Third Five-Year Review of the Silver Mountain Mine Superfund Site, Okanogan County, Washington

Prepared by: Date:

Brianne D. Harcourt, Site Manager
Toxics Cleanup Program
Washington State Department of Ecology

Approved by: Date:

Daniel D. Opalski, Director
Environmental Cleanup Office
USEPA Region 10

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: Silver Mountain Mine		
EPA ID *(from WasteLAN)*: WAD980722789		
Region: 10	**State:** WA	**City/County:** Okanogan County

SITE STATUS

NPL STATUS: Deleted	
Remediation status (choose all that apply): Complete	
Multiple OUs?* No	**Construction completion date?** 11/6/1992
Has site been put into reuse? No	

REVIEW STATUS

Lead agency: Washington State	
Author name: Brianne Harcourt	
Author title: Site Manager	**Author affiliation:** Washington State Department of Ecology
Review period:** 2/15/2007 to 9/12/2007	
Date(s) of site inspection: June 26, 2007	
Type of review: NPL State/Tribe-lead	
Review number: 3 (third)	
Triggering action: Previous Five-Year Review Report/annual inspections	
Triggering action date *(from WasteLAN)*: 9 / 23 / 2002	
Due date *(five years after triggering action date)*: 9 / 23 / 2007	

*["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd

Issues:

Annual State Inspections & Evaluations: Annual state inspections and maintenance of the site occurred in 2004, 2005 and 2007, but did not occur in 2003 and 2006. A site inspection did occur concurrently with this five-year review.

Recommendations and Follow-up Actions:

Conduct annual inspections and maintenance of the cap to ensure continued protection of human health and the environment at the Silver Mountain Mine (Site). The EPA fence is in disrepair; however, a newer fence placed by the adjacent property owner adequately controls access to the Site. The fence situation should continue to be monitored on an annual basis to ensure that it is protective of the remedy.

The Uniform Environmental Covenant Act (UECA) was adopted by the State of Washington in 2007. EPA and Ecology will consider and investigate establishment of a new covenant under UECA prior to the next five-year review. This may help ensure long-term protectiveness of the cap and non-usage of groundwater for human consumption. A UECA may also allow Ecology and EPA to more effectively enforce the restrictions and bind successive owners.

Protectiveness Statement:

The remedial action cleanup activities taken at the Site are consistent with the objectives of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and provide protection of human health and the environment. The cap remains in excellent condition and institutional controls remain in-place and appear to be effective. The Record of Decision and Explanation of Significant Differences indicate cleanup standards for the heap pile and mine dump materials and the surrounding soils are 200 milligrams per kilogram (mg/kg) for arsenic and 95 mg/kg for total cyanide. These protective levels reduce the risks to levels below the 1.0 Hazard Index or health based levels; and for arsenic, a human carcinogen, the cancer risk factor will be reduced below one in ten thousand.

Other Comments:

None.

Contents

Page

Appendices

Executive Summary

The Silver Mountain Mine (Site) is located in rural Okanogan County, Washington. The Site was listed on the National Priorities List in 1986. The Record of Decision was issued in 1990 and an Explanation of Significant Differences was issued in 1994. The cleanup consisted of consolidating and capping contaminated arsenic- and cyanide-laden materials. Five-year and annual reviews are required to be conducted at the Site. Since the last five-year review conducted in 2002, annual reviews were completed in 2004, 2005 and 2007. Annual reviews were not completed in 2003 and 2006. The failure to conduct annual inspections in 2003 and 2006 did not result in a less protective Site and the cap remains in excellent condition.

Overall, the remedy is performing as designed and no additional actions are required. The Washington State Department of Ecology will be conducting annual inspections and maintenance of the Site. The Washington Uniform Environmental Covenants Act (UECA) was adopted by the state of Washington in 2007. Prior to the next five-year review, Ecology and EPA will consider and investigate conducting a title search on the Site and developing a new deed restriction under the new Washington Uniform Environmental Covenants Act.

Acronyms

Applicable or Relevant and Appropriate Requirements (ARARs)
Code of Federal Regulations (CFR)
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
Contaminants of Concern (COC)
Environmental Protection Agency (EPA)
Explanation of Significant Differences (ESD)
Feasibility Study (FS)
Institutional Controls Program (ICP)
micrograms per liter (ug/L)
milligrams per kilogram (mg/kg)
National Contingency Plan (NCP)
National Priority List (NPL)
Quality Assurance and Quality Control (QA/QC)
Record of Decision (ROD)
Remedial Actions (RA)
Remedial Action Objectives (RAOs)
Remedial Investigation and Feasibility Study (RI/FS)
State Superfund Contract (SSC)
To be considered (TBC)
Uniform Environmental Covenants Act (UECA)
U.S. Bureau of Land Management (BOM)
Washington State Department of Ecology (Ecology)

I. Introduction

This report summarizes the third five-year review of remedial actions implemented by the Environmental Protection Agency (EPA) Region 10 and the State of Washington at the Silver Mountain Mine Superfund Site (Site) in Okanogan County, Washington. This five-year review of remedial actions has been prepared to meet the federal statutory requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 of CERCLA, 42 U.S.C. § 9621 and the National Contingency Plan, 40 CFR 300.430(f)(4)(ii). The Washington Department of Ecology has the lead for this Site and conducted the Five-Year Review. EPA is the support agency and accordingly commented on the Five-Year Review Report.

At the time of this five-year review, full implementation of the Site remedy had been completed. Two five-year reviews and three annual reviews have been completed. The Site was deleted from the National Priorities List (NPL) on September 22, 1997. The purpose of this five-year review is to evaluate the implementation and performance of the remedy to determine if the remedy is protective of human health and the environment. The EPA documents that set-forth the selected remedy for the Site include:

- Record of Decision (ROD), Silver Mountain Mine Superfund Site, Okanogan County, Washington, March 27, 1990 and
- Explanation of Significant Differences (ESD) at the Silver Mountain Mine Superfund Site, Okanogan County, Washington, October 12, 1994.

The trigger action for Five-Year Reviews was the completion of the remedial action in 1992. This review covers the entire Site, which has been addressed as a single operable unit.

II. Site Background & Chronology

1) Site Description and History

The Site is located in Okanogan County, in north-central Washington State, about six air miles northwest from the town of Tonasket. See attachment 1 for a diagram showing the location of the Site. The five-acre Site lies in a north-south running valley known as Horse Springs Coulee and is currently owned by Mr. Jim McDaniel of Loomis, Washington. The area around the Site is generally unpopulated, is semi-arid with scrub vegetation, and is primarily used for cattle grazing.

Underground, hard rock mining for silver and gold began at the Site in 1902. By 1956, the sporadic development of the mine produced about 2000 feet of underground workings and several tailings piles in a mine dump consisting of waste and mineralized rock. A 400-ton per day mill was constructed in 1952, but was never used. The mill had been removed prior to the Superfund investigations.

From 1980 to 1981, Precious Metals Extraction, Ltd., constructed a cyanide heap leach pile located north of the mill foundation and attempted to extract silver and gold from the previously mined tailings. The heap pile consisted of about 5,300 tons of mineralized rock in a 100-foot by 105-foot by 14-foot pile on top of a 20 mil (one-thousandth of an inch) thick plastic liner. About 4,400 pounds of sodium cyanide was mixed with water and sprayed on the top of the heap pile. The cyanide-laden solution was then collected in a leachate collection pond located south of the heap pile.

In July 1981, the Site was abandoned without cleanup or treatment of chemicals on the Site. Cyanide solution remained in the leachate collection pond and in the heap pile. Several empty cyanide drums and large containers of carbon also were abandoned on-site.

In November 1981, the Washington Department of Ecology (Ecology) investigated the Site, and in 1982, took an emergency action to neutralize the cyanide solution with sodium hypochlorite. After two applications and recirculating the hypochlorite solution through the heap and leachate collection pond, the cyanide levels dropped in the leachate collection pond. Some residual material, however, remained in the heap material and continued to leach, as cyanide was detected in the heap pile in 1989. Because there was no cyanide detected in the soil or heap pile during the Site cleanup in 1992, it appears that some natural degradation occurred.

Ecology recommended the Site for the NPL in 1982. In October 1984, the Site was added to the NPL by the EPA.

Ecology started initial remedial planning activities in 1981. In 1982, Ecology provided reduction of risks at the Site by neutralizing the cyanide solution. In 1985, Ecology removed the drums of hazardous materials left on-site when the Site was abandoned. See Table 1 for a summary of chronological events.

Table 1: Chronology of Site Events at the Silver Mountain Mine

Event	Date
Initial discovery of problem or contamination	11/1981
Pre-NPL responses	
Preliminary assessment	08/31/1984
HRS package	09/06/1984
Proposal to NPL	10/15/1984
Site inspection	02/27/1985
NPL RP search	05/15/1985
NPL listing	06/10/1986
Removal actions	1982
Remedial Investigation/Feasibility Study complete	03/27/1990
ROD signature	03/27/1990
ROD amendments or ESDs	10/12/1994
Enforcement documents (CD, AOC, Unilateral Administrative Order)	NA
Remedial design start	05/01/1990

Remedial design complete	11/27/1991
Superfund State Contract, Cooperative Agreement, or Federal Facility Agreement signature	01/04/1991
Actual remedial action start	06/15/1991
Construction dates (start, finish)	06/29/1992 to 11/06/1992
Construction completion date	11/06/1992
Final Close-out Report	06/1997
Deletion from NPL	09/22/1997
Previous five-year reviews	07/16/1997, 09/23/2002

2) Studies Conducted at the Site

In 1988, EPA started the Remedial Investigation and Feasibility Study (RI/FS) by contracting with the U.S. Bureau of Mines (BOM). BOM conducted the Site investigation which obtained the data necessary to determine the nature and extent of contamination. The physical and chemical characteristics of the Site were evaluated by field mapping and analysis of Site materials. The hydrogeologic investigation incorporated four monitoring wells, three off-site water supply wells, and two on-site surface seeps. Thirty-four samples from the heap leach pile and mine dump material, twenty samples of nearby soils, and three rounds of water samples from the seven wells and the two surface water seeps were collected and analyzed.

The investigation identified and evaluated the following three potential sources of contaminants identified at the Site:

- The heap leach pile.
- The unprocessed rock.
- The mine drainage water.

Potential exposure pathways for contaminants were identified as:

- On-site soils.
- On-site surface water.
- On-site ground water in a shallow aquifer.
- Off-site ground water in the region.

