	1.7E+00	6.3E-02
Arsenic	2.5E-01	2.2E+00
Barium	4.7E-02	6.3E-03
Beryllium	5.1E-03	4.2E-04
Cadmium	9.8E-02	2.5E-02
Chromium	1.1E-01	1.2E-02
Copper	2.6E-02	1.1E-04
Cyanide	4.2E-01	3.7E-02
Fluoride	2.0E-01	0.0E+00
Manganese	3.6E-02	1.6E-02
Mercury	5.7E-03	5.0E-03
Nickel	3.3E-02	8.7E-03
Nitrate	0.0E+00	0.0E+00
Nitrite	0.0E+00	0.0E+00
Selenium	2.2E-02	1.7E-03
Silver	1.4E-02	2.1E-02
Thallium	1.1E-02	1.7E-02
Tin	9.0E-04	0.0E+00
Vanadium	7.8E-02	1.3E-02
Zinc	1.1E-02	7.1E-03
Hazard Index:	3.1	2.4

Combined Hazard Index: 5.5

B. CARCINOGENIC (Arsenic only)

Water	Soil
2.4E-04	2.1E-03

Total risk: 2.3E-03

Table 5. Stock Tank Drinking Water Risks

Noncarcinogenic Risks		Carcinogenic Risk	
Compound	Hazard quotient	Compound	Risk
Antimony	0.0E+00		
Arsenic	1.6E+00	Arsenic	1.6E-03
Barium	3.4E-03		
Beryllium	1.7E-03		
Cadmium	1.7E-02		
Chromium	3.4E-03		
Cyanide	4.1E-03		
Fluoride	7.1E-05		
Manganese	2.0E-04		
Mercury	5.7E-03		
Nickel	1.1E-02		
Selenium	0.0E+00		
Silver	1.4E-02		
Thallium	1.1E-02		
Tin	2.9E-04		
Vanadium	2.4E-03		
Zinc	5.1E-04		
Hazard Index =	1.7E+00		

The total noncarcinogenic hazard quotient for the water in the stock tank is 1.7. Arsenic, with a hazard quotient of 1.6, accounts for nearly all of this risk. The risks presented by the stock tank are shown in Table 5 above.

Conclusions - Human Health Risks

At the Silver Mountain Mine site, the most important exposures routes are ingestion of and dermal contact with soil, and ingestion of groundwater or surface water.

Using reasonable maximum exposure assumptions, arsenic, antimony, and cyanide are the most important contaminants in water. Nitrate/nitrite and lead were each present in a single groundwater sample at concentrations above extablished criteria, though these samples may not be representative of overall site conditions. Exposure to arsenic in water could result in an increased cancer risk of 2 in ten thousand. There is also a risk of noncarcinogenic effects, mainly neurologic, liver, and skin related, from arsenic, cyanide and

other chemicals. The hazard quotient for these effects is 2.5.

The most important contaminant in soil is arsenic. Exposure to soil could result in an increased cancer risk of two in one thousand. The hazard index of 2.4 indicates that soil exposure could also result in a risk of noncarcinogenic effects, principally skin and neurologic disorders.

Uncertainty is inherent in all risk assessments. The major sources of uncertainty in the Silver Mountain Mine risk assessment are toxicity reference values, assumed future land use, the actual toxicity/risk of the dermal pathway, and the water data (as mentioned above). Due to the uncertainty in these and other areas, conservative assumptions were made in order to be protective of human health.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Environmental Risks

The greatest risk to wildlife and plants appears to be from the arsenic concentrations in the soils surrounding the leach heap. These soils are contaminated with levels of arsenic toxic to vegetation and ruminants, and are likely to be utilized by sagebrush biota, although the area involved is small. In the future, once the heap cover deteriorates, there may be some acute toxicity at times from temporary ponding of leachate. Soils from the heap and dump may exert their potential toxicity if they erode, spread out, leach, etc.

There is no current risk to wildlife or plants from groundwater, and no future risk is anticipated. Surface waters, however, attract wildlife, enhancing exposure to toxic levels of pollutants within those waters. The mine drainage to the trough will probably continue to be a source of elevated arsenic concentrations. To a lesser extent, the seep area may continue to be a source of elevated aluminum, copper, and lead.

VII. DESCRIPTION OF ALTERNATIVES

The Feasibility Study developed eight alternatives, utilizing a variety of treatment, containment, and disposal options, to reduce the risks remaining at the site after early initial treatment actions. The three alternatives which best met the evaluation criteria (protectiveness, cost effectiveness, compliance with regulations) were selected for detailed analysis and are described below, along with the no action alternative, which must be considered to comply with the NCP. As discussed further in Section X of this document, the primary applicable or relevant and appropriate regulations are action-specific. There are no location-specific ARARs for this site, and the Safe Drinking Water Act standards are the only potentially applicable chemical-specific ARAR. The alternatives are referred to by the numbers assigned in the Feasibility Study and Proposed Plan.

Alternative 1: No Action

This alternative leaves the site as-is, with no treatment or containment of contaminated materials and no restrictions on site access. The leach heap is subjected to all normal weathering forces and seasonal water runoff. No ARARs are invoked, and thus none are violated.

Alternative 2: Grading, Clay/Soil Cap, Institutional Controls, and Groundwater Monitoring

This alternative consists of a series of actions leading to capping the leach heap. First, all contaminated materials on site are consolidated onto the leach heap, with sampling conducted to verify that contaminated materials are adequately consolidated. These contaminated materials consist of surface soils surrounding the heap that contain cyanide and elevated arsenic concentrations and approximately 1600 yd^3 of mineralized mine dump. The leach heap is then graded and contoured to a shape that will minimize water erosion of the surface layer and seasonal runoff contact with the reshaped heap. A soil/clay mixture is placed and compacted over the graded heap to reduce infiltration of both air and water into the contaminated materials.

Because the wastes at Silver Mountain Mine are specifically exempt from the Resource Conservation & Recovery Act, the remedy does not involve the disposal of RCRA-regulated waste, and RCRA land disposal restrictions and Subtitle C closure standards are not applicable. The Washington State Dangerous Waste Act does regulate certain wastes containing concentrations of arsenic greater than 100 mg/kg if the waste was generated after 1981. Because the

waste at the site was generated prior to this date, the State Dangerous Waste rules are not applicable; however, they have been determined to be relevant and appropriate to the type of waste being managed.

The cap will be designed and constructed to promote drainage, minimize erosion of the cover, and provide long-term minimization of migration of liquids through the underlying contaminated materials. Because mean annual precipitation is only 11.4 inches per year, the cap is expected to readily meet or exceed these performance criteria. Long-term operation and maintenance will be conducted to monitor the groundwater around the site and to ensure the integrity of the cap.

Groundwater sampling is conducted for five years or more to verify whether contaminants are migrating. As an added precaution, a restriction or notice not to disturb the cap shall be placed on the deed for the site, and a fence with appropriate warning signs is constructed around the site to limit access. The community will be provided notice of groundwater sampling activities, sampling results, and the potential for contamination of the low-yield aquifer under the site.

This alternative does not completely eliminate the problem of the remaining cyanide and toxic metals migrating from the leach heap, but it does minimize these problems by shielding the contaminated materials from the conditions that promote migration of arsenic and cyanide. The cap significantly reduces natural oxidation of the metal sulfides and the remaining cyanide compounds and eliminates casual contact with the contaminated materials by humans and animals. Future disturbance of the cap is minimized by the fencing and deed restrictions placed on the site.

ARARs for this alternative include Occupational Health and Safety Administration (OSHA) regulations on worker safety, Clean Air Act (CAA) emission standards during implementation, Washington State Dangerous Waste regulations on capping, Maximum Contaminant Levels (MCLs) for groundwater protection, and the state's Minimum Standards for Construction and Maintenance of Wells.

Construction of the cap should take 2-3 months. Operation and maintenance (O&M) requirements include semi-annual groundwater sampling and yearly inspections of the site to monitor the condition of the cap. The present value cost, including construction and O&M, is estimated at $635,600.

Alternative 6: Removal and Continuous Rinse to Treat for Cyanide, Fine Solids to Resource Conservation and Recovery Act (RCRA) Disposal to Remove Arsenic

The major feature of this alternative is the additional treatment of approximately 5740 yd^3 of heap, mine dump, and soil to destroy the remaining cyanide and remove the more mobile arsenic. The material is moved to a trommel where it is rinsed with water (to remove the cyanide and water-soluble metals) and sized to remove the finer solids. Oversized solids are allowed to drain and then are left on the site if they meet treatment standards of 200 mg/kg arsenic and 95 mg/kg cyanide (see Table 6 below). The fine solids are further dewatered and then transported to a landfill that meets RCRA requirements.

Treatability tests are needed to determine the proper operating conditions for meeting the arsenic and cyanide treatment standards. It is doubtful that this alternative can meet the arsenic standard of 200 mg/kg, because it will not remove the arsenic that is present in the tightly bound sulfide mineral form. The arsenic in this form is not mobile now, but it will slowly oxidize and become available to the environment over time.

The rinsate is processed to destroy the cyanide and remove the soluble metal contaminants by precipitation. Treated rinsate would be released to the ground if it meets State land application discharge limits. The discharge of treated rinsate is regulated under the State Water Pollution Control Act (RCW 90-48), although no discharge limits specific to this project have been set by the State. The volume of rinse water generated is estimated to be 400 gal/hr. The metal-containing sludge generated by the rinsate treatment is disposed of at a hazardous waste facility, in accordance with Resource Conservation and Recovery Act (RCRA) regulations.

ARARs include the OSHA and CAA requirements as under Alternative 2, and several State of Washington water quality regulations, including the State Water Pollution Control Act and the State Waste Discharge Permit Program (although no permits are required for on-site activities).

No groundwater monitoring or institutional controls are included in this alternative. The estimated time required for implementation is one year. Neither O&M nor monitoring is anticipated in the cost calculation. However, both groundwater monitoring and capping may be needed if treatability study results show that health-based risk levels cannot be met through treatment. Estimated present worth costs are $1.2 million.

Alternative 7: Offsite RCRA Disposal

The major features of this alternative are the excavation, transport, and disposal of approximately 5740 yd^3 of contaminated materials (leach heap, mineralized mine dump, and surrounding soil). The contaminated materials are hauled in appropriately controlled trucks to an existing RCRA landfill. After disposal, the site no longer has any contaminated materials stored on it, and there is no need to restrict site entry and future use. Because the low-yield aquifer is affected by naturally occurring arsenic in the bedrock, the community will be provided notice of the possibility of groundwater contamination.

ARARs include the State Dangerous Waste Regulations for transportation and disposal of hazardous wastes; the CAA and OSHA regulations again apply during implementation. Implementation time for this alternative is 2-3 months. No O&M, monitoring, or institutional controls are required. Disposal costs are estimated at $1.4 million.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Each of the four alternatives described in the preceding section was evaluated according to the following nine criteria:

Threshold Criteria

1. Overall protection of human health and the environment: whether or not the remedy provides adequate protection or describes the mechanisms for controlling risk for the different exposure pathways.

2. Compliance with ARARs: whether or not the remedy ensures compliance with Applicable or Relevant and Appropriate Requirements of other federal and state environmental standards or statutes.

Primary Balancing Criteria

3. Long-term effectiveness and permanence: the ability of the remedy to provide protection and reduce risks to health and the environment after cleanup goals have been met.

4. Reduction of toxicity, mobility, or volume through treatment: the anticipated effectiveness of treatment technologies used.

5. Short-term effectiveness: the speed with which the remedy achieves protection, as well as any adverse effects which it may create during construction and implementation.

6. Implementability: the technical and administrative feasibility of the remedy.

7. Cost: includes capital and O&M costs.

Modifying Criteria

8. State acceptance: whether the state concurs with or opposes the remedy.

9. Community acceptance: whether or not the remedy is acceptable to the community, and how it addresses their continuing concerns about the site.

The following section describes how each alternative meets the various criteria.

Overall Protection of Human Health and the Environment

The offsite disposal option affords the strongest measure of protection at the site, in that the contaminated materials are completely removed from the site. Once the materials are removed, there will be no restrictions on activities at the site. However, disposal at another facility merely moves the risk from one site to another. Some potential for groundwater contamination remains at the site due to naturally occurring arsenic in the bedrock.

The capping alternative prevents direct contact with the contaminated materials, by means of both the cap itself and the fence erected around the heap. There still remains a small potential for arsenic and the remaining cyanide to mobilize and enter the ground under the capped heap; however, the cap should minimize that potential by minimizing contact of air and water with the contaminated materials. Groundwater monitoring and contingent groundwater treatment included in this alternative will assure that it remains protective.

The treatment alternative provides a good measure of protection, because all of the contaminated material will be washed and the more mobile arsenic in the fine materials will be removed and disposed offsite. However, the washed coarse material, which will remain onsite, will still contain arsenic-bearing sulfide minerals. The arsenic in this form has a low mobility, but over time the sulfide minerals will oxidize and the arsenic will become available to the environment. Depending on treatment results (whether health-

based levels can be achieved), capping and groundwater monitoring may have to be added to this alternative.

The no action alternative does not protect human health or the environment. Humans and animals can come in contact with the contaminated materials, and potentially harmful leachate could accumulate in the catchment pond downslope from the leach heap during wet periods of the year, as the existing cover deteriorates from natural weathering.

Since the no action alternative fails to meet this threshold criterion, it will not be considered further in this analysis.

Compliance with ARARs

The capping and offsite disposal alternatives meet all ARARs. The treatment alternative can be designed to meet ARARs, but some difficulty may arise due to Washington State regulations governing wastewater. If rinsate treatment operations cannot be designed to meet State standards, the wastewater might have to be transported a minimum of 30 miles to a POTW for treatment.

Long-Term Effectiveness and Permanence

Offsite disposal of the contaminated materials eliminates the long-term risks associated with the site. No institutional barriers or restrictions are placed on the site and there is no need for any inspection, repair, or maintenance activities. Some potential for groundwater contamination remains at the site due to naturally occurring arsenic in the bedrock.

The capping alternative is highly reliable and effective. Due to the dry climate in the area, the need for major repairs of the cap during its 30-year design life is considered very low. A notice or restriction in the deed to the property should restrict future owners from disturbing the cap.

The treatment alternative has, in theory, a high level of long-term effectiveness. The washed materials left onsite are free from cyanide and soluble-metal contaminants. While this technology is not new, its effectiveness in meeting the arsenic treatment standard is not known. The arsenic remaining in the cleaned materials is in the form of low mobility sulfide minerals that undergo slow oxidation. Over time the arsenic would become more mobile due to natural weathering conditions. No institutional controls or barriers are included, but if treatability studies indicated the need,

capping and groundwater monitoring will be added to this alternative.

Reduction of Contaminant Mobility, Toxicity, or Volume

Early treatment actions significantly reduced the concentration of cyanide in the leach heap. Further treatment of the leach heap would reduce the toxicity and somewhat reduce the volume of the washed materials to be left onsite. Cyanide and soluble-metal contaminants are washed from the contaminated material, and the rinsate is subsequently treated to destroy and precipitate the contaminants. The principal threat, arsenic, is partially removed (rather than treated) through sizing operations that separate out the fine materials. Precipitated sludge and fine solids are disposed at a hazardous waste site. Arsenic in the form of sulfide minerals remains in the washed materials, but it has very low mobility.

Capping the heap greatly reduces the potential for the contaminants to move into the environment, because it eliminates wind and water erosion. Capping minimizes water and air infiltration into the heap, thus limiting the natural oxidation rate of the metal sulfides and the cyanide and metal complexes; this in turn significantly reduces the potential for contaminant mobility. Capping slows the natural degradation of cyanide. This alternative does not reduce the volume of contaminated materials.

Disposal of the materials at a hazardous waste landfill does not reduce either the toxicity or the volume of the contaminants. Placement of the contaminated materials in a properly constructed RCRA landfill should reduce the mobility of the contaminants into the environment.

Short-Term Effectiveness

The capping alternative has the highest short-term effectiveness, as it takes only 2-3 months to implement and involves the least movement of contaminated materials. Worker safety is assured through wetting the contaminated materials to control blowing dust, and taking other routine safety measures to prevent exposure to contaminated material.

Offsite disposal also takes 2-3 months and requires safety precautions during the removal of the leach heap materials. Materials are hauled to the landfill in appropriately sealed and labeled trucks to minimize the risk of human contact with the contaminants.

The treatment alternative requires about a year's work. Safety clothing and equipment are required to assure worker safety, and precautions are taken when materials are hauled offsite, as in the above alternative. This alternative has the lowest short-term effectiveness because the likelihood of contaminated materials becoming airborne during sizing operations is very high.

Implementability

Offsite landfilling is easy to implement. Loading, hauling, and long-term disposal services are readily available, and landfill capacity does not pose a problem. No future site remediation or monitoring is required. Some potential for groundwater contamination remains at the site due to naturally occurring arsenic in the bedrock.

Capping is also easily implemented. The technology to construct the alternative is well developed and the means to perform maintenance functions on the cap and monitor the effectiveness of the remedial action are available.

Treatment is less implementable. The technologies to wash and size the contaminated materials and to treat the rinsate are generally proven, and the availability of equipment and technical personnel should be good. However, treatability tests are required to determine how effective this alternative will be in reducing arsenic concentrations. It is doubtful that treatment/removal of fines could reduce the arsenic present in the sulfide mineral form to the cleanup standard of 200 mg/kg (see Table 6 below). In addition, the ARARs for this alternative might necessitate disposal of wastewater off-site, making implementation more difficult than orginally planned. Under this alternative, the site requires no future monitoring, but if treatability studies indicated the need, capping and groundwater monitoring will be added to this alternative.

Cost

The capping alternative has an estimated capital cost of $370,360 and annual O&M costs of $39,650. The present value, based on a 30-year period for site activities, is $635,600.

Capital costs for the treatment alternative are estimated at $855,290, and present worth at $1.2 million. No monitoring or maintenance costs are included.

Offsite disposal would cost an estimated $1.4 million.

State Acceptance

The Washington State Department of Ecology has given verbal approval of Alternate 2, capping.

Community Acceptance

Two commentors suggested using an alternative other than the selected capping alternative. Community interest in the site is generally low. A total of three private citizens and one local official commented on the proposed plan: two favored a capping option, the official favored taking no action, and the other citizen gave no opinion. All public comments are shown in Section XI of this document, the "Responsiveness Summary."

IX. THE SELECTED REMEDY

The selected remedy is Alternative 2 (grading and capping the leach heap; institutional controls; and groundwater monitoring). EPA and the state of Washington agree that this alternative best meets the selection criteria. A more detailed description of the components of the remedy follows.

Consolidation and Grading

All contaminated soils and mine dump material will be consolidated with the leach heap, graded, and contoured to a shape that will minimize water infiltration. Locations which might include such materials include the mine dump areas and surface soils around the leach heap. This work will be accomplished using conventional earth-moving equipment. Samples will be collected after contaminated materials have been consolidated to verify that all material contaminated with concentrations of arsenic greater than 200 mg/kg or cyanide greater than 95 mg/kg is made part of the heap. The rationale for these cleanup standards are shown in Table 6 below.

Table 6. Cleanup Standards for Leach Heap, Mine Dump, and Soil

Constituent	Concentration at Site	Standard	Rationale
arsenic	274 mg/kg max	200 mg/kg	Hazard Index = 1.0 Cancer Risk = 10^{-4}
cyanide	101 mg/kg max	95 mg/kg	Hazard Index = 0.1

Capping

Capping is the most important component of this remedy in terms of preventing contaminant migration. Five types of caps were evaluated in the Feasibility Study; the soil/clay type was selected because it was as protective as any other evaluated, and it was the most cost effective. The Remedial Design work will include designing a specific cap to meet the following criteria: promote drainage, minimize erosion of the cover, and provide long-term minimization of migration of liquids through the underlying contaminated materials.

Mine Adit and Stock Tank

The entrance to the mine will be plugged using conventional techniques in order to protect public safety, particularly the curious visitor who may enter the mine. The pipe that now carries mine drainage water to the stock tank will be removed. A new well will be installed on the land owner's property in the Horse Springs Coulee aquifer to replace the stock tank as an animal water supply.

Institutional Controls

The site will be fenced to prevent people and animals from disturbing the cap and existing monitoring wells. A restriction or notice will be placed on the deed to the property which restricts future disturbance of the cap. The community will be provided notice of sampling of the low-yield aquifer under the site, the sampling results, and the potential for contamination, including that from naturally occurring arsenic in the bedrock.

Groundwater Monitoring

A groundwater monitoring program will be implemented to verify concentrations of potential contaminants, both spatially and temporally. During the Remedial Investigation, groundwater concentrations of contaminants exceeded human health-based standards on a sporadic basis. A groundwater monitoring program to meet the objective of detecting and verifying the extent of contamination would be conducted in two stages:

Stage 1. Existing wells will be sampled on a quarterly basis for two years for selected parameters to verify any changes in contaminants of concern at the site, and whether they occur at concentrations above cleanup standards. All existing wells will be used in the verification analysis for cyanide, nitrate, and nitrite, which are the groundwater contaminants that originate only in the heap. The other contaminants of concern, arsenic, antimony, and lead, have a probable major

source in bedrock and would therefore be verified primarily in well 3, which should have the least bedrock influence among existing wells. If elevated levels of contaminants are not detected, sampling frequency will be decreased to semi-annually.

If elevated levels of contaminants are detected and verified, a more extensive monitoring system will be established in Stage 2 to monitor contamination at the point of compliance and to clarify the natural bedrock component of contamination in relation to contamination coming from on-site sources. If elevated levels of contaminants are not verified, Stage 2 will not be needed either for verification of contamination or for compliance monitoring. The selected parameters and the standard (acceptable concentration) for each are shown in Table 7 below.

Stage 2. The more extensive monitoring system will include the four existing monitoring wells, three additional downgradient wells, one additional upgradient well, and a contingency for a fourth additional downgradient well if required to adequately span the flow path of groundwater at the point of compliance. Two of the downgradient wells will be installed at the point of compliance established in the western margin of the Horse Springs Coulee aquifer. A third downgradient well and an upgradient well will be installed to provide an adequate two-dimensional array of monitoring points to verify the direction of flow.