The risk assessment identified arsenic and cyanide as the primary contaminants of concern. Arsenic is a component of the native rock in the area. The concentration of arsenic in the soil is related to the amount of arsenic in the native rock and whether it is oxidized in the native rock. The oxidized arsenic is more soluble which in turn can increase the concentration in the soils from all of the mined materials, the heap pile, and the mine dump. The highest arsenic levels found during the RI/FS were in the mined material and in mine drainage water sampled from the stock water tank.

Cyanide was brought to the Site by Precious Metals Extraction, Ltd., and spread on the prepared heap of previously mined materials. Cyanide concentrations in the heap pile were reduced during the 1982 removal action taken by Ecology. The cyanide in the leachate pond was measured prior to the Ecology actions, and only a small concentration was measured in the leachate pond after the Ecology removal.

Both arsenic and cyanide were found in the perched shallow aquifer just at the edge of the heap pile. During the RI/FS, the concentrations were found to be elevated above the background level in on-site monitoring wells. Due to the low yield, or low hydraulic conductivity, in the aquifer under the Site and diversion of the surface seeps away from the Site, natural attenuation is expected to result in a gradual decrease in these groundwater values.

Although elevated levels of arsenic were found in the mine drainage, it was anticipated that blocking the mine entrance would divert surface water runoff and eliminate this exposure route. As part of a subsequent risk assessment, the mine drainage was determined to pose no ecological threat.

The Feasibility Study screened twenty-three various methods of cleaning up the Site. From this list, eight alternatives were developed and evaluated against the nine criteria listed in the National Contingency Plan (NCP).

Three primary contamination sources were identified in the ROD. First, arsenic and cyanide were found in the heap leach pile of mined material and in the trench remaining from the abandoned cyanide heap leaching operation. Second, west of the heap pile was a larger pile of unprocessed rock from which the material was taken for the heap leaching operation. The rock contained high levels of arsenic. Third, mine drainage water from the mine entrance (adit or portal) contained high levels of arsenic. This drainage water was piped from within the adit to a cattle watering trough adjacent to the leachate collection pond. Water from the trough overflowed and ponded on the Site.

On March 27, 1990, the ROD was signed by EPA which included the following remedial action objectives (RAOs):

- Prevent human and environmental exposure to contaminants of concern (COCs) in soils above protective levels.
- Prevent migration of COCs in soils off-site or to groundwater.
- Determine whether COCs are present in groundwater above protective levels, and if so the extent of the contamination. (Note that an ESD later documented that the last RAO was unnecessary and was eliminated – See Section 4 of this document.)

The ROD required implementation of the following cleanup actions:

- Consolidation of the arsenic and cyanide contaminated soil and mined rock.
- Cleanup standards were determined for arsenic and cyanide.
- Construction of a soil/clay cap over the consolidated soil and rock.

- Closure of the mine entrance to divert the flow of mine drainage away from the Site and for safety reasons.
- Fence the Site to protect the cap.
- Place deed restrictions on the property to prevent future disturbance and to make future owners aware of the Site.
- Installation of a new well in the Horse Springs Coulee aquifer to provide an alternate stock water supply.
- Installation of new ground water monitoring wells.

The March 1990 ROD was followed in October 1994 by an ESD to address conditions which were not predicted when the ROD was developed. This is discussed in greater detail below.

3) Remedial Construction Activities

EPA contracted with Roy F. Weston (Weston) to design and construct the remedy as set forth in the ROD. The design was completed in late 1990, and a soil hauling subcontract was awarded on September 30, 1991. During December 1991 and January 1992, top soil for the cover over the cap was blended onsite and stockpiled. On April 3, 1992, Weston awarded the subcontract for consolidation, capping, and fencing the Site. The following construction work was completed during the summer of 1992:

- Mobilization and initial clay stockpiling (cap material) started - June 29, 1992.
- Consolidation of mined material completed - July 31, 1992.
- Closure of the mine entrance completed - August 11, 1992.
- Cap and cover completed - August 12, 1992.
- Site fenced - August 15, 1992.
- Site hydroseeded - November 6, 1992.

The four monitoring wells that were placed on the Site during the RI/FS were not damaged during the construction of the cap, even though it was anticipated that at least two wells would have to be abandoned to consolidate the mined materials and construct the cap. Therefore, no new monitoring wells were constructed. The four existing wells were considered sufficient to provide long-term monitoring.

The consolidation action removed contaminated mine dumps from four areas around the Site and consolidated them in a single location. The Site consolidation met the ROD performance goals of arsenic in exposed soils remaining at the Site. The cyanide levels in all of the soil samples taken were all non-detectable.

During the remedial action, two background samples were taken from the soils sloughing off the hillside and onto the Site during the remedial action. One of the samples indicated relatively high arsenic concentrations. The project managers believed that some native soils had higher arsenic concentrations than the cleanup levels on-site and it appeared that there was a distinct difference between the soil samples taken from the valley and site soils. The Site is located at the intersection of the valley floor where the heap leach pile was located and the mine portal which was excavated into the side of the mountain.

One of the past actions that occurred at the Site was the construction of an aqueduct across the Site along the edge of the valley. Rock rubble from the aqueduct construction was dumped over the edge of the cut and in several places commingled with the mine waste in the mine dumps. The project managers determined that visual observation was an adequate method of distinguishing between the two types of waste material (size, fracturing, and color). Where the two different activities commingled the rock, all the material was consolidated under the cap.

Following construction activities, surface water continued to enter the Site at a slow rate from a new seep coming from the blocked mine entrance. This flow was diverted away from the capped landfill area towards an area off-site and infiltrates into the ground before reaching the Site fence.

The installation of the groundwater monitoring wells and stock water supply well, as dictated by the ROD, was attempted. These remedial construction activities did not come to completion because the two test wells that were drilled did not locate water prior to hitting bedrock. The well locations were selected using the best available information. The resolution of this unforeseen development is further discussed in the "Explanation of Significant Differences" section below.

4. Explanation of Significant Differences

In October 1994, EPA completed an ESD to describe changes in the remedial action due to unforeseen conditions encountered at the Site during implementation of the ROD. Changes found in the conditions at the Site required EPA to modify the remedial actions that were described in the March 27, 1990 ROD. These changes were made as a result of new information about the groundwater in proximity to the Site. The EPA made the following two changes to the selected remedy:

- To allow the stock water tank to be reestablished, if needed, using the mine drainage, as had historically occurred; and
- Not to monitor the groundwater.

The ROD stated that an alternate water supply would be provided to replace the mine drainage as stock water source, assuming that the Horse Springs Coulee aquifer was a reasonable source in terms of quantity, quality, and depth of water. Two attempts were made to locate a groundwater source to replace the mine drainage as a water supply for livestock. Neither of the attempts was productive and water was not found despite drilling locations that were determined to be prime locations. Since stock water is key to the usefulness of the land and water resources are very limited in the vicinity of the Site, the evaluation of other sources necessarily focused on whether the mine drainage could still be used. Although the baseline risk assessment qualitatively noted an "enhanced" ecological risk from the stock tank, a more recent assessment by EPA's contractor, Roy F. Weston, indicates that no significant ecological risk concerns arise from the presence of the stock tank. A baseline risk assessment indicated that arsenic concentrations at the site are below acceptable levels (200 ug/L) both for cattle drinking the water and human

consumption of the cattle. Additional literature reviews and risk calculations have been done to confirm this. Allowing the mine drainage is consistent with the cleanup. By allowing the mine drainage to be used as a source of stock water, (e.g., by reestablishing the stock tank), EPA is consistent with the cleanup selected in the ROD. EPA left the property owner with a stock water supply despite groundwater conditions which prevented establishing an alternative groundwater well for stock watering as originally planned.

The ROD stated that monitoring the groundwater to assure that it does not become contaminated would occur. Three wells were installed in October 1988 and fourth well in June 1989. Although the wells were protected during construction in 1991 and 1992, they were damaged and discovered to be inoperable in August 1993. It was not determined how the wells were damaged, though vandalism and structural failure were considered. Following review of the monitoring well status, depths, and considering the lack of useable groundwater near the Site, it was determined that the Site conditions did not warrant reestablishment of a groundwater monitoring network for the Site. After consultation with Ecology, EPA determined that cleanup actions diminished the threats to the groundwater aquifer; the shallow groundwater aquifer was not found above the bedrock formation at the Site where water was previously thought to be located; and monitoring wells constructed during Site studies were damaged beyond use. Hence, the remedy was modified to not require groundwater monitoring at the Site.

III. Responsibilities for Remedy Implementation and Long-Term Operations and Maintenance

On January 4, 1991, EPA and Ecology entered into a State Superfund Contract (SSC) to provide the State of Washington matching funds for cleanup of the Site. The construction estimate was $750,000 at that time. It was agreed in the SSC that EPA would implement the cleanup and pay 90 percent of the costs and that Ecology would pay the required 10 percent. Ecology also agreed to take over the operation and maintenance of the Site once the vegetative cover was established. The SSC has been amended once to increase the total cost to $1 million with the State's share still remaining at 10 percent.

EPA implemented the remedy in 1992 and oversaw operations and maintenance until July 10, 1997, at which time, Ecology agreed to accept long-term operations and maintenance.

IV. Progress since the Last Five-Year Review

This is the third five-year review; the first five-year review was completed by EPA Region 10 in July 1997; the second five-year review was completed by Ecology in April 2002. The second five-year review in 2002 concluded the remedy was complete and protective of human health and the environment.

An issue that could have affected protectiveness is that Ecology's inspections had not occurred each year as planned in the O&M plan. Since the 2002 five-year review only three inspections were conducted. Inspections were not conducted in 2003 and 2006. The failure to conduct

annual inspections in 2003 and 2006 did not result in a less protective Site and the cap remains in excellent condition.

V. Five-Year Review Process

Administrative Components:

The current landowner (Mr. Jim McDaniel) was contacted and interviewed both pre- and post-Site inspection. Anne Dailey, EPA Region 10, was contacted and provided information concerning the previous five-year review.

Community Involvement:

A legal advertisement was placed in three local newspapers that are published in communities near the Site; Methow Valley News, Omak-Okanogan County Chronicle, and Oroville Gazette. This notice was also published in Ecology's Site Register, and included a public comment period that lasted from May 29, 2007 to June 29, 2007. No comments were received during the public comment period. Additionally, the current landowner was notified of our intent to conduct a five-year review at Silver Mountain Mine. No other community involvement was deemed necessary for this remote Site.

Document Review:

This five-year review consisted of a review of relevant documents in the Ecology's Central Regional Offices file including background and historical data, correspondence from 1982 to the present, remedial investigation, feasibility study, record of decision, remedial action report, explanation of significant differences, operations and maintenance plan, and first and second five-year review. The Okanogan County Auditor's Office was contacted in March 2007 to verify that the deed restriction was recorded. The deed restriction is Okanogan County document number 847844 and located in Volume 150, Pages 0191 & 0192.