Table 7. Groundwater Parameters & Standards

Constituent	Concentration at Site	Standard	Rationale
antimony	40 ug/l	120 ug/l	Health based level
arsenic	14 ug/l	6 ug/l	10(-4) cancer risk
cyanide	122 ug/l	154 ug/l	Health advisory
lead	23 ug/l	20 ug/l	Proposed MCL
nitrate (N)	17 mg/l	10 mg/l (as N) (45 mg/l as NO_3)	MCL
nitrite (N)	0.4 mg/l	1 mg/l (as N) (3.3 mg/l as NO_2)	Proposed MCL
combined nitrate and nitrite	17.4 mg/l	10 mg/l (as N)	Proposed MCL

The parameters to be used for ground water monitoring will include the field parameters (water level, temperature, pH, electrical conductivity, and Eh) and the parameters of concern identified in the Remedial Investigation (total cyanide, weak acid dissociable cyanide, arsenic, antimony, lead, nitrate, and nitrite). The need for continued groundwater monitoring will be evaluated during the five-year review of the site.

A statistical procedure will be used to evaluate monitoring data for determining the spatial and temporal trends in contaminant levels. Groundwater treatment design would begin if the Stage 2 (point of compliance) wells show contamination coming from the site exceeds the standards in Table 7 and is not the result of naturally occurring contamination, based on statistical evaluation of all the data.

Contingent Groundwater Treatment Program

If groundwater treatment is chosen as a remedial alternative based on analyses of monitoring results, groundwater extraction and treatment at the surface will be employed. Potential treatment for cyanide could be chosen from methods listed in Section 2.5.4 of the Feasibility Study Report (EPA, Jan. 17, 1990) for treatment of rinsewater from leachate. Potential treatment for arsenic will employ arsenic

removal by use of iron sulfate or other precipitant. In this method of treatment, ferric sulfate is added as a floc to the water to be treated. A high oxidation state is maintained by aeration during treatment in order to keep iron in the ferric form and arsenic in the arsenate form. A slightly acidic operating pH of pH 6-7 is maintained to promote chemical removal of arsenic from water by any of three following processes:

1. Precipitation of ferric arsenate.
2. Coprecipitation of arsenic with ferric hydroxide.
3. Adsorption of arsenic with ferric hydroxide.

Arsenic removal is then completed by separation of sludge from water.

As noted above, groundwater treatment would not be implemented until the level of groundwater contamination is verified. A design phase would also precede any groundwater treatment to verify that groundwater extraction is practical in the shallow aquifer. On the basis of the Remedial Investigation, groundwater treatment is at present considered to be an inappropriate alternative because of the low levels of contaminants and the low hydraulic conductivity of the shallow aquifer.

Points of Compliance

A point of compliance for groundwater standards will be established in the western margin of Horse Springs Coulee aquifer 100-200 feet downgradient from the edge of the leach heap. This point is chosen on the basis of two findings of the Remedial Investigation:

1. The shallow aquifer beneath the heap has a very low hydraulic conductivity on the order of 7 x 10-6 cm/s. Such low hydraulic conductivity makes the shallow aquifer unusable as a water supply. Horse Springs Coulee aquifer, on the other hand, is an important water supply for irrigation and residential use. The part of Horse Springs Coulee aquifer adjacent to the mine site is the most appropriate point to monitor for effects of contaminants.

2. Some of the contaminants of concern (arsenic, antimony, and lead) in the shallow aquifer have a potential natural source in bedrock adjacent to the leach heap and mine dump. A point of compliance in Horse Springs Coulee aquifer, rather than the shallow aquifer, is more removed from the potential bedrock source and will better allow differentiation of contaminants from the mining activities versus naturally occurring contaminants.

X. STATUTORY DETERMINATIONS

The selected remedy meets statutory requirements of Section 121 of CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. The evaluation criteria are discussed below.

1. Protection of Human Health and the Environment

The selected remedy will protect human health and the environment by consolidating the contaminated materials onto the leach heap; capping and covering the heap and implementing institutional controls to minimize exposure; and monitoring the groundwater to assure it is not affected by sources at the site. These are all long-term measures. In the short term, standard health and safety precautions will be taken to protect workers; no other populations are currently at risk from this site.

2. Attainment of ARARs

The selected remedial actions meets all identified ARARs. These are listed below, by media. Except for the Safe Drinking Water Act (SDWA) standards, these are all action-specific ARARs (SDWA standards are chemical-specific). There are no location-specific ARARs for this site.

Hazardous Waste:

RCRA. Not applicable due to mining waste exclusion (40 CFR 261.4). Not relevant and appropriate because the waste at the Silver Mountain Mine site does not exhibit a characteristic of hazardous waste and is not similar to a RCRA waste.

Washington State Dangerous Waste Regulations (WAC 173-303). Some wastes containing greater than 100 ppm arsenic are regulated as dangerous wastes. Although the remedial actions planned do not constitute treatment, storage, or disposal, the actions are sufficiently similar to make these regulations relevant and appropriate. Specific sections of the regulations that are relevant and appropriate include:

Section 610 Closure and Postclosure

Subsection 2a: Closure performance standard. Must close in a manner that: minimizes the need for further maintenance; and controls, minimizes or eliminates to the extent nessary to protect human health and the environment, postclosure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere; and returns the land to the appearance and use of surrounding

land areas to the degree possible given the nature of the previous dangerous waste activity.

Subsection 7d: Postclosure care and use of property. Postclosure use of property on which dangerous wastes remain after closure must never be allowed to disturb the integrity of the final cover or any other components of any containment system, or the function of the facility's monitoring systems, unless the Department finds that the disturbance is necessary to the proposed use of the property, and will not increase the potential hazard to human health or the environment.

Subsection 10b(i)(A)(B): Notice in deed to property. Within sixty days of closure the owner or operator must: record, in accordance with state law, a notation on the deed to the property, or on some other instrument which is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that the land has been used to manage dangerous wastes; and that its use is restricted as specified in subsection 7d.

Section 645, subsection 8: Groundwater monitoring requirements.

Section 665, subsection 6: Closure and postclosure care for landfills. This subsection contains general requirements for a final cover, maintenance, and monitoring.

Water:

Safe Drinking Water Act, Maximum Contaminant Levels (MCLs). An applicable requirement at the point of compliance, these are the federal standards for drinking water supplies. MCLs exist for several elements found at the site, including arsenic, cadmium, lead, silver, and several others.

Minimum Standards for Construction and Maintenance of Wells (WAC 173.160). An applicable requirement, this state of Washington regulation addresses how wells must be installed and abandoned by licenses well contractors. The well to be drilled to replace the stock tank must comply with both the administrative and substantive requirements of WAC 173.160 and WAC 173.162, because the well will be located in the Horse Springs Coulee aquifer, outside of the site boundaries.

State Water Pollution Control Act (RCW 90.48). This could be applicable if groundwater treatment were conducted. This act requires the use of all known available and reasonable methods to prevent and control pollution of the waters of the state. Specific substantive requirements are set forth in:

90.48.010 Policy enunciated

90.48.020 Definitions (pollution & waters of the state)
90.48.080 Discharge of polluting matter in waters prohibited.

Regulation of Public Ground Waters (RCW 90.44). This could be applicable if groundwater treatment were conducted. This chapter establishes that the "first in time, first in right" doctrine of water appropriation applies to groundwater as well as surface water. If the groundwater extraction system adversely impacts either the quantity or quality of a senior water right holder, the impacts must be mitigated.

Water Resources Act of 1971 (RCW 90.54). This could be applicable if groundwater treatment were conducted. This act sets forth fundamentals of water resource policy for the state to insure that waters of the state are protected and fully utilized for the greatest benefit to the people of the state and, in relation thereto, to provide direction to the Department of Ecology and other state agencies and officials, in carrying out water and related resources programs. Specific substantive requirements are set forth in:

90.54.020 General declaration of fundamentals for utilization and management of waters of the state. Establishes: beneficial uses; the basis for allocation which includes the loss of opportunity in the equation for maximum net benefits; base flow in perennial streams and rivers shall be retained, and all known available and reasonable methods of treatment shall be applied to discharge of wastes into waters of the state.

Protection of Withdrawal Facilities Associated with Ground Water Rights (WAC 173-150). This could be applicable if groundwater treatment were conducted. The purpose of this chapter is to establish and set forth the policies and procedures of the Department of Ecology in regard to the protection of the availability of groundwater as it pertains to the water withdrawal facilities of holders of groundwater rights. Particularly:

173-150-060 Defines impairment of water rights.
173-150-090 Voluntary agreements. Allows junior and senior water right holders to reach a mutually satisfying agreement regarding impairment of water supply by one of the parties.
173-150-100 Ensures protection of water quality as well as quantity.

Water Quality Standards for Surface Waters of the State of Washington (WAC 173-210). This would be applicable if groundwater treatment were conducted and resulted in discharges to surface water. The purpose of this regulation is to establish water quality standards for surface water of

the state, and it includes provisions for the protection of beneficial uses. Particularly:

173-201-035 General considerations. Subsection (8) states the antidegradation policy of the state as guided by RCW 90.48 and RCW 90.54.

173-201-045 General water use and criteria classes. Establishes criteria for the beneficial uses to be protected.

173-201-047 Toxic substances. The acute surface water quality criteria for cyanide in freshwatr is 22 ug/L and the chronic freshwater criteria is 5.2 ug/L.

173-201-070 & 080 General and specific classifications for all freshwaters of the state.

State Waste Discharge Permit Program (WAC 173-216). Permits are not required for onsite CERCLA remedial actions, but are applicable to offsite discharges to ground or surface waters not already regulated under the NPDES program. This would be relevant and appropriate to onsite discharges to groundwater. The pertinent subsections are:

173-216-020 Policy enunciated. Requires the use of all known available and reasonable methods to prevent and control the discharge of wastes into the waters of the state.

173-216-060 Prohibits discharges.

173-216-110 Permit terms and conditions. Establishes conditions necessary to prevent and control waste discharges into waters of the state.

Underground Injection Control Program (WAC 173-218). This would be applicable if fluids were injected through wells offsite, and relevant and appropriate if fluids were injected through wells onsite. This regulation sets forth procedures and practices to protect groundwaters, including underground sources of drinking water, from injected fluids. Pertinent subsections are:

173-218-020 Policy enunciated. Requires the use of all known available and reasonable methods to prevent and control the discharge of fluids and waste fluids into the waters of the state.

173-218-030 Defines beneficial uses and well classes.

173-218-050 Prohibits new Class I injection wells. Class I wells inject fluids below the lowest aquifer.

173-218-080 Prohibits all Class IV wells, which inject dangerous or radioactive waste fluids.

173-218-090 Prohibits Class V injection wells that inject industrial, municipal, or commercial waste fluids into or above an underground source of drinking water.

173-218-100 Permit terms and conditions. Substantive requirements for injection.

Submission of Plans and Reports for Construction of Wastewater Facilities (WAC 173-240). This would be relevant and appropriate if groundwater treatment were conducted. This regulation establishes the requirements for engineering reports, plans and specifications, construction quality assurance, and the operation and maintenance manual.

Air:

Clean Air Act, PM10 Standard. This applies to any fugitive emissions from the remedial action work.

Washington State General Regulations for Air Pollution Sources (WAC 173-400), Section 40: General Standards for Maximum Emissions. This section is applicable and addresses fugitive dust and other emissions during excavation and cleanup related activities.

Ambient Air Quality Standards for Particulate Matter (WAC 173-470). Applicable state requirement.

Safety:

Occupational Safety and Health Act, 29 CFR 1910. This applicable federal act governs worker safety at hazardous waste sites.

Occupational Health Standards--Safety Standards for Carcinogens, Part P, Hazardous Waste Operations and Emergency Response (WAC 296-62-300). This applicable regulation includes training requirements for workers potentially exposed to hazardous substances. Effective June 1, 1990 the training requirement for general site workers (e.g., equipment operators, transport vehicle operators, general laborers, and supervisory personnel) engaged in hazardous substance work must receive 40 hours of health and safety training, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. Workers engaged in hazardous waste operation within the exclusion zone and the contamination reduction zone must have 80 hours of instruction in addition to the field experience.

3. Cost Effectiveness

The selected action was the most cost-effective of the alternatives that passed screening, being significantly less expensive than Alternatives 6 and 7 (Alternative 1, No Action, failed the protectiveness criterion).

4. Utilization of Permanent Solutions and Alternative Treatment Technologies

An early treatment action was taken to reduce the concentration of cyanide in the leach heap at this site. For this Record of Decision, several treatment technologies were considered, but were not selected because their higher cost (compared to capping) was not justified by any increase in protectiveness. There are no known technologies for treating the arsenic in the waste; all of the technologies evaluated treat only the cyanide, which is no longer the principal threat at the site. The technology that passed screening--cyanide rinsing with removal of fine solids containing mobile arsenic, followed by rinsate treatment--may not be a permanent solution because its effectiveness in removing the relatively stable arsenic compounds, which are currently the principal threat, is somewhat in doubt. Arsenic remaining in the rock after treatment/removal would oxidize over time and become available to the environment. In addition, the treatment alternative would be difficult to implement if rinsate treatment pilot tests revealed that state ARARs concerning disposal of treated rinsate could not be met.

5. Land Disposal Restrictions

Wastes resulting from the beneficiation of mining materials are categorically excluded from regulation as hazardous wastes under RCRA (40 CFR 261.4[b][7]). Heap leaching operations are included under the definition of "beneficiation." Therefore, the Land Disposal Restrictions are not applicable. Land Disposal Restrictions are also not relevant and appropriate for two reasons: (1) waste is not being disposed of in a new unit, an expansion of an existing unit, or a replacement unit, and (2) the waste does not exhibit a RCRA characteristic and is not sufficiently similar to a RCRA waste to invoke the RCRA regulations.

6. Preference for Treatment as a Principal Element

An early treatment action was taken to reduce the concentration of cyanide in the leach heap at this site. For this Record of Decision, several treatment technologies were considered, but were not selected because their higher cost was not justified by any increase in protectiveness. There are no known technologies for treating the arsenic, which is now the principal threat. Technologies for treating cyanide, which is no longer the principal threat at the site, were evaluated. The technology that passed screening--cyanide rinsing with removal of fine solids containing mobile arsenic, followed by rinsate treatment--may not be effective for

removing stable arsenic compounds. The capping alternative was believed to better meet the selection criteria overall.

XI. Responsiveness Summary

Overview

This section contains a summary of comments and concerns raised during the comment period held from January 29 to February 28, 1990, as well as comments received on the draft Remedial Investigation and Feasibility Study Reports. A brief description of community background and involvement is also included.

Background of Community Involvement

EPA conducted community interviews in September 1987, and found community interest in the site to be low. The owner of the site was the most concerned citizen at that time. Other citizens and local officials interviewed expressed concern over other environmental issues in the area, such as a local landfill contaminated with pesticides and a large sawdust pile at an inoperative mill which periodically catches fire. Mines are relatively common in this area.

The concerns expressed to EPA during community interviews were:

1) Citizens wanted timely and accurate information on the site.
2) Some citizens expressed concern over the implications this cleanup would have for other mining operations of similar types in the area.
3) Citizens were surprised at EPA's involvement at the site. They appeared to consider it a non-threatening, low priority site.

Summary of Comments Received

EPA held a public comment period from January 29 to February 28, 1990. The public sent 3 letters and placed four telephone calls to the Environmental Protection Agency's site manager during this time. In addition, two agencies commented on the draft Remedial Investigation and Feasibility Study (RI/FS) Reports prior to the public comment period. All comments received are summarized below and grouped by category, e.g. EPA's preferred alternative, cost, groundwater, etc.

1. EPA's Preferred Alternative

Comment: **One citizen supported the proposed cap remedy, particularly for control of any contaminants that could become airborne.**

Response: EPA agrees that the cap will prevent the spread of contamination through air releases, and believes that in addition the cap will minimize the spread of contamination through all media.

Comment: **The same citizen commented that local soils are sandy, therefore EPA may have to import the clay.**

Response: If this alternative is the final remedy selected, the specifics will be determined during the remedial design phase. EPA agrees that it is likely that clay will have to be imported and mixed with local soil for the cap.

Comment: **The property owner asked if the preferred alternative would include a new well to replace the stock tank and if there would be a pump in it.**

Response: The preferred plan does include a new well to be drilled into the Horse Springs Coulee aquifer to provide an alternative water supply for livestock. It is likely to be placed east of the original stock tank in the Horse Springs Coulee aquifer. The actual location and configuration of the well will be part of the remedial design and can not be determined at this point. EPA will work with the land owner to ensure water is provided to his livestock.

Comment: **The property owner asked if a chain-link fence will be put up. The owner had noticed the top of one of the wells had been broken off, and a fence would help reduce further vandalism.**

Response: The preferred alternative includes fencing the site to prevent humans and livestock from entering and disturbing the cap or monitoring wells once the cap is in place. This should minimize further damage to existing or new wells.

Comment: **One commentor asked whether a liner would be placed under the leach heap prior to capping.**

Response: EPA considered moving the heap onto a newly constructed liner, but determined this would not provide additional protection of human health and the environment to offset the risks of moving contaminated materials. This is primarily because the contaminated materials are dry and relatively stable, and the cap will minimize the water and air that can come into contact with them. Constructing a bottom

liner could be more protective if the wastes were wet and/or leachate was likely to be generated from the heap. However, EPA believes the conditions at the Silver Mountain Mine site do not warrant this extra step.

Comment: **In commenting on the RI/FS Reports, one federal official felt that the capping alternative should only be considered a temporary solution, which displaces the problem until sometime in the future. If the material is left in place, an irreversible contamination of groundwater in the area could occur.**

Response: EPA does not believe that the preferred alternative will fail as the commentor suggests. Once the cover is in place, the threat to the groundwater from the materials on site is greatly reduced, because oxidation of the tightly bound arsenic will be minimized. EPA determined during the feasibility study that treatment of the material on site to remove arsenic to health-based concentrations is not possible, and that the capping alternative is the most protective of the environment overall. Groundwater sampling indicates little or no contamination has occurred to date, and groundwater monitoring will continue under the chosen alternative.

2. Remedial Investigation Report

Comment: **A federal Public Health official wrote that since arsenic concentration was so high in mine tailings, more soil sampling should be done on rest of the property.**

Response: During the remedial investigation, soil near the leach heap and at several locations around the site was sampled. The results showed that high concentrations of arsenic were limited to the soils immediately surrounding the heap. When this contaminated soil is consolidated with the heap prior to capping, sampling will be done to verify that the remaining soil does not contain arsenic above health-based concentrations.

Comment: **The commentor above suggested that the tailings piles be included in any remedial action at the site.**

Response: The contaminated mine tailings are included in the remedial action chosen for the site; they will be consolidated with the leach heap prior to capping.

Comment: **The commentor above believes that the airborne/inhalation exposure route should be considered.**

Response: The cap will eliminate this route of exposure.

Comment: **The commentor above questioned whether the addition of the amount of arsenic ingested daily (about 50 ug/day) to the reasonable maximum exposure would change the estimated cancer risk.**

Response: Including the arsenic ingested from other sources would result in a higher overall risk estimate, however, this is not the usual method for assessing risks at Superfund sites. EPA attempts to predict the excess risk resulting from the reasonable maximum exposure at the site; this represents risks above those from other sources, such as average daily ingestion from food sources.

Comment: **A citizen pointed out that in Appendix P of the Remedial Investigation Report, the concentrations of contaminants in groundwater at the site were lower than those in background samples.**

Response: The commentor has misinterpreted this particular table. The "gdw/ref" column does not represent on-site groundwater, rather it shows the concentration of on-site groundwater as it enters (and is diluted by) the Horse Springs Coulee aquifer. The purpose of this table is to indicate incremental contamination to the regional aquifer for the ecological risk assessment. Actual concentrations of contaminants in the on-site groundwater are given in several other places in the RI/FS Reports, including Appendix D.

3. Groundwater

Comment: **A citizen questioned whether the actual water flow is being tapped into when the groundwater is monitored. He would like to be allowed to confirm this by using the "dousing" method.**

Response: EPA uses scientific methods when conducting remedial investigations, and therefore has not used the dousing method at this site. EPA believes that it has accurately characterized the aquifer at the site; detailed information is given in the Remedial Investigation Report.

Comment: **One citizen asked what the location and frequency of groundwater sampling will be.**

Response: The sampling will be conducted in two phases. During the first phase each existing well will be sampled on a quarterly basis for two years. If elevated levels of contaminants are not detected, sampling frequency will be decreased to semi-annually and no new wells will be constructed. Groundwater monitoring will continue for five years, and then results will be analyzed to determine whether

the monitoring should continue. If elevated concentrations are found and verified, a more extensive monitoring system will be established in the second phase.

In the second phase, if necessary, EPA will be installing three or four new wells at locations to be determined during the design of the remedy. Three wells will be downgradient of the site, one will be upgradient, and possibly another will be installed downgradient if more information is needed. These are in addition to the four existing wells.

If the contamination becomes high enough to exceed EPA health-based levels, design of a groundwater treatment system will be implemented during the second phase.

Comment: **One citizen expressed that "slugs" of contaminants could be released to the groundwater. His concern was that future landowners should be notified of this potential for groundwater contamination.**

Response: The selected remedy includes a notice or restriction to be placed on the property deed to prevent owners from disturbing the cap. In response to this comment, the chosen remedial alternative also states that if the shallow aquifer becomes contaminated, the deed notice will be modified to prevent owners from using the aquifer.

4. Other Alternatives Under Consideration

Comment: **One citizen asked why EPA did not choose alternative #3, the multimedia cap.**

Response: EPA considers the multimedia cap to be non-cost-effective for several reasons, including the low net precipitation (making the low-permeability soil cap virtually as effective as the multimedia cap) and the temperature extremes (which can reduce the expected life of a synthetic membrane). The solid, stable physical structure of the waste and the goal to reduce future exposures to arsenic made the clay/soil cap a comparable alternative, at a lower cost than the multimedia cap.

Comment: **A county official wrote a recommendation for alternative #1 (No Action). The official felt that the site had been stabilized for several years and is now fenced, so the threat is gone.**

Response: EPA believes that alternative #1 does not effectively reduce the potential health risks from the site. Although the immediate threat from cyanide leaching into the pond was reduced by "stabilization" actions in 1981, 1982, and

1985, there remains a significant risk from the arsenic at the site. In addition, the cyanide remaining in the leach heap could migrate to the groundwater. These are the primary risks that caused the "no action" alternative to be judged unprotective of human health and the environment.

Comment: **A federal official recommended alternative #6 (removal and continuous rinse for cyanide). He suggested the cost could be partially covered by recovering ore, while eliminating an environmental problem.**

Response: While EPA seriously considered additional treatment, it found that treatment could not remove or destroy the arsenic, which is currently the principal threat, to health-based concentrations. The arsenic remaining on site could slowly oxidize and become available to the environment. In addition, the estimated costs of treatment are considerably higher than those of the selected remedy, and the ultimate fate of the treatment rinse water cannot be determined without treatability tests. For these reasons, EPA did not select a treatment alternative.