Data Review:

Ecology reviewed the previous five-year report, along with annual reports from 2004 and 2005. Laboratory results of mine seep samples collected from the Site show that arsenic concentration are neither increasing nor decreasing. However, contaminant flow was not measured during any of the sampling events and no mass contaminant movement into the soil column is known at this time. It is not clear if flow rates from the mine seep vary from season to season or year to year. Overall concentrations remain below regulatory concern as explained in the ESD.

Site Inspection:

On June 26, 2007, Rick Roeder and Brianne Harcourt conducted a Site inspection of the Silver Mountain Mine. The Site inspection included all elements of the Silver Mountain Mine

Maintenance Checklist as developed in December 1994 and amended July 8, 1997. See attached completed checklist and Site inspection pictures. The cap continues to maintain good grass cover. Weeds are very limited on the cover. The EPA Site fence is in disrepair; however, a newer fence placed by the adjacent property owner adequately controls general access to the Site. The newer fence containing a gate still provides for limited access of cattle to the watering hole near the mine adit. Access to the watering hole by cattle was evident; however, there was little evidence that cattle routinely frequented the cap. One water sample from the seep was collected per the Operations and Maintenance Plan. The sample was sent to Valley Environmental Laboratory in Yakima, Washington for analysis. The water analysis indicated an arsenic concentration of 108 micrograms per liter (ug/l). There are no drinking water wells used by humans located at this remote area.

Interviews:

The current landowner was contacted and interviewed during multiple phone calls to clarify elements of this report. The landowner stated that no cattle currently visit the Site. He stated that juveniles were visiting the Site approximately three years ago and "partying" mostly around the mill foundation. He stated that the proper authorities were notified and the problem has been taken care of. The landowner does not visit the Site routinely.

Technical Assessment

Question: Is the remedy functioning as intended by the decision documents?

Yes, the remedy is functioning as intended by the decision documents. The consolidated and capped soil contamination remedy restricts access to contaminated water for livestock and wildlife purposes and a deed restriction prohibits human consumption of the seep water and drilling of water wells in the vicinity of the Site. Based on the 2007 Site inspection, the cap remains in excellent condition and no new uses of surface or groundwater in the vicinity has occurred. Although the Site fence is in disrepair, a newer adjacent landowner-owned fence in excellent condition surrounds and restricts access to the Site.

The deed restriction appears to be working with the current landowner knowledgeable and understanding of the purpose of the restriction. In March 2007, Anne Dailey, EPA confirmed that the deed restrictions are in place at the Okanogan County Auditors Office. As noted above, the document is registered as Okanogan Document Number 847844 and is located in Volume 150, Pages 0191-0192. In 2007, a copy of the deed restriction was included in EPA's new developed Institutional Controls Tracking System.

Annual Site inspections did not occur in 2003 or 2006. Failure to inspect and correct deficiencies annually could permit Site deficiencies to go unnoticed for an extended length of time. Cap erosion can worsen significantly in ensuing years once started and woody weeds can become established and breach the clay cover. It does not appear that these conditions have occurred; however, inspections should occur annually to prevent the potential for harm to the remedy.

Question: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

Changes in Standards and TBCs

In 2001, EPA promulgated a more stringent arsenic drinking water standard reducing the drinking water MCL for arsenic from 50 µg/l to 10 µg /l. The arsenic drinking water standard is not applicable to this Site since humans are not consuming water in this area. Additionally, the site has a deed restriction preventing the use of the mine seeps and the drilling of water wells for the purpose of human consumption. The mine seep concentration remains below regulatory concern (200 µg /l for agricultural use including stock watering) as discussed in the ESD.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The exposure assumptions used to develop the human health and ecological risk assessments remain valid. There has been no change in the toxicity factors for the contaminants of concern. The assumptions in the analysis are considered reasonable in developing risk-based cleanup levels. It is anticipated that there will be a change in the toxicity factor for arsenic in water for human consumption.

Question: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no new information to question the protectiveness of the remedy.

Technical Assessment Summary: Based on Ecology's review and investigation of the Site, the remedy is functioning as intended by the decision documents. Physical hazards do remain on this remote Site, specifically, steep drop-offs and pits from the mill's foundation walls and interior pits. Cellular phone service is not currently provided to the area.

Two annual inspections did not occur since the last five-year review. However, based on Ecology's assessment and the lack of access to the Site, the lack of annual evaluations did not impact Site protectiveness. This issue is further discussed in Section VI, Issues.

VI. Issues

One issue is raised as part of the evaluation and elaborated below:

1) State Inspections & Evaluations

Consistent annual state inspections and maintenance of the Site has not occurred since the previous five-year review in 2002 (two have occurred out of four required). Ecology regional

field office personnel have committed that inspections be completed annually, and the next five-year review will be completed in 2012.

VII. Recommendations and Follow-up Actions

As part of this five-year review, four recommendations are being identified in the table below to improve remedy performance or protectiveness in alignment with the Remedial Action Objectives and performance standards of the Site. Conducting annual inspections and maintenance of the cap will ensure continued protection of human health and the environment at this Site. As part of these inspections, Ecology will verify that the neighbor's fence remains to help protect the cap and the institutional controls remain in effect.

Prior to the next five-year review, EPA and Ecology will consider and investigate whether a title search should be performed for this Site. A title search can confirm if any prior in-time encumbrances can be located.

The UECA was adopted by the State of Washington in 2007. Prior to the next five-year review EPA and Ecology will consider and investigate establishment of a new covenant under UECA. This may help ensure long-term protectiveness of the cap and non-usage of groundwater for human consumption. A UECA may also allow Ecology and EPA to more effectively enforce the restrictions and bind successive owners.

Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current	Future
Conduct Annual Inspections.	Ecology's Central Regional Office	EPA Region 10	September of every year	Y	Y
Monitor Fence. EPA fence should be replaced if adjacent owner's fence fails or is in disrepair.	Ecology's Central Regional Office	EPA Region 10	September of every year	N	Y
Consider and investigate conducting a title search for the Site.	Ecology with support from EPA Region 10	EPA Region 10	Next Five-year review	N	Y
Consider and investigate establishment of a new deed under the Uniform Environmental Covenant Act.	Ecology with support from EPA Region 10	EPA Region 10	Next Five-year review	N	Y

VIII. Protectiveness Statement

The remedial action cleanup activities taken at the Site are consistent with the objectives of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and are protective of human health and the environment. The cap remains in excellent condition and institutional controls remain in-place and appear to be effective. The cleanup standards for the heap pile and mine dump materials and the surrounding soils are 200 milligrams per kilogram (mg/kg) for arsenic and 95 mg/kg for total cyanide. These protective levels reduce the risks to levels below the 1.0 Hazard Index or health based levels; and for arsenic, a human carcinogen, the cancer risk factor will be reduced below one in ten thousand.

According to the data obtained during the construction work, the cyanide in the soils is below detection (0.5 mg/kg), and the concentrations of arsenic that remain in the areas that were cleaned up are believed to be less than 200 mg/kg unless natural background is higher.

The major source of contaminants identified in the ROD, the rock material from the mining operations (heap pile and mine dump), have been addressed. The mine drainage was reevaluated in the ESD and it was determined that the acid mine drainage did not pose an ecological threat. According to the risk assessment and amended assessment, the inhalation and ingestion of the contaminated soils were the major routes of exposure. The arsenic laden waste rock from the mine was contained and capped. The cleanup also reduces the impacts to the groundwater by diverting the run on water away from the capped mine waste and by controlling leachate generation by capping which reduces infiltration.

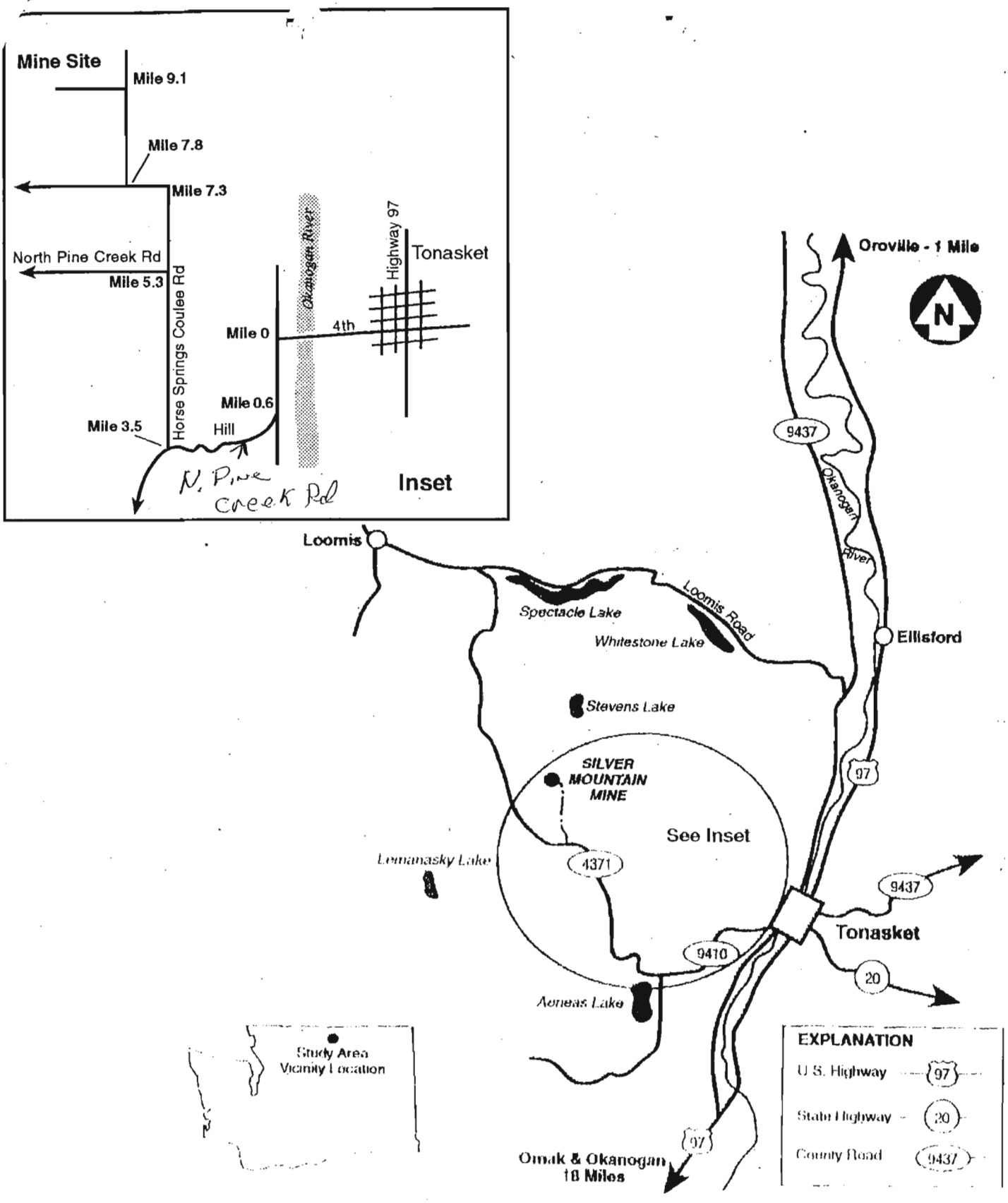
IX. Next Five-Year Review

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) requires a five-year review of all sites with hazardous substances remaining above the health-based levels for unrestricted use of the Site. The cleanup of the Site utilized containment of the hazardous materials as the method to reduce the risk.