5. Technical Assistance Grants

Comment: **One citizen wanted to know if Technical Assistance Grant (TAG) recipients could sample wells after EPA has finished monitoring the wells.**

Response: Technical Assistance Grant funds may not be used for any monitoring or other technical field or laboratory use.

Comment: **A citizen asked if a TAG for Silver Mountain Mine could be used to cover other mining sites in the area as well.**

Response: Technical Assistance Grant funds are to be used only at the Superfund site they are granted for.

6. Other

Comment: **A hazardous waste treatment firm representative wrote requesting to be put on the mailing list.**

Response: EPA added the firm to the mailing list when the letter arrived and sent it a copy of the proposed plan, as requested.

Comment: **A county official commented on the Oroville Dump site and felt that the "Bureaucratic Blunder" should not occur again with this site.**

Response: EPA believes its activity at the Silver Mountain Mine site reflects consideration of community concerns about "bureaucratic waste" while still striving to protect the environment.

Comment: **One commentor had difficulty in getting copies of the RI/FS Reports.**

Response: EPA appreciates being notified of the problems associated with locating the reports. The commentor was mailed copies of the reports during the comment period. EPA is verifying that the administrative record will be accessible to the public.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

ADMINISTRATIVE RECORD INDEX

for

SILVER MOUNTAIN MINE

March 27, 1990

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 1. 0. . SITE IDENTIFICATION

SUB-HEAD: 1. 1. . Correspondence

1. 1. . - 0001 DATE: 07/30/81 PAGES: 1
AUTHOR: CLAR PRATT/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: SILVER MOUNTAIN MINE CYANIDE LEACH OPERATION

1. 1. . - 0002 DATE: 08/20/81 PAGES: 2
AUTHOR: JOHN HODGSON/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: LEADPOINT CONSOLIDATED MINES, INC. TOATS COULEE, OKANOGAN COUNTY AND THE USE OF SODIUM CYANIDE IN HEAP LEACHING OPERATIONS

1. 1. . - 0003 DATE: 09/11/81 PAGES: 1
AUTHOR: KAREN K. ALBRECHT/OKANOGAN COUNTY HEALTH DEPARTMENT
ADDRESSEE: JOHN HODGSON/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: LETTER: INFORMATION REGARDING VISIT TO THE SILVER MOUNTAIN MINE SITE

1. 1. . - 0004 DATE: 09/25/81 PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: TELEPHONE CONVERSATION WITH KEN RUSSELL OF THE MINE SAFETY AND HEALTH ADMINISTRATION CONCERNING UNSAFE OPERATION OF THE SILVER MOUNTAIN MINE

1. 1. . - 0005 DATE: 09/29/81 PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: TELEPHONE CONVERSATION WITH J. WAYNE TATMAN CONCERNING SILVER MOUNTAIN MINE

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1. 1. . - 0006 DATE: 08/20/82 PAGES: 3
AUTHOR: PATRICIA D. EWING/-
ADDRESSEE: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: LETTER: PROVIDING INFORMATION ABOUT OWNERSHIP AND PHYSICAL CONDITIONS OF THE SILVER MOUNTAIN MINE SITE

1. 1. . - 0007 DATE: 11/17/82 PAGES: 5
AUTHOR: J. MEYER/
ADDRESSEE: /
DESCRIPTION: SITE DESCRIPTION OF SILVER MOUNTAIN MINE

1. 1. . - 0008 DATE: 04/13/84 PAGES: 1
AUTHOR: DONALD WESTON/J.R.B. ASSOCIATES
ADDRESSEE: FILE/J.R.B. ASSOCIATES
DESCRIPTION: REPORT OF CONTACT WITH BARRY NELSON OF THE OKANOGAN COUNTY HEALTH DEPARTMENT CONCERNING SILVER MOUNTAIN MINE

1. 1. . - 0009 DATE: 11/15/84 PAGES: 1
AUTHOR: LORI COHEN/EPA
ADDRESSEE: FILE/EPA
DESCRIPTION: RECORD OF TELEPHONE CONVERSATION WITH DENNIS BOWHEY OF THE WASHINGTON STATE DEPARTMENT OF ECOLOGY CONCERNING THE STATUS OF SILVER MOUNTAIN MINE

1. 1. . - 0010 DATE: 02/22/85 PAGES: 10
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: REPORT ON SILVER MOUNTAIN MINE. GEOLOGICAL DESCRIPTION AND MAPS INCLUDED

1. 1. . - 0011 DATE: / / PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: TELEPHONE CONTACT WITH DOUG OSTRUM CONCERNING SILVER MOUNTAIN MINE

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1. 1. . - 0012 DATE: / / PAGES: 1
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: BRIEF DESCRIPTION OF OPERATION AND STATUS OF SILVER MOUNTAIN MINE SITE

1. 1. . - 0013 DATE: / / PAGES: 5
AUTHOR: /.
ADDRESSEE: PETE KMET, ET AL./
DESCRIPTION: HANDWRITTEN NOTES CONCERNING DATA ON SILVER MOUNTAIN MINE. INCLUDES A ONE-PAGE TYPED STATUS REPORT

SUB-HEAD: 1. 2. . Site Inspection/Preliminary Assessment Reports

1. 2. . - 0001 DATE: 11/01/80 PAGES: 1
AUTHOR: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: KEN J. ECKSTEIN/WELL OWNER
DESCRIPTION: WELL WATER REPORT

1. 2. . - 0002 DATE: 06/01/81 PAGES: 1
AUTHOR: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: DAVE GILLESPIE/WELL OWNER
DESCRIPTION: WELL WATER REPORT

1. 2. . - 0003 DATE: 06/04/81 PAGES: 17
AUTHOR: JIM HUDGINS, DICK SIRGINSON, DEAN HARNING/MINE SAFETY AND HEALTH ADMINISTRATION
ADDRESSEE: FILE/MINE SAFETY AND HEALTH ADMINISTRATION
DESCRIPTION: REPORT: FEDERAL INSPECTION OF THE SILVER STAR MOUNTAIN MINE.
SEE ALSO: 1.2. -0009

1. 2. . - 0004 DATE: 08/22/81 PAGES: 5
AUTHOR: DONALD WESTON/J.R.B. ASSOCIATES
ADDRESSEE: FILE/EPA
DESCRIPTION: POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

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1. 2. . - 0005 DATE: 04/13/82 PAGES: 1
AUTHOR: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: DAVE GILLESPIE/WELL OWNER
DESCRIPTION: WELL WATER REPORT

1. 2. . - 0006 DATE: 09/17/84 PAGES: 2
AUTHOR: MICHAEL J. GALLAGHER/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: ON-SITE INSPECTION OF SILVER MOUNTAIN MINE BY ECOLOGY & ENVIRONMENT, INC., 09/04/84

1. 2. . - 0007 DATE: 01/25/85 PAGES: 102
AUTHOR: WILLIAM CARBERRY/ECOLOGY AND ENVIRONMENT, INC.
ADDRESSEE: J. E. OSBURN/EPA
DESCRIPTION: PRELIMINARY SITE INSPECTION REPORT OF SILVER MOUNTAIN MINE

1. 2. . - 0008 DATE: 05/13/85 PAGES: 1
AUTHOR: DAVE MURDOCK, MIKE GALLAGHER, DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: WASHINGTON STATE DEPARTMENT OF ECOLOGY INSPECTION REPORT ON SILVER MOUNTAIN MINE SITE

1. 2. . - 0009 DATE: 08/12/86 PAGES: 1
AUTHOR: MIKE GALLAGHER AND DOUG DUNSTER/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: GLYNIS STUMPF/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: INSPECTION REPORT ON SILVER MOUNTAIN MINE

1. 2. . - 0010 DATE: 10/15/86 PAGES: 1
AUTHOR: MIKE GALLAGHER, DOUG DUNSTER, BRAD EWY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: WASHINGTON STATE DEPARTMENT OF ECOLOGY INSPECTION REPORT ON SILVER MOUNTAIN MINE

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1. 2. . - 0011 DATE: 12/12/88 PAGES: 16
AUTHOR: LYNN WILLIAMS/EPA
ADDRESSEE: WALTER TURNER/MINE SAFETY AND HEALTH ADMINISTRATION
DESCRIPTION: LETTER: REQUEST FOR COPY OF SILVER STAR MOUNTAIN MINE VIOLATION. COPY OF VIOLATION INCLUDED. SEE ALSO: 1.2. -0003

1. 2. . - 0012 DATE: / / PAGES: 1
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: REPORT: CONDITIONS AND STATUS OF SILVER MOUNTAIN MINE SITE 1984 AND 1986

1. 2. . - 0013 DATE: / / PAGES: 5
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/EPA
DESCRIPTION: SITE INSPECTION REPORT

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HEADING: 2. 0. . SITE STABILIZATION (WDOE) - BACKGROUND

SUB-HEAD: 2. 1. . Correspondence

2. 1. . - 0001 DATE: 11/18/82 PAGES: 2
AUTHOR: ED DENIKE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: SILVER MOUNTAIN MINE CYANIDE NEUTRALIZATION

2. 1. . - 0002 DATE: 03/13/85 PAGES: 1
AUTHOR: MIKE BLUM/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: RECORD OF TELEPHONE CONVERSATION WITH DENNIS BOWHEY CONCERNING SILVER MOUNTAIN MINE SITE

2. 1. . - 0003 DATE: 04/10/85 PAGES: 1
AUTHOR: MIKE BLUM/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: RECORD OF TELEPHONE CONVERSATION WITH DENNIS BOWHEY CONCERNING SILVER MOUNTAIN MINE SITE

2. 1. . - 0004 DATE: 05/10/85 PAGES: 5
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: MIKE BLUM/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: SILVER MOUNTAIN MINE CLEAN UP PROPOSAL FOR IN-HOUSE REVIEW

2. 1. . - 0005 DATE: 06/01/85 PAGES: 3
AUTHOR: GLYNIS STUMPF/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: HANDWRITTEN MEMORANDUM: NOTES CONCERNING ACTIVITIES AT SILVER MOUNTAIN MINE SITE

2. 1. . - 0006 DATE: 06/28/85 PAGES: 1
AUTHOR: LORI COHEN/EPA
ADDRESSEE: FILE/EPA
DESCRIPTION: SILVER MOUNTAIN MINE SITE UPDATE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

2. 1. . - 0007 DATE: 07/08/85 PAGES: 3
AUTHOR: DAVE MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: SITE STABILIZATION OPERATION AT SILVER MOUNTAIN MINE SITE, 06/15/85 TO 06/28/85

2. 1. . - 0008 DATE: 10/18/85 PAGES: 1
AUTHOR: DAVE MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: MEMORANDUM: FOLLOW-UP STABILIZATION AT SILVER MOUNTAIN MINE SITE

2. 1. . - 0009 DATE: 05/27/86 PAGES: 1
AUTHOR: DAVE MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: REPORT: TELEPHONE CONVERSATION WITH JIM MCDANIEL CONCERNING SILVER MOUNTAIN MINE SITE