The five-year review process will be used to ensure that the cap is still intact and blocking exposure pathways for human health and the environment. As noted in the ESD discussion above, groundwater monitoring will not be conducted. The next (fourth) Five-Year Review is due in 2012, five-years from the date of this third Five-Year Review is signed.

Appendix A

Site Location Map



Site Location Map

FIGURE

1

Appendix B

Silver Mountain Mine 5-Year Review Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Silver Mountain Mine	**Date of inspection:** 06/26/2007
Location and Region: Kamis, WA (10)	**EPA ID:**
Agency, office, or company leading the five-year review: WA. Dept. of Ecology	**Weather/temperature:** Clear, warm (75° F)

Remedy Includes: (Check all that apply)

- ✓ Landfill cover/containment
- Access controls
- ✓ Institutional controls
- Groundwater pump and treatment
- Surface water collection and treatment
- Other _____

- Monitored natural attenuation
- Groundwater containment
- Vertical barrier walls

Attachments: Inspection team roster attached ✓ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Jim McDaniel (Name) Owner (Title) 7/12/07 (Date)
   Interviewed at site at office (by phone) Phone no. (509) 223-4361
   Problems, suggestions; Report attached See 5-year review report

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency EPA (2006)
Contact Anne Dailey ____ multiple 553-2110
Name Title Date Phone no.
Problems; suggestions; Report attached see 5-year review report

Agency Okanogan County Auditor's office
Contact Denise Haines by Anne Dailey ____ 03/2007 email
Name Title Date Phone no.
Problems; suggestions; Report attached obtained copy of deed restriction

Agency ____
Contact ____ ____ ____ ____
Name Title Date Phone no.
Problems; suggestions; Report attached ____

Agency ____
Contact ____ ____ ____ ____
Name Title Date Phone no.
Problems; suggestions; Report attached ____

4. **Other interviews** (optional) Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual — ✓ Readily available — Up to date — N/A
   - As-built drawings — ✓ Readily available — ✓ Up to date — N/A
   - Maintenance logs — ✓ Readily available — ✓ Up to date — N/A

   Remarks: Documents available @ Ecology's CRC

2. **Site-Specific Health and Safety Plan** — ✓ Readily available — Up to date — N/A
   - Contingency plan/emergency response plan — Readily available — Up to date — (N/A)

   Remarks: Documents available @ Ecology's CRC

3. **O&M and OSHA Training Records** — Readily available — Up to date — (N/A)

   Remarks:

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available — Up to date — (N/A)
   - Effluent discharge — Readily available — Up to date — (N/A),
   - Waste disposal, POTW — Readily available — Up to date — (N/A)
   - Other permits_____ — Readily available — Up to date — (N/A)

   Remarks:

5. **Gas Generation Records** — Readily available — Up to date — (N/A)

   Remarks:

6. **Settlement Monument Records** — Readily available — Up to date — (N/A)

   Remarks:

7. **Groundwater Monitoring Records** — ✓ Readily available — Up to date — N/A

   Remarks: MW RI/FS available @ Ecology's CRC

8. **Leachate Extraction Records** — Readily available — Up to date — (N/A)

   Remarks:

9. **Discharge Compliance Records**
   - Air — Readily available — Up to date — (N/A)
   - Water (effluent) — Readily available — Up to date — (N/A)

   Remarks:

10. **Daily Access/Security Logs** — Readily available — Up to date — (N/A)

    Remarks:

IV. O&M COSTS

1. **O&M Organization**
   (State in-house) Contractor for State
   PRP in-house Contractor for PRP
   Federal Facility in-house Contractor for Federal Facility
   Other_____

2. **O&M Cost Records** negligible
   Readily available Up to date
   Funding mechanism/agreement in place
   Original O&M cost estimate_____ Breakdown attached

   Total annual cost by year for review period if available

   From_____ To_____ _____ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS (Applicable) N/A

A. Fencing

1. **Fencing damaged** Location shown on site map Gates secured, N/A
   Remarks Exterior fence restricts access to site

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map (N/A)
   Remarks_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes (No) N/A
Site conditions imply ICs not being fully enforced — Yes (No) N/A

Type of monitoring (*e.g.*, self-reporting, drive by) site visit
Frequency annual / 5-year
Responsible party/agency Ecology
Contact Brianne Harcourt (Name) Site manager (Title) _____ (Date) 509.454.7836 (Phone no.)

Reporting is up-to-date — (Yes) No N/A
Reports are verified by the lead agency — (Yes) No N/A

Specific requirements in deed or decision documents have been met — (Yes) No N/A
Violations have been reported — Yes No (N/A)
Other problems or suggestions: Report attached

2. **Adequacy** (ICs are adequate) ICs are inadequate N/A
Remarks

D. General

1. **Vandalism/trespassing** Location shown on site map No vandalism evident
Remarks some historic vandalism @ mill-foundation. Nothing appeared to be new.

2. **Land use changes on site** (N/A)
Remarks

3. **Land use changes off site** (N/A)
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads Applicable N/A

1. **Roads damaged** Location shown on site map Roads adequate (N/A)
Remarks

B. Other Site Conditions

Remarks N/A

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map (Settlement not evident)
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** Location shown on site map (Cracking not evident)
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** Location shown on site map (Erosion not evident)
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** Location shown on site map (Holes not evident)
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** Grass (Cover properly established) No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** (N/A)
   Remarks_____

7. **Bulge** Location shown on site map (Bulges not evident)
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** (Wet areas/water damage not evident)
   - Wet areas — Location shown on site map — Areal extent_____
   - Ponding — Location shown on site map — Areal extent_____
   - Seeps — Location shown on site map — Areal extent_____
   - Soft subgrade — Location shown on site map — Areal extent_____

   Remarks_____

9. **Slope Instability** Slides — Location shown on site map (No evidence of slope instability)
   Areal extent_____
   Remarks_____

B. Benches Applicable (N/A)

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** — Location shown on site map — N/A or okay
   Remarks_____

2. **Bench Breached** — Location shown on site map — N/A or okay
   Remarks_____

3. **Bench Overtopped** — Location shown on site map — N/A or okay
   Remarks_____

C. Letdown Channels Applicable (N/A)

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** — Location shown on site map — No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____

2. **Material Degradation** — Location shown on site map — No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____

3. **Erosion** — Location shown on site map — No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable (N/A)

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks_____

E. Gas Collection and Treatment Applicable (N/A)

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks_____

F. Cover Drainage Layer Applicable (N/A)

1. **Outlet Pipes Inspected** Functioning N/A
   Remarks_____

2. **Outlet Rock Inspected** Functioning N/A
   Remarks_____

G. Detention/Sedimentation Ponds Applicable (N/A)

1. **Siltation** Areal extent_____ Depth_____ N/A
   Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   Erosion not evident
   Remarks_____

3. **Outlet Works** Functioning N/A
   Remarks_____

4. **Dam** Functioning N/A
   Remarks_____

H. Retaining Walls Applicable (N/A)

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** Location shown on site map Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge Applicable (N/A)

1. **Siltation** Location shown on site map Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** Location shown on site map N/A
   Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** Functioning N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS Applicable (N/A)

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   Performance not monitored
   Frequency_____ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES

Applicable (N/A)

A. Groundwater Extraction Wells, Pumps, and Pipelines

Applicable (N/A)

1. **Pumps, Wellhead Plumbing, and Electrical**
   Good condition All required wells properly operating Needs Maintenance N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines

Applicable (N/A)

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

C. Treatment System Applicable (N/A)

1. **Treatment Train** (Check components that apply)
   - Metals removal — Oil/water separation — Bioremediation
   - Air stripping — Carbon adsorbers
   - Filters_____
   - Additive (*e.g.*, chelation agent, flocculent)_____
   - Others_____
   - Good condition — Needs Maintenance
   - Sampling ports properly marked and functional
   - Sampling/maintenance log displayed and up to date
   - Equipment properly identified
   - Quantity of groundwater treated annually_____
   - Quantity of surface water treated annually_____

   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   N/A — Good condition — Needs Maintenance

   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   N/A — Good condition — Proper secondary containment — Needs Maintenance

   Remarks_____

4. **Discharge Structure and Appurtenances**
   N/A — Good condition — Needs Maintenance

   Remarks_____

5. **Treatment Building(s)**
   N/A — Good condition (esp. roof and doorways) — Needs repair
   Chemicals and equipment properly stored

   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   Properly secured/locked — Functioning — Routinely sampled — Good condition
   All required wells located — Needs Maintenance — N/A

   Remarks_____

D. Monitoring Data (N/A)

1. Monitoring Data
   Is routinely submitted on time — Is of acceptable quality

2. Monitoring data suggests:
   Groundwater plume is effectively contained — Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs Maintenance N/A
   Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

see attached report

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

see attached report

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

see attached report.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

see attached report.