2. 1. . - 0010 DATE: 05/29/86 PAGES: 2
AUTHOR: GLYNIS STUMPF/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: HERRY JEWETT/
DESCRIPTION: HANDWRITTEN MEMORANDUM: ROPES SECURING THE COVER, WHICH IS STABILIZING THE HEAP AT SILVER MOUNTAIN MINE SITE, ARE BEING STOLEN

2. 1. . - 0011 DATE: 12/19/88 PAGES: 3
AUTHOR: JOHN R. BENHAM/U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF MINES
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: LETTER: CONCERNING A DETAILED SURVEY OF THREE MONITOR WELLS AND CONSIDERATION OF A FOURTH WELL AT THE SILVER MOUNTAIN MINE SITE. INCLUDES 2 GRAPHS

2. 1. . - 0012 DATE: 01/06/89 PAGES: 6
AUTHOR: DAVID A. DENTON, JR./U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF MINES
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: MEMORANDUM: CONCERNING A SCHEDULE FOR WORK COMPLETION AT THE SILVER MOUNTAIN MINE SITE. INCLUDES 4 PAGES OF "INITIAL WET LAB ANALYSIS"

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 2. 2. . Sampling Data

2. 2. . - 0001 DATE: 06/18/81 PAGES: 2
AUTHOR: /OKANOGAN COUNTY HEALTH DEPARTMENT
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY, METAL: SILVER MOUNTAIN MINE SITE

2. 2. . - 0002 DATE: 06/11/81 PAGES: 1
AUTHOR: KAREN ALBRECHT/OKANOGAN COUNTY HEALTH DEPARTMENT
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

2. 2. . - 0003 DATE: 10/26/81 PAGES: 2
AUTHOR: J. HODGSON, H. PORATH/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

2. 2. . - 0004 DATE: 11/19/81 PAGES: 1
AUTHOR: H. PORATH/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

2. 2. . - 0005 DATE: 11/19/81 PAGES: 1
AUTHOR: H. PORATH/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY, METALS: SILVER MOUNTAIN MINE SITE

2. 2. . - 0006 DATE: 04/05/82 PAGES: 1
AUTHOR: /
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

2. 2. . - 0007 DATE: 12/03/82 PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

2. 2. . - 0008 DATE: 06/04/83 PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

2. 2. . - 0009 DATE: 11/29/83 PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIAN MINE SITE

2. 2. . - 0010 DATE: 09/04/84 PAGES: 1
AUTHOR: /E AND E, INC.
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

2. 2. . - 0011 DATE: 11/07/84 PAGES: 1
AUTHOR: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTQN STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: DATA SUMMARY: SILVER MOUNTAIN MINE SITE

SUB-HEAD: 2. 3. . Orders

2. 3. . - 0001 DATE: 11/13/81 PAGES: 4
AUTHOR: /WASHINGTON STATE SUPERIOR COURT
ADDRESSEE: BARRY NELSON, BLACKBURN S. JOSLIN/OKANOGAN COUNTY HEALTH DEPARTMENT
DESCRIPTION: ORDER: PERMITTING COUNTY HEALTH OFFICIALS TO ENTER THE SILVER MOUNTAIN MINE SITE TO ABATE HEALTH HAZARDS

SUB-HEAD: 2. 4. . Pilot Site Mitigation Plan

2. 4. . - 0001 DATE: 06/17/85 PAGES: 22
AUTHOR: /RIEDEL ENVIRONMENTAL SERVICES, INC.
ADDRESSEE: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: PILOT SITE MITIGATION PLAN FOR SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

2. 4. . - 0002 DATE: 05/22/85 PAGES: 18
AUTHOR: JOHN H. RUDDICK/RIEDEL ENVIRONMENTAL SERVICES, INC.
ADDRESSEE: DAVID MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: LETTER: TRANSMITTAL OF 17-PAGE SITE MITIGATION PLAN SUMMARY, DATED 05/21/85, FOR SILVER MOUNTAIN MINE SITE

SUB-HEAD: 2. 5. . Consent for Access Agreement

2. 5. . - 0001 DATE: 06/03/85 PAGES: 1
AUTHOR: JIM MC DANIEL/SILVER MOUNTAIN MINE
ADDRESSEE: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: AGREEMENT TO ALLOW WDOE PERSONNEL ON THE SILVER MOUNTAIN MINE SITE TO NEUTRALIZE AND DISMANTLE HEAP LEACHING OPERATIONS

SUB-HEAD: 2. 6. . Notification of Hazardous Waste Activities

2. 6. . - 0001 DATE: 06/24/85 PAGES: 1
AUTHOR: GLYNIS A. STUMPF/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/EPA
DESCRIPTION: UNIFORM HAZARDOUS WASTE MANIFEST NO. 13494

2. 6. . - 0002 DATE: 06/28/85 PAGES: 1
AUTHOR: DAVID O. MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/EPA
DESCRIPTION: UNIFORM HAZARDOUS WASTE MANIFEST NO. 13495

2. 6. . - 0003 DATE: 09/03/85 PAGES: 3
AUTHOR: DAVID O. MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/
DESCRIPTION: NOTIFICATION OF DANGEROUS WASTE ACTIVITIES. INCLUDES NOTE BY LAWRENCE ASHLEY CONFIRMING TELEPHONE CONVERSATION WITH ROSS POTTER 06/25/85

2. 6. . - 0004 DATE: 04/03/86 PAGES: 2
AUTHOR: DAVID O. MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: FILE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: GENERATOR ANNUAL DANGEROUS WASTE REPORT FOR SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 2. 7. . Photos

2. 7. . - 0001 DATE: 06/26/85 PAGES: 9
AUTHOR: GLYNIS STUMPF/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: XEROGRAPHIC COPIES OF PHOTOGRAPHS TAKEN AT SILVER MOUNTAIN MINE SITE. 3 TO 5 PHOTOGRAPHS PER PAGE, EACH LABELED

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 3. 0. . REMEDIAL INVESTIGATION (RI) - FEDERAL LEAD

SUB-HEAD: 3. 1. . Correspondence

3. 1. . - 0001 DATE: 11/11/88 PAGES: 1
AUTHOR: DEDE MONTGOMERY/EPA
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: LETTER: REVIEW OF SITE SAFETY PLAN PREPARED BY BUREAU OF MINES FOR THE SILVER MOUNTAIN MINE SITE. SEE ALSO 3.4. -0005

SUB-HEAD: 3. 2. . Memo of Understanding

3. 2. . - 0001 DATE: 09/01/87 PAGES: 15
AUTHOR: HENRY L. LONGEST, II/EPA
ADDRESSEE: REGIONAL DIRECTORS/EPA
DESCRIPTION: MEMORANDUM: AGREEMENT BETWEEN EPA AND BUREAU OF MINES TO OBTAIN BUREAU ASSISTANCE IN TREATMENT OF INORGANIC HAZARDOUS WASTE

SUB-HEAD: 3. 3. . Meetings

3. 3. . - 0001 DATE: 12/07/87 PAGES: 2
AUTHOR: KEITH ROSE/EPA
ADDRESSEE: /
DESCRIPTION: AGENDA: SILVER MOUNTAIN MINE SITE RI/FS SCOPING MEETING

3. 3. . - 0002 DATE: 12/22/87 PAGES: 3
AUTHOR: KEITH ROSE/EPA
ADDRESSEE: /
DESCRIPTION: NOTES: SILVER MOUNTAIN MINE MEETING. INCLUDES LIST OF ATTENDEES

SUB-HEAD: 3. 4. . Work Plans

3. 4. . - 0001 DATE: 06/01/88 PAGES: 71
AUTHOR: /CH2M HILL
ADDRESSEE: /EPA
DESCRIPTION: WORK PLAN FOR REMEDIAL INVESTIGATION OF THE SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

3. 4. . - 0002 DATE: 06/01/88 PAGES: 183
AUTHOR: /CH2M HILL
ADDRESSEE: /EPA
DESCRIPTION: PLANS: QUALITY ASSURANCE, FIELD SAMPLING, AND SITE SAFETY FOR SILVER MOUNTAIN MINE SITE

3. 4. . - 0003 DATE: 07/28/88 PAGES: 10
AUTHOR: WILLIAM B. SCHMIDT/U.S. DEPARTMENT OF THE INTERIOR
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: LETTER: DISCUSSION OF QUALITY ASSURANCE AND SAFETY PROCEDURES. INCLUDES STATEMENT OF SERVICES AND ESTIMATED COSTS FOR SILVER MOUNTAIN MINE SITE

3. 4. . - 0004 DATE: 09/15/88 PAGES: 5
AUTHOR: WILLIAM B. SCHMIDT/U.S. DEPARTMENT OF THE INTERIOR
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: RESPONSE TO TECHNICAL QUESTIONS RAISED BY EPA AND WASHINGTON STATE DEPARTMENT OF ECOLOGY

4. . - 0005 DATE: 10/31/88 PAGES: 41
AUTHOR: /BUREAU OF MINES
ADDRESSEE: /EPA
DESCRIPTION: SITE SAFETY PLAN FOR THE SILVER MOUNTAIN MINE SITE. FOR AMENDMENTS AND REVISIONS, SEE 3.4. -0006. SEE ALSO 3.1. -0001

3. 4. . - 0006 DATE: / / PAGES: 3
AUTHOR: DAVID K. DENTON, JR./BUREAU OF MINES
ADDRESSEE: BURTON GOSLING/BUREAU OF MINES
DESCRIPTION: MEMORANDUM: REVISION TO SILVER MOUNTAIN MINE SITE SAFETY PLAN. SEE ALSO: 3.4. -0004

SUB-HEAD: 3. 5. . Comments on Work Plan

3. 5. . - 0001 DATE: 08/01/88 PAGES: 5
AUTHOR: KEITH ROSE/EPA
ADDRESSEE: WILLIAM B. SCHMIDT/U.S. DEPARTMENT OF THE INTERIOR
DESCRIPTION: LETTER: COMMENTS BY EPA AND WASHINGTON STATE DEPARTMENT OF ECOLOGY ON THE WORK PLAN FOR THE SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 3. 6. . Sampling and Analysis Data

3. 6. . - 0000 DATE: / / PAGES: 0
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: SEE 3.7 0002 AND 3.7 0003 FOR SAMPLING AND ANALYSIS DATA SUMMARIES

SUB-HEAD: 3. 7. . Remedial Investigation Reports

3. 7. . - 0001 DATE: 01/19/90 PAGES: 218
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: REMEDIAL INVESTIGATION REPORT, SILVER MOUNTAIN MINE, OKANOGAN COUNTY, WASHINGTON

3. 7. . - 0002 DATE: 12/15/89 PAGES: 401
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: REMEDIAL INVESTIGATION REPORT VOLUME 2 - APPENDICES SILVER MONTAIN MINE, OKANOGAN COUNTY, WASHINGTON

3. 7. . - 0003 DATE: 12/15/89 PAGES: 582
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: APPENDIX D CHEMICAL ANALYSES AND DATA QUALITY VALIDATION

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 4. 0. . FEASIBILITY STUDY (FS)

SUB-HEAD: 4. 1. . Feasibility Study Report

4. 1. . - 0001 DATE: 01/17/90 PAGES: 300
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: FEASIBILITY STUDY REPORT SILVER MOUNTAIN MINE, OKANOGAN COUNTY, WASHINGTON

SUB-HEAD: 4. 2. . Proposed Plan

4. 2. . - 0001 DATE: 01/26/90 PAGES: 6
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: SILVER MOUNTAIN MINE SUPERFUND SITE FACT SHEET HORSE SPRINGS COULEE, WASHINGTON THE PROPOSED PLAN

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 5. 0. . RECORD OF DECISION (ROD)

SUB-HEAD: 5. 1. .