Appendix C

Silver Mountain Mine Maintenance Requirements and Checklist

Table 1—Silver Mountain Mine Maintenance Requirements

Operation and Maintenance Requirements	Corrective Action	Frequency
1) Heap leach cap inspection		
a) Check for cap subsidence.	Remove topsoil, fill with clay, compact, replace topsoil and revegetate.	Annually
b) Check for erosion of cap particularly on east-facing wall between mill and south side of heap leach.	Fill with topsoil and revegetate. Areas where continual erosion occurs may need to be covered with riprap.	Annually
2) Vegetative cover inspection		
a) Verify adequate grass coverage.	Reseed areas where grass is not established.	Annually
b) Check for occurrence of knapweed or other weeds.	Spray site with herbicide, such as TORDON® or 2-4D.[a]	Annually
c) Check for holes caused by burrowing animals	Fill bottom of hole with large rock. Fill top of hole (top 8 inches) with clay from stockpile located south of cap. Add moisture to clay if needed to provide plasticity. Compact during and after placement.	Annually
d) Remove woody vegetation from cap cover[b]	Not applicable.	Annually
3) Fence inspection		
Inspect cap perimeter fence for damaged posts, broken wire and gate damage.	Repair as required to ensure the integrity of the cap.	Annually
4) Mine entrance drainage ditch inspection		
a) Inspect side slopes of ditch for sloughing into ditch.	Round edges of ditch. Remove sloughed material.	Annually
b) Verify ditch drains water beyond cap mound towards mill facility.	Remove ditch material as needed for drainage away from cap.	Annually
c) Check for high spots in ditch bottom and for vegetative growth.	Remove vegetation in ditch. Remove high spots to promote drainage.	Annually
5) Inspect closure of mine vent		
Inspect mine vent closure for subsidence or breakthrough.	Fill with surrounding soil for subsidence. Plug with large rock or concrete rubble if broken through. Backfill with soil.	Annually

Table 1—Silver Mountain Mine Maintenance Requirements

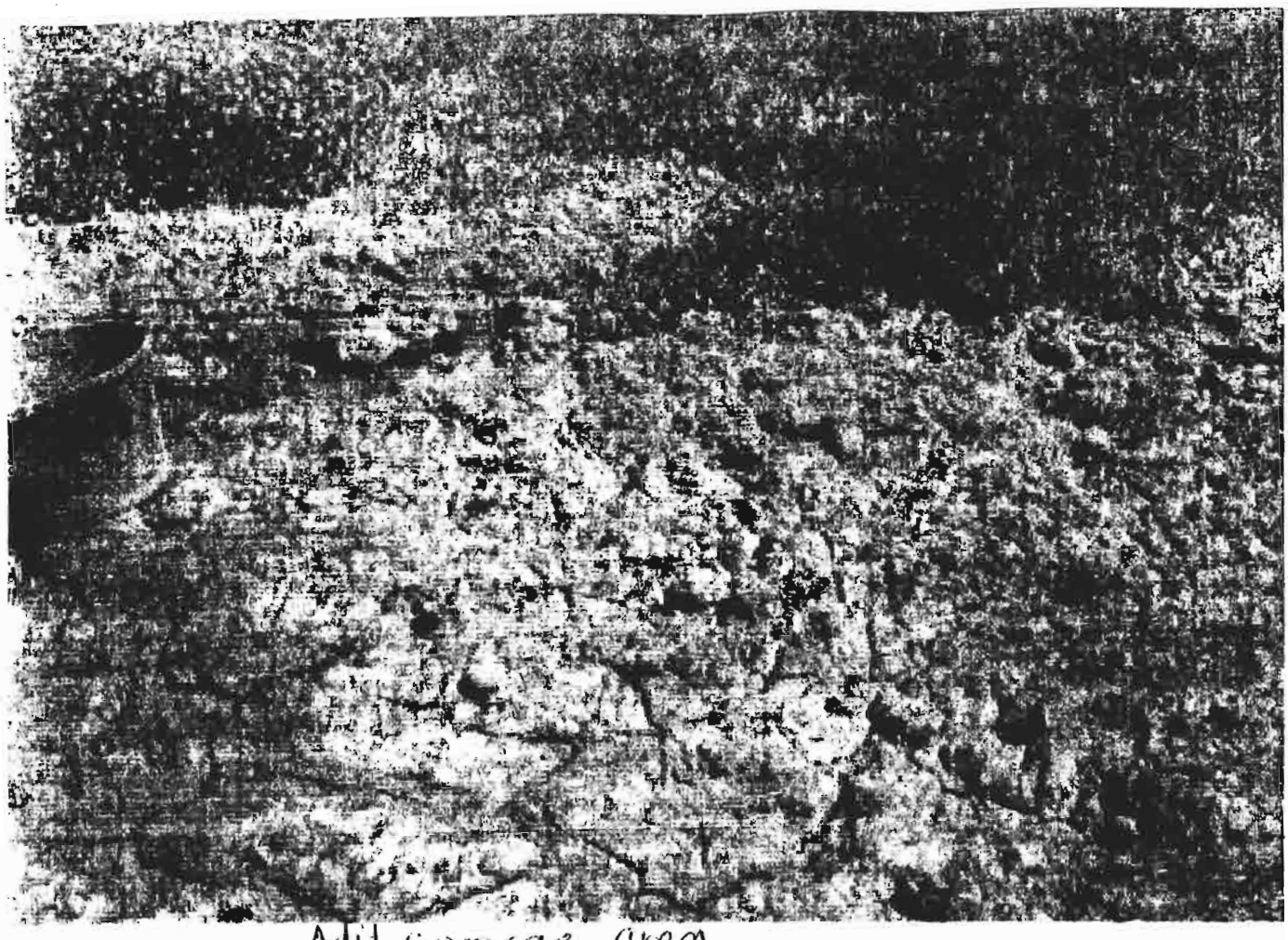
Operation and Maintenance Requirements	Corrective Action	Frequency
1) Heap leach cap inspection		
a) Check for cap subsidence.	Remove topsoil, fill with clay, compact, replace topsoil and revegetate.	Annually
b) Check for erosion of cap particularly on east-facing wall between mill and south side of heap leach.	Fill with topsoil and revegetate. Areas where continual erosion occurs may need to be covered with riprap.	Annually
2) Vegetative cover inspection		
a) Verify adequate grass coverage.	Reseed areas where grass is not established.	Annually
b) Check for occurrence of knapweed or other weeds.	Spray site with herbicide, such as TORDON® or 2-4D.[a]	Annually
c) Check for holes caused by burrowing animals	Fill bottom of hole with large rock. Fill top of hole (top 8 inches) with clay from stockpile located south of cap. Add moisture to clay if needed to provide plasticity. Compact during and after placement.	Annually
d) Remove woody vegetation from cap cover[b]	Not applicable.	Annually
3) Fence Inspection		
Inspect cap perimeter fence for damaged posts, broken wire and gate damage.	Repair as required to ensure the integrity of the cap.	Annually
4) Mine entrance drainage ditch inspection		
a) Inspect side slopes of ditch for sloughing into ditch.	Round edges of ditch. Remove sloughed material.	Annually
b) Verify ditch drains water beyond cap mound towards mill facility.	Remove ditch material as needed for drainage away from cap.	Annually
c) Check for high spots in ditch bottom and for vegetative growth.	Remove vegetation in ditch. Remove high spots to promote drainage.	Annually
5) Inspect closure of mine vent		
Inspect mine vent closure for subsidence or breakthrough.	Fill with surrounding soil for subsidence. Plug with large rock or concrete rubble if broken through. Backfill with soil.	Annually

Table 1—Silver Mountain Mine Maintenance Requirements (*Continued*)

Operation and Maintenance Requirements	Corrective Action	Frequency
6) Mine entrance closure inspection		
Inspect entrance of mine to verify no openings into mine shaft have developed.	Plug with large stone.	Annually
7) Sample Mine Drainage Water		
Collect mine drainage water samples and analyze for total arsenic.	Not applicable.	Annually

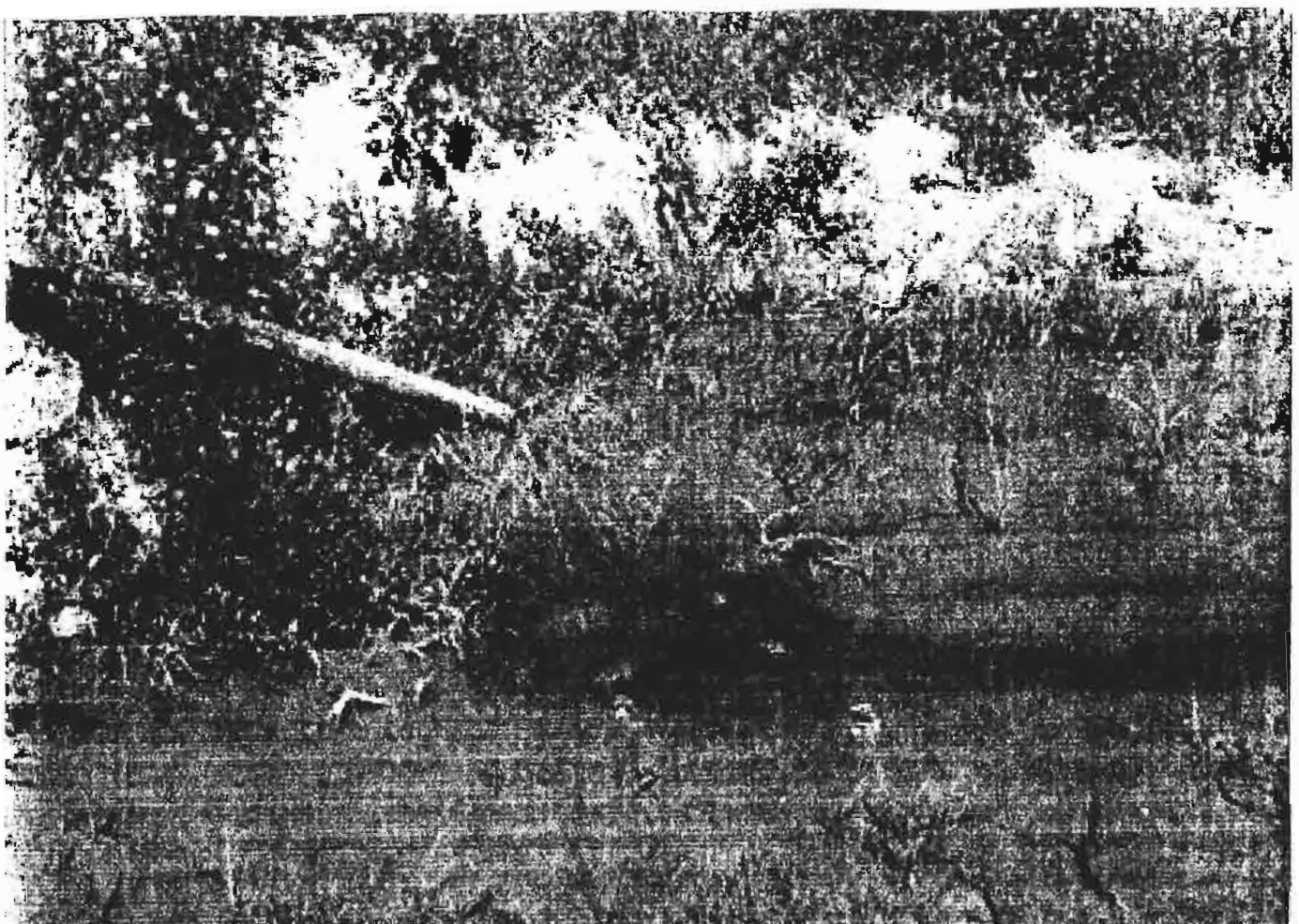
[a] For additional information on herbicide application or weed control call Okanogan County Noxious Weed Control Board (509-422-7165) or the Okanogan County Cooperative Extension Office (509-422-7245).