5. 1. . - 0001 DATE: / / PAGES: 0
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: RESERVED

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 6. 0. . STATE COORDINATION

SUB-HEAD: 6. 1. . Correspondence

6. 1. . - 0001 DATE: 11/30/82 PAGES: 1
AUTHOR: JOHN MEYER/EPA
ADDRESSEE: FILE/EPA
DESCRIPTION: RECORD OF TELEPHONE CONVERSATION WITH DENNIS BOWHEY CONCERNING SILVER MOUNTAIN MINE SITE. CLEAN-UP WOULD HAVE TO BE A STATE RESPONSIBILITY

6. 1. . - 0002 DATE: 10/18/84 PAGES: 1
AUTHOR: ROBERT E. LANDRETH/EPA
ADDRESSEE: DENNIS BOWHEY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: LETTER: THANKING WDOE FOR THE OPPORTUNITY TO BE INVOLVED AND GAINING EXPERIENCE FROM THE FIELD WORK AT SILVER MOUNTAIN MINE SITE

6. 1. . - 0003 DATE: 06/02/85 PAGES: 2
AUTHOR: KATHRYN DAVIDSON/EPA
ADDRESSEE: KEN BACK/WASHINGTON PLANNING AND COMMUNITY AFFAIRS AGENCY
DESCRIPTION: LETTER: NOTIFICATION OF SILVER MOUNTAIN MINE SITE BECOMING AN EPA FUNDED PROJECT

6. 1. . - 0004 DATE: 07/01/85 PAGES: 1
AUTHOR: LORI COHEN/EPA
ADDRESSEE: CAROL KRAEGE/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: LETTER: MATERIALS ON SILVER MOUNTAIN MINE SITE PRP SEARCH. IS SILVER STAR AND SILVER MOUNTAIN THE SAME MINE?

6. 1. . - 0005 DATE: 08/28/85 PAGES: 1
AUTHOR: DORI GOODRICH/WASHINGTON STATE DEPARTMENT OF COMMUNITY DEVELOPMENT
ADDRESSEE: LORI COHEN/EPA
DESCRIPTION: LETTER: NOTIFICATION THAT THE INTERGOVERNMENTAL REVIEW PROCESS IS COMPLETE, CONCERNING SILVER MOUNTAIN MINE SITE AND THE U.S.D.A. PESTICIDE LABORATORY

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

6. 1. . - 0006 DATE: 03/24/88 PAGES: 7
AUTHOR: BRAD J. EWY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: LETTER: REVIEW OF REMEDIAL INVESTIGATION WORK, QUALITY ASSURANCE, FIELD SAMPLING, AND SITE SAFETY PLANS FOR THE SILVER MOUNTAIN MINE SITE

6. 1. . - 0007 DATE: 07/19/88 PAGES: 1
AUTHOR: BRAD J. EWY/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: LETTER: REVIEW OF 06/88 REMEDIAL INVESTIGATION WORK, QUALITY ASSURANCE, FIELD SAMPLING, AND SITE SAFETY PLANS FOR THE SILVER MOUNTAIN MINE SITE

6. 1. . - 0008 DATE: 09/20/88 PAGES: 2
AUTHOR: LYNN WILLIAMS/EPA
ADDRESSEE: DOROTHY MILHOLLIN/WASHINGTON STATE DEPARTMENT OF ECOLOGY
DESCRIPTION: LETTER: REQUEST FOR ECOLOGY RECORDS SEARCH CONCERNING THE SILVER MOUNTAIN MINE SITE

6. 1. . - 0009 DATE: 02/14/90 PAGES: 7
AUTHOR: BRAD EWY/DOE
ADDRESSEE: JANET O'HARA/EPA
DESCRIPTION: LETTER LISTING WASHINGTON STATE ARAR'S

6. 1. . - 0010 DATE: 03/21/90 PAGES: 3
AUTHOR: Carol Kraege/Washington Dept. of Ecology
ADDRESSEE: Janet O'Hara/EPA
DESCRIPTION: Letter listing applicable ARAR's to pump and treat scenario outlined in the draft ROD.

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 7. 0. . ENFORCEMENT

SUB-HEAD: 7. 1. . Correspondence

7. 1. . - 0001 DATE: 05/29/85 PAGES: 1
AUTHOR: BONNIE B. BUNNING/WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
ADDRESSEE: WALTER STEINWEG/PRC ENGINEERING
DESCRIPTION: LETTER: INFORMATION ABOUT POSSIBLE LOCATION OF WAYNE TATMAN, PRP FOR SILVER MOUNTAIN MINE

SUB-HEAD: 7. 2. . Notice Letters and Requests for Information

7. 2. . - 0001 DATE: 06/26/85 PAGES: 1
AUTHOR: DAVE MURDOCK/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: WAYNE TATMAN/SILVER MOUNTAIN MINE
DESCRIPTION: NOTICE LETTER

7. 2. . - 0002 DATE: 01/29/88 PAGES: 6
AUTHOR: CHARLES E. FINDLEY/EPA
ADDRESSEE: JAMES E. BROUSSEAU/LEADPOINT CONSOLIDATED MINES COMPANY
DESCRIPTION: NOTICE LETTER

7. 2. . - 0003 DATE: 01/29/88 PAGES: 6
AUTHOR: CHARLES E. FINDLEY/EPA
ADDRESSEE: NORMAN A. LAMB/LEADPOINT CONSOLIDATED MINES COMPANY
DESCRIPTION: NOTICE LETTER

7. 2. . - 0004 DATE: 01/29/88 PAGES: 7
AUTHOR: CHARLES E. FINDLEY/EPA
ADDRESSEE: JIM MC DANIEL/LEADPOINT CONSOLIDATED MINES COMPANY
DESCRIPTION: NOTICE LETTER

7. 2. . - 0005 DATE: 01/29/88 PAGES: 6
AUTHOR: CHARLES E. FINDLEY/EPA
ADDRESSEE: G. PATRICK MORRIS/SILVER MOUNTAIN MINE
DESCRIPTION: NOTICE LETTER

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

7. 2. . - 0006 DATE: 01/29/88 PAGES: 6
AUTHOR: CHARLES E. FINDLEY/EPA
ADDRESSEE: M. BLAIR OGDEN/SILVER MOUNTAIN MINE
DESCRIPTION: NOTICE LETTER

7. 2. . - 0007 DATE: 01/29/88 PAGES: 6
AUTHOR: CHARLES E. FINDLEY/EPA
ADDRESSEE: J. WAYNE TATMAN/LEADPOINT CONSOLIDATED MINES COMPANY
DESCRIPTION: NOTICE LETTER

SUB-HEAD: 7. 3. . Responses to Requests for Information

7. 3. . - 0001 DATE: 02/12/88 PAGES: 3
AUTHOR: WILLIAM V. COTTRELL/ATTORNEY AT LAW
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: RESPONSE LETTER: WRITTEN FOR JAMES MC DANIEL AND HIS WIFE, CLAIMING NON-RESPONSIBILITY FOR THE SILVER MOUNTAIN MINE SITE. INCLUDES COPY OF THE DEED

7. 3. . - 0002 DATE: 03/11/88 PAGES: 25
AUTHOR: NORMAN A. LAMB/LEADPOINT CONSOLIDATED MINES COMPANY
ADDRESSEE: KEITH ROSE/EPA
DESCRIPTION: RESPONSE LETTER: INFORMATION ABOUT SILVER MOUNTAIN MINE SITE, INCLUDING COPIES OF DEED, ARTICLES OF INCORPORATION, TITLE INSURANCE, ETC.

SUB-HEAD: 7. 4. . Consent for Access Agreements

7. 4. . - 0001 DATE: 08/05/88 PAGES: 1
AUTHOR: KEITH A. ROSE/EPA
ADDRESSEE: NORMAN A. LAMB/LEADPOINT CONSOLIDATED MINES COMPANY
DESCRIPTION: LETTER: REQUEST FOR ACCESS TO THE SILVER MOUNTAIN MINE SITE

7. 4. . - 0002 DATE: 08/05/88 PAGES: 1
AUTHOR: KEITH A. ROSE/EPA
ADDRESSEE: JAMES MC DANIEL/LOOMIS, WA 98827
DESCRIPTION: LETTER: REQUEST FOR ACCESS TO THE SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

7. 4. . - 0003 DATE: 08/10/88 PAGES: 3
AUTHOR: KEITH A. ROSE/EPA
ADDRESSEE: JAMES MC DANIEL/LOOMIS, WA 98827
DESCRIPTION: LETTER: REQUEST FOR ACCESS TO THE SILVER MOUNTAIN MINE SITE. INCLUDES BLANK, REVISED CONSENT AGREEMENT

7. 4. . - 0004 DATE: 10/17/88 PAGES: 2
AUTHOR: NORMAN LAMB/LEADPOINT CONSOLIDATED MINE COMPANY
ADDRESSEE: FILE/EPA
DESCRIPTION: SIGNED CONSENT FORM FOR ACCESS TO THE SILVER MOUNTAIN MINE SITE

7. 4. . - 0005 DATE: 12/21/88 PAGES: 5
AUTHOR: KEITH A. ROSE/EPA
ADDRESSEE: JAMES W. MC DANIEL/LOOMIS, WA 98837
DESCRIPTION: LETTER: FOLLOW-UP OF TELEPHONE CONVERSATION SEEKING CONSENT FOR ACCESS TO THE SILVER MOUNTAIN MINE SITE. INCLUDES A 2-PAGE UNSIGNED CONSENT FORM AND A 2-PAGE SIGNED CONSENT FORM

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 8. 0. . HEALTH ASSESSMENTS

SUB-HEAD: 8. 1. . Correspondence

8. 1. . - 0001 DATE: 07/28/88 PAGES: 1
AUTHOR: STEPHEN D. VON ALLMEN/U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
ADDRESSEE: JOEL MULDER/EPA
DESCRIPTION: MEMORANDUM: TRANSMITTAL OF PRELIMINARY HEALTH ASSESSMENT FOR THE SILVER MOUNTAIN MINE SITE

8. 1. . - 0002 DATE: 01/09/90 PAGES: 2
AUTHOR: Gregory D. Thomas/Agency for Toxic Substances and Disease Registry
ADDRESSEE: Janet O'Hara/EPA
DESCRIPTION: Letter commenting on draft RI/FS Report

SUB-HEAD: 8. 2. . ATSDR Health Assessments

8. 2. . - 0001 DATE: 07/28/88 PAGES: 4
AUTHOR: STEPHEN D. VON ALLMEN/U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
ADDRESSEE: JOEL MULDER/EPA
DESCRIPTION: LETTER: TRANSMITTAL FOR PRELIMINARY HEALTH ASSESSMENT FOR SILVER MOUNTAIN MINE SITE. INCLUDES A 3-PAGE PRELIMINARY HEALTH ASSESSMENT DATED 07/27/88

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 9. 0. . NATURAL RESOURCE TRUSTEES

SUB-HEAD: 9. 1. . Correspondence

9. 1. . - 0001 DATE: 08/15/85 PAGES: 1
AUTHOR: Allen D. Klein/U.S. Dept. of the Interior
ADDRESSEE: Robert Kievit/EPA
DESCRIPTION: Letter stating that DOI has no present plans for work at Silver Mt. Mine and does not anticipate any work in future