[b] Mowing may be required to kill woody vegetation such as sagebrush, bitterbrush, or rabbit brush, whose deep roots could penetrate the clay cap and increase the potential for infiltration into the heap leach.

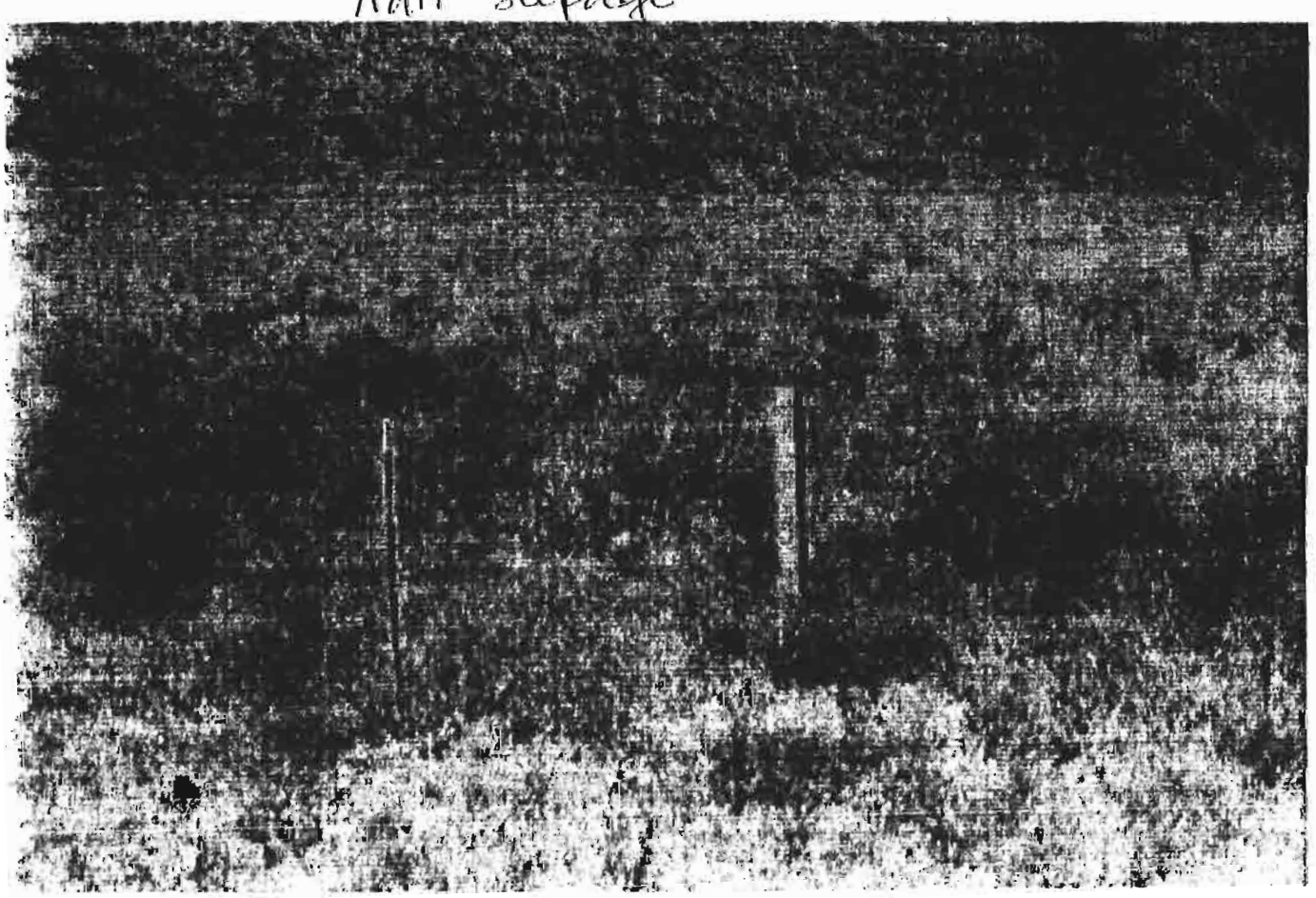


Adit seepage area

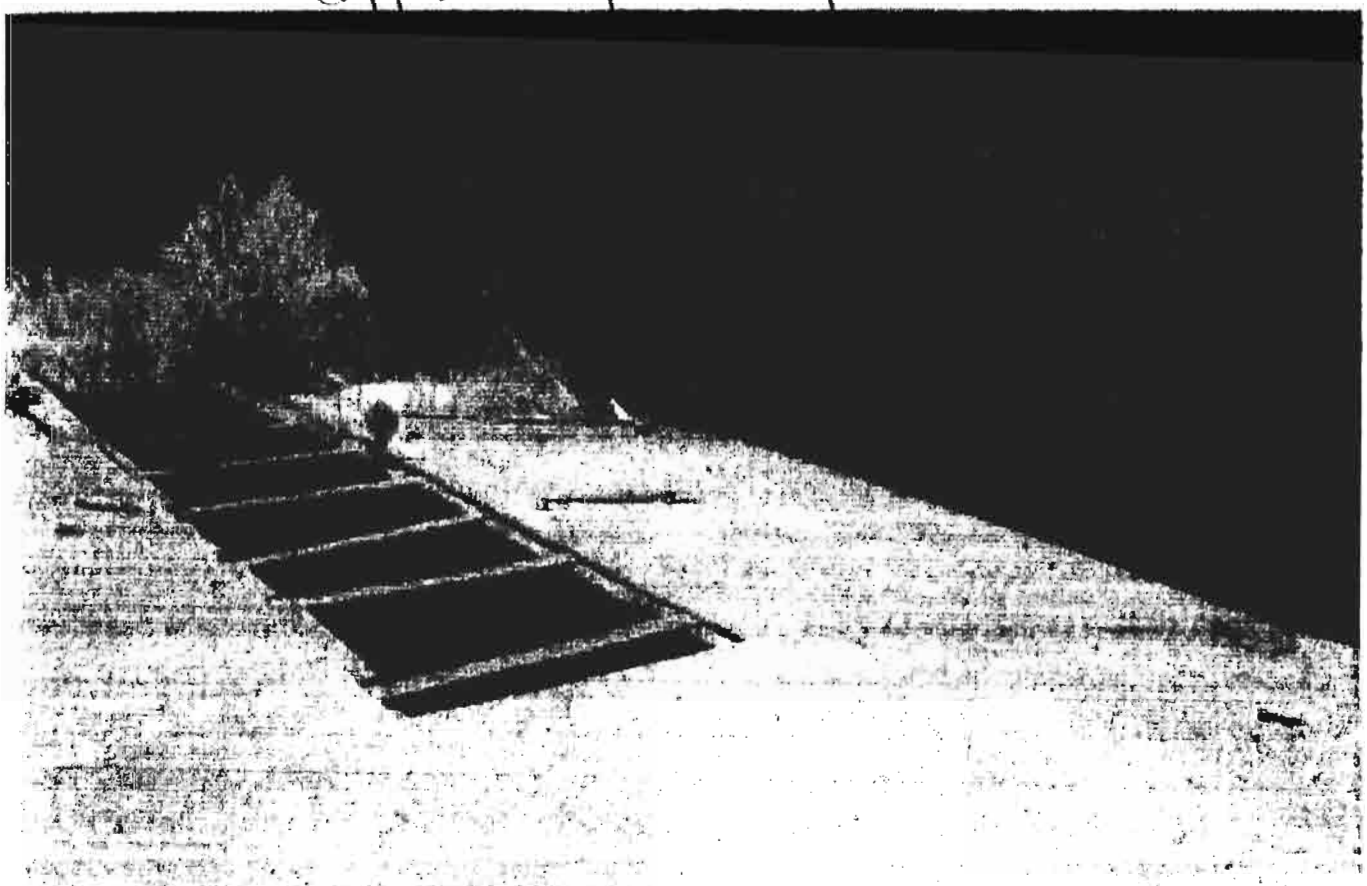
closed mine entrance

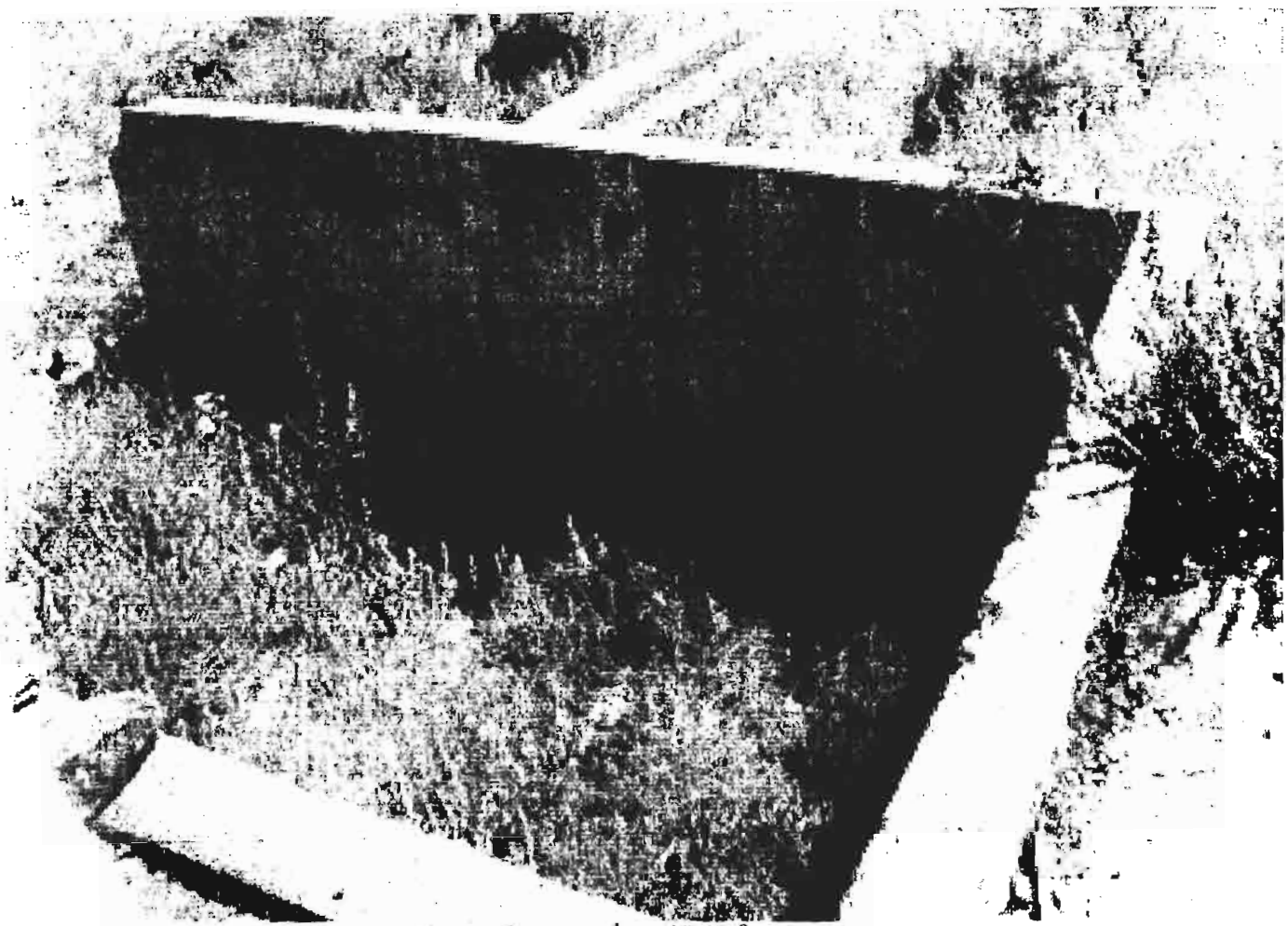


Adit seepage

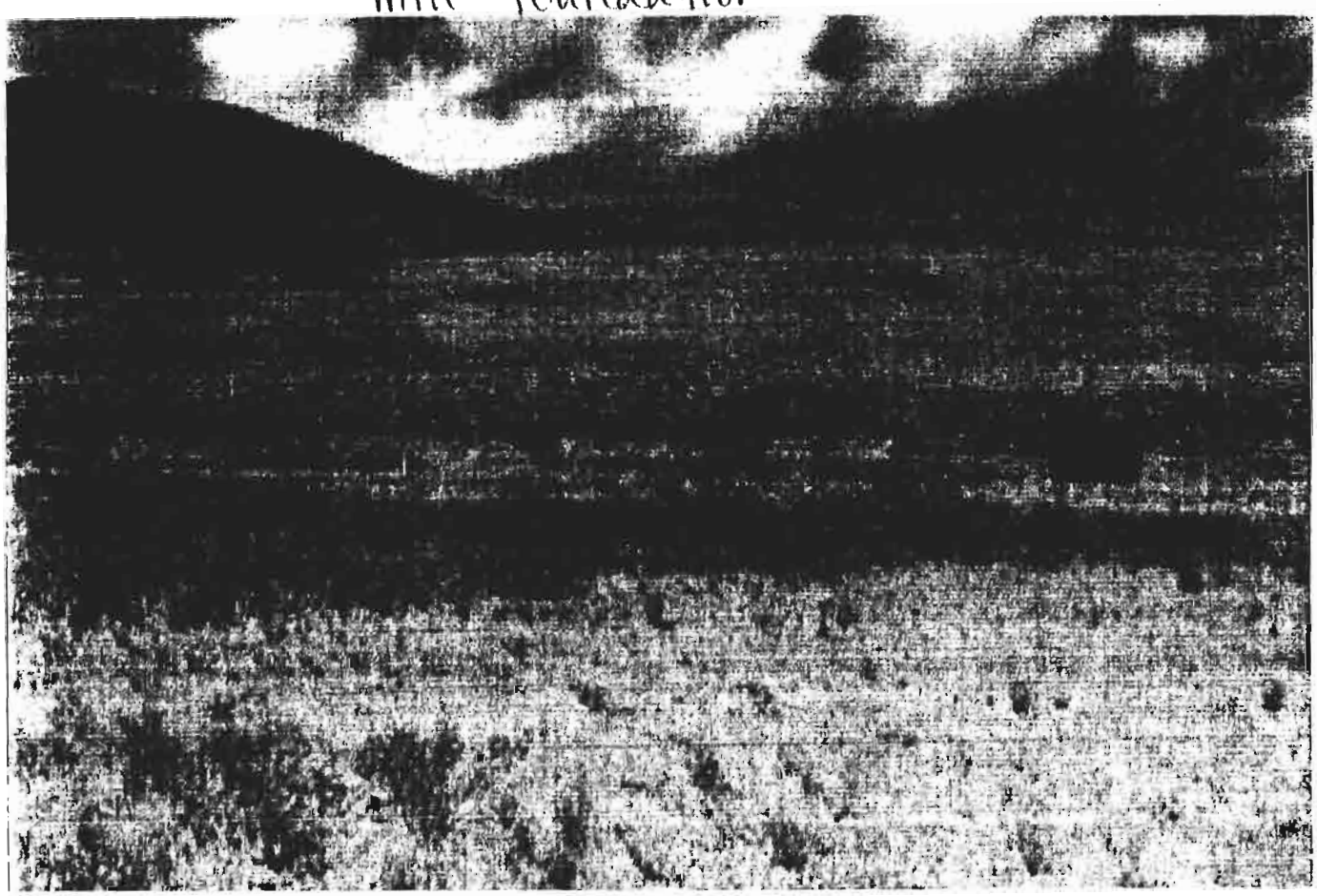


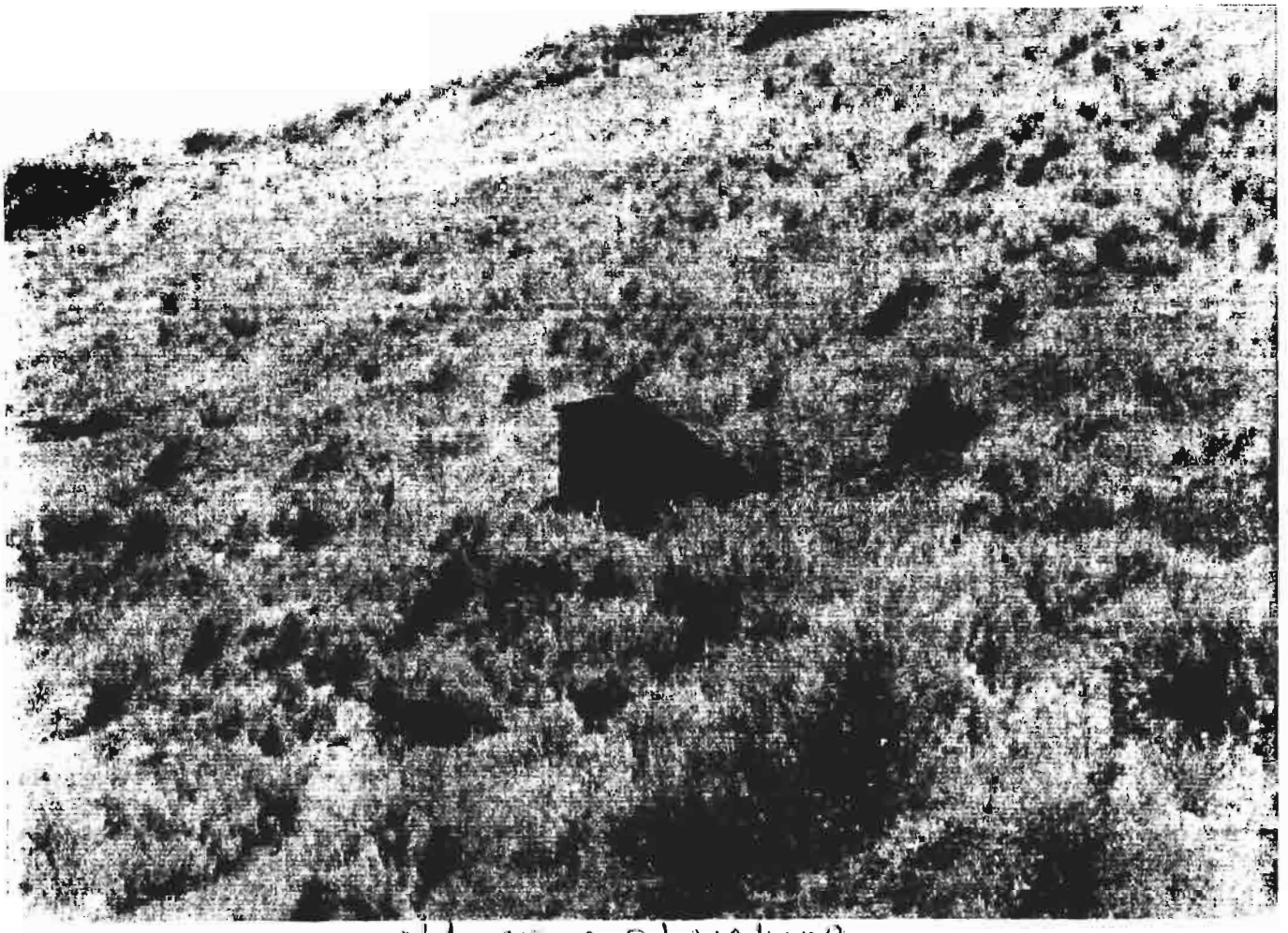
capped heap leach pile



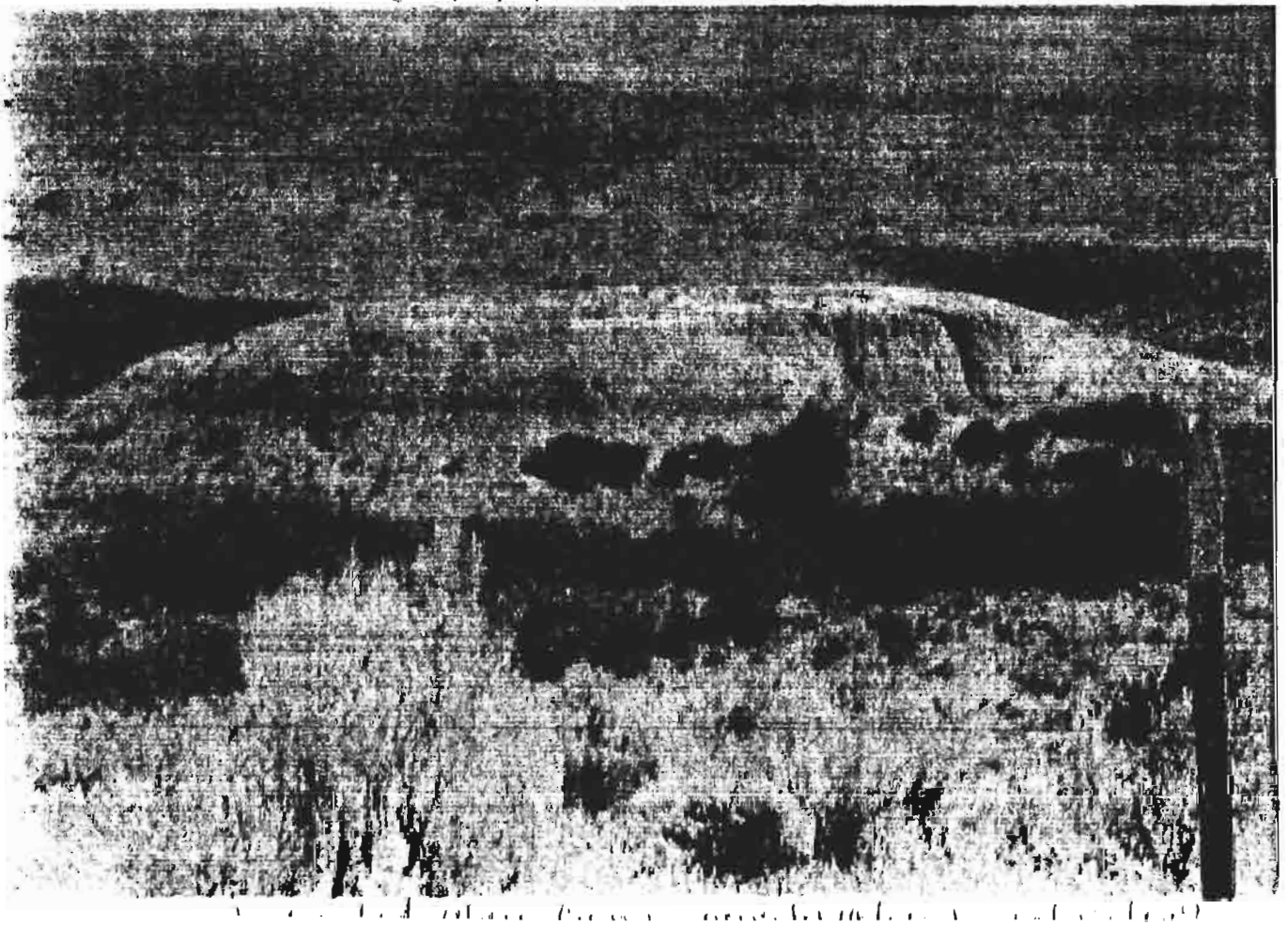


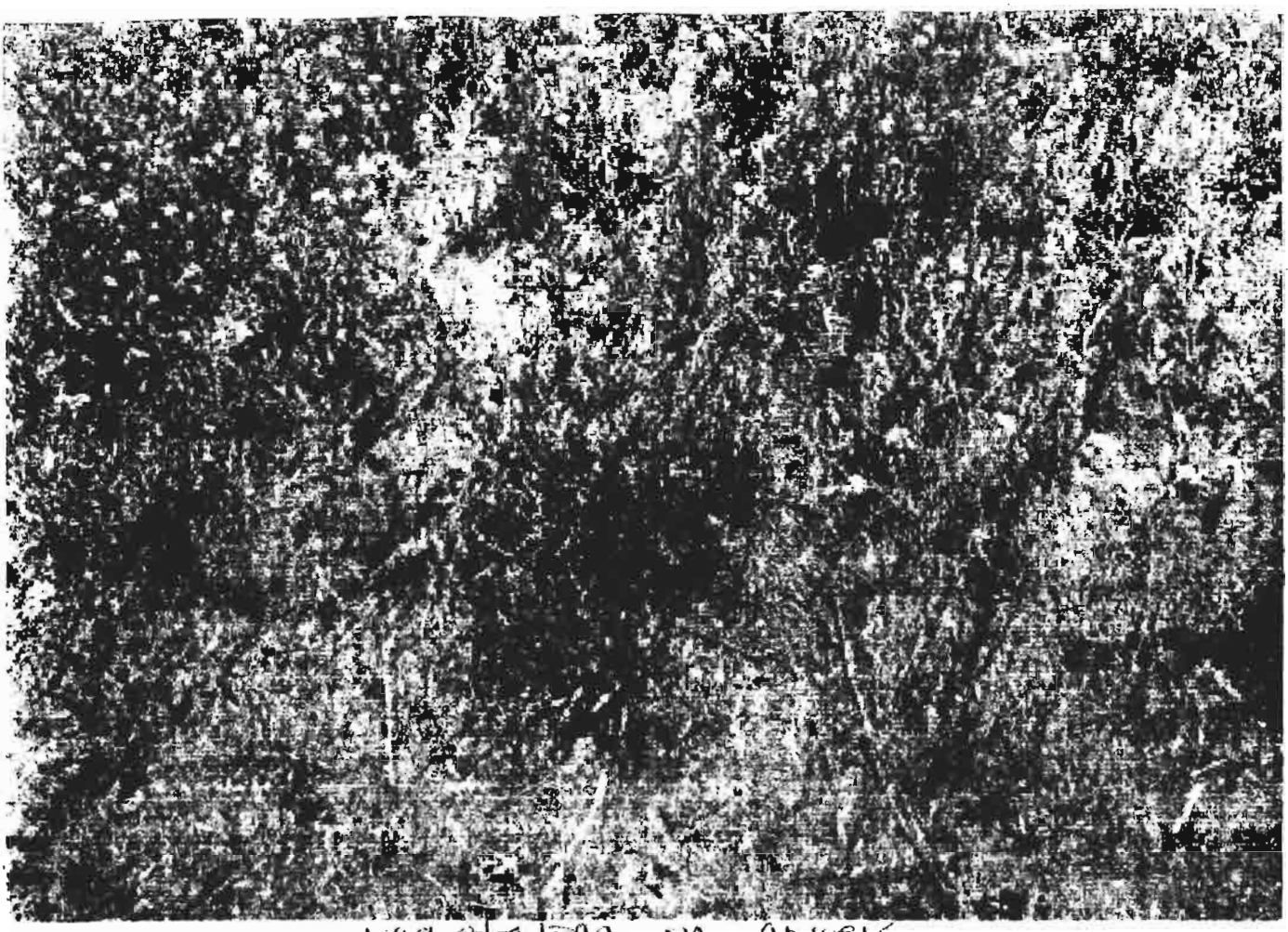
mill foundation



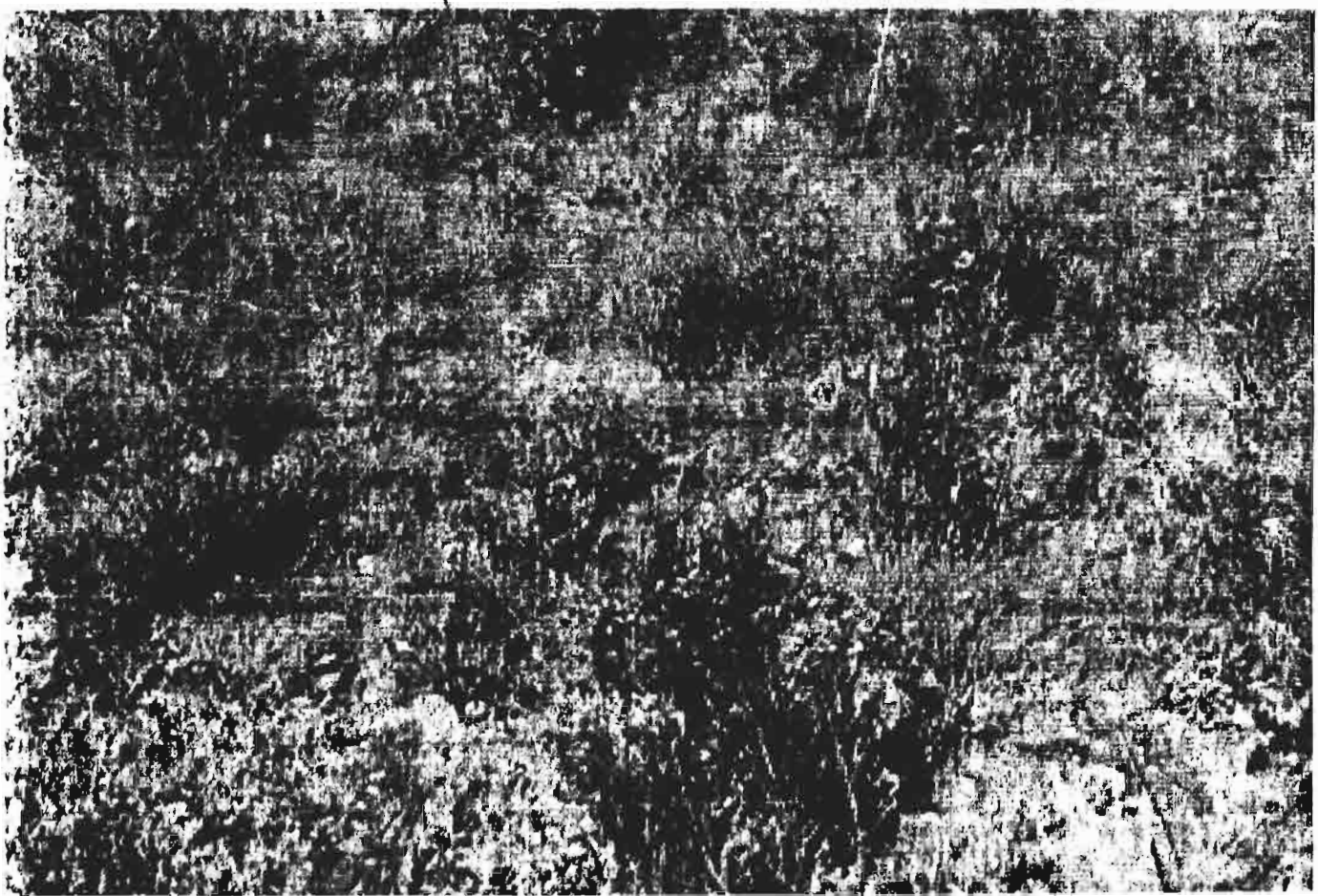