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

HEADING: 10. 0. . PUBLIC PARTICIPATION

SUB-HEAD: 10. 1. . Correspondence

10. 1. . - 0001 DATE: 03/29/85 PAGES: 1
AUTHOR: DEBORAH FLOOD/EPA
ADDRESSEE: JAMES MC DANIEL/LOOMIS, WA 98827
DESCRIPTION: LETTER: COMPLETION OF 09/04/84 INVESTIGATION OF THE SILVER MOUNTAIN MINE SITE

10. 1. . - 0002 DATE: 11/10/87 PAGES: 1
AUTHOR: BERT SANGER/OROVILLE REGIONAL PLANNING ADVISORY COMMISSION
ADDRESSEE: DEBORAH J. YAMAMOTO/EPA
DESCRIPTION: LETTER: TRANSMITTAL OF DRAFT COMPREHENSIVE PLAN FOR THE OROVILLE REGION. LETTER ALSO ADDRESSED TO JENNIFER RUFFOLOS OF ICF TECHNOLOGY

10. 1. . - 0003 DATE: 12/18/87 PAGES: 1
AUTHOR: JENNIFER RUFFOLO/ICF TECHNOLOGY INCORPORATED
ADDRESSEE: ELLEN WEAVER/OKANOGAN PUBLIC LIBRAY
DESCRIPTION: LETTER: TRANSMITTAL OF EPA'S COMMUNITY RELATIONS PLAN FOR THE SILVER MOUNTAIN MINE SITE

10. 1. . - 0004 DATE: 02/15/90 PAGES: 1
AUTHOR: Jackie Scott/Hazardous Waste Treatment Control
ADDRESSEE: Jeff Webb/EPA
DESCRIPTION: Letter requesting that they be put on the Silver Mt. Mine mailing list

SUB-HEAD: 10. 2. . Community Relations Plan

10. 2. . - 0001 DATE: 12/01/87 PAGES: 25
AUTHOR: HANS EWOLDSEN/WOODWARD-CLYDE CONSULTANTS
ADDRESSEE: DEBBIE YAMAMOTO AND TIMOTHY BRINCEFIELD/EPA
DESCRIPTION: COMMUNITY RELATIONS PLAN FOR THE SILVER MOUNTAIN MINE SITE

SILVER MOUNTAIN MINE - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 10. 3. . Fact Sheets and Press Releases

10. 3. . - 0001 DATE: 07/30/85 PAGES: 2
AUTHOR: DAVE MURDOCK, ED IVES/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: /
DESCRIPTION: INFORMATION REGARDING PROGRESS OF NEUTURALIZING HEAP LEACHING OPERATIONS AT THE SILVER MOUNTAIN MINE SITE

10. 3. . - 0002 DATE: 07/01/87 PAGES: 1
AUTHOR: TIM BRINCEFIELD/EPA
ADDRESSEE: /
DESCRIPTION: NEWS RELEASE CONCERNING PUBLIC ASSISTANCE GRANTS

10. 3. . - 0003 DATE: 09/14/87 PAGES: 2
AUTHOR: DEBORAH J. YAMAMOTO/EPA
ADDRESSEE: /
DESCRIPTION: ANNOUNCEMENT OF EPA'S PREPARATION FOR AN IN-DEPTH INVESTIGATION OF CONTAMINATION AT THE SILVER MOUNTAIN MINE SITE

10. 3. . - 0004 DATE: 10/12/88 PAGES: 3
AUTHOR: KEITH ROSE/EPA
ADDRESSEE: /
DESCRIPTION: ANNOUNCEMENT OF THE BEGINNING OF EPA'S REMEDIAL INVESTIGATION AT THE SILVER MOUNTAIN MINE SITE

10. 3. . - 0005 DATE: 09/21/89 PAGES: 1
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: BACKGROUND AND STATUS INFORMATION CONCERNING SILVER MOUNTAIN MINE SITE (DOCUMENT DATE IS APPROXIMATE)

10. 3. . - 0006 DATE: 01/26/90 PAGES: 6
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: SEE 4.2 0001 FOR FACT SHEET INFORMATION ON THE PROPOSED PLAN

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SUB-HEAD: 10. 4. . Comments and Responses

10. 4. . - 0001 DATE: 01/10/90 PAGES: 1
AUTHOR: Ron Eggers/Bureau of Indian Affairs, Portland Area Office
ADDRESSEE: Janet O'Hara/EPA
DESCRIPTION: Letter commenting on draft RI/FS (See also Section 9.0)

10. 4. . - 0002 DATE: 02/01/90 PAGES: 1
AUTHOR: Melvin E. Kuhlmann/Board of County Commissioners, Okanagan County
ADDRESSEE: Janet B. O'Hara/EPA
DESCRIPTION: Letter recommending alternative #1, commenting on expense of remediation

10. 4. . - 0003 DATE: 02/20/90 PAGES: 1
AUTHOR: Janet B. O'Hara/EPA
ADDRESSEE: Administrative Record/EPA
DESCRIPTION: Record of Communication - phone call received from Michael Mazetti by Janet O'Hara regarding proposed plan for Silver Mt. Mine

10. 4. . - 0004 DATE: 02/22/90 PAGES: 1
AUTHOR: Janet O'Hara/EPA
ADDRESSEE: Administrative Record/EPA
DESCRIPTION: Record of Communication - phone call from Richard Bayless to Janet O'Hara regarding proposed plan for Silver Mt. Mine

10. 4. . - 0005 DATE: 02/22/90 PAGES: 1
AUTHOR: Janet B. O'Hara/EPA
ADDRESSEE: Richard Bayless/
DESCRIPTION: Letter accompanying copies of the RI/FS Study Reports

10. 4. . - 0006 DATE: 02/26/90 PAGES: 1
AUTHOR: Janet O'Hara/EPA
ADDRESSEE: File/
DESCRIPTION: Handwritten comments on RI/FS Reports received by Janet O'Hara in a phone communication from Richard Bayless

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10. 4. . - 0007 DATE: 02/26/90 PAGES: 1
AUTHOR: Richard Bayless/
ADDRESSEE: Janet O'Hara/EPA
DESCRIPTION: Letter commenting on RI/FS Reports

10. 4. . - 0008 DATE: 02/28/90 PAGES: 1
AUTHOR: Janet O'Hara/EPA
ADDRESSEE: Mr. McDaniel/
DESCRIPTION: Record of Communication - phone call received by Janet O'Hara from Mr. McDaniel regarding new well to replace his stock tank

10. 4. . - 0009 DATE: 03/19/90 PAGES: 1
AUTHOR: Gretchen Schmidt/EPA
ADDRESSEE: Michael Mazetti/
DESCRIPTION: Handwritten notes from phone conversation of 3/19/90 - confirmation of comments and comments on groundwater

10. 4. . - 0010 DATE: 03/19/90 PAGES: 1
AUTHOR: Gretchen Schmidt/EPA
ADDRESSEE: Richard Bayless/
DESCRIPTION: Handwritten notes from phone conversation of 3/19/90

SUB-HEAD: 10. 5. . Public Notice of Availability of Information, Notice of Meetings

10. 5. . - 0001 DATE: 01/29/90 PAGES: 1
AUTHOR: /The Wenatchee World
ADDRESSEE: /
DESCRIPTION: Newspaper ad announcing public meeting and public comment period

10. 5. . - 0002 DATE: 02/13/90 PAGES: 1
AUTHOR: /The Wenatchee World
ADDRESSEE: /
DESCRIPTION: Newspaper ad announcing 3 week remainder of public comment period

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10. 5. . - 0003 DATE: 02/15/90 PAGES: 1
AUTHOR: /Gazette Tribune
ADDRESSEE: /
DESCRIPTION: Newspaper ad announcing 3 week remainder of public comment period

10. 5. . - 0004 DATE: 01/25/90 PAGES: 1
AUTHOR: /Gazette Tribune
ADDRESSEE: /
DESCRIPTION: Newspaper ad announcing investigation results and public meeting

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HEADING: 11. 0. . TECHNICAL SOURCES AND GUIDANCE DOCUMENTS

SUB-HEAD: 11. 1. . Guidances

11. 1. . - 0001 DATE: 03/07/89 PAGES: 3
AUTHOR: /EPA
ADDRESSEE: FILE/EPA
DESCRIPTION: LIST OF EPA GUIDANCES USED IN THE INVESTIGATION AND DECISION-MAKING PROCESSES FOR THE SILVER MOUNTAIN MINE SITE

SUB-HEAD: 11. 2. . Maps and Photos

11. 2. . - 0001 DATE: 04/01/70 PAGES: 1
AUTHOR: /U.S. GEOLOGICAL SURVEY
ADDRESSEE: /
DESCRIPTION: COPY OF MAP OF OKANOGAN COUNTY. NOTE: ORGINAL IS ONE LARGE SHEET AND HAD TO BE COPIED ONTO TWO SMALLER SHEETS

11. 2. . - 0002 DATE: 07/24/81 PAGES: 1
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: COPY OF PHOTOS OF THE SILVER MOUNTAIN MINE SITE. ACTUAL PHOTOS LOCATED AT EPA REGION X HEADQUARTERS

11. 2. . - 0003 DATE: 07/01/82 PAGES: 1
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: COPY OF PHOTOS OF THE SILVER MOUNTAIN MINE SITE. ACTUAL PHOTOS LOCATED AT EPA REGION X HEADQUARTERS

11. 2. . - 0004 DATE: 08/12/86 PAGES: 1
AUTHOR: MIKE GALLAGHER/WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: /
DESCRIPTION: COPY OF PHOTOGRAPHS, PROBABLY OF THE SILVER MOUNTAIN MINE SITE. ACTUAL PHOTOS LOCATED AT EPA REGION X HEADQUARTERS

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SUB-HEAD: 11. 3. . Technical Sources

11. 3. . - 0001 DATE: 01/01/72 PAGES: 31
AUTHOR: /WASHINGTON STATE DEPARTMENT OF ECOLOGY
ADDRESSEE: /
DESCRIPTION: INVESTIGATIONS; GEOHYDROLOGIC EVALUATION OF ANEAS LAKE-HORSE SPRINGS COULEE, OKANOGAN COUNTY, WASHINGTON

11. 3. . - 0002 DATE: 12/26/86 PAGES: 8
AUTHOR: F. W. DE VRIES/E. J. DU PONT DE NEMOURS & COMPANY
ADDRESSEE: LORI COHEN/EPA
DESCRIPTION: LETTER: TRANSMITTAL OF BULLETIN ON CHLORINATION OF CYANIDE RESIDUES FROM MINING INDUSTRY OPERATIONS

11. 3. . - 0003 DATE: / / PAGES: 3
AUTHOR: /E. J. DU PONT DE NEMOURS & COMPANY
ADDRESSEE: /
DESCRIPTION: TECHNICAL INFORMATION BULLETIN ON "CHLORINATION OF CYANIDE RESIDUES FROM MINING INDUSTRY OPERATIONS"

11. 3. . - 0004 DATE: 03/01/84 PAGES: 4
AUTHOR: /DU PONT
ADDRESSEE: /
DESCRIPTION: DATA SHEET ON "KOSTONE B PEROXYGEN COMPOUND" FOR TREATMENT OF MINING WASTE CONTAINING CYANIDE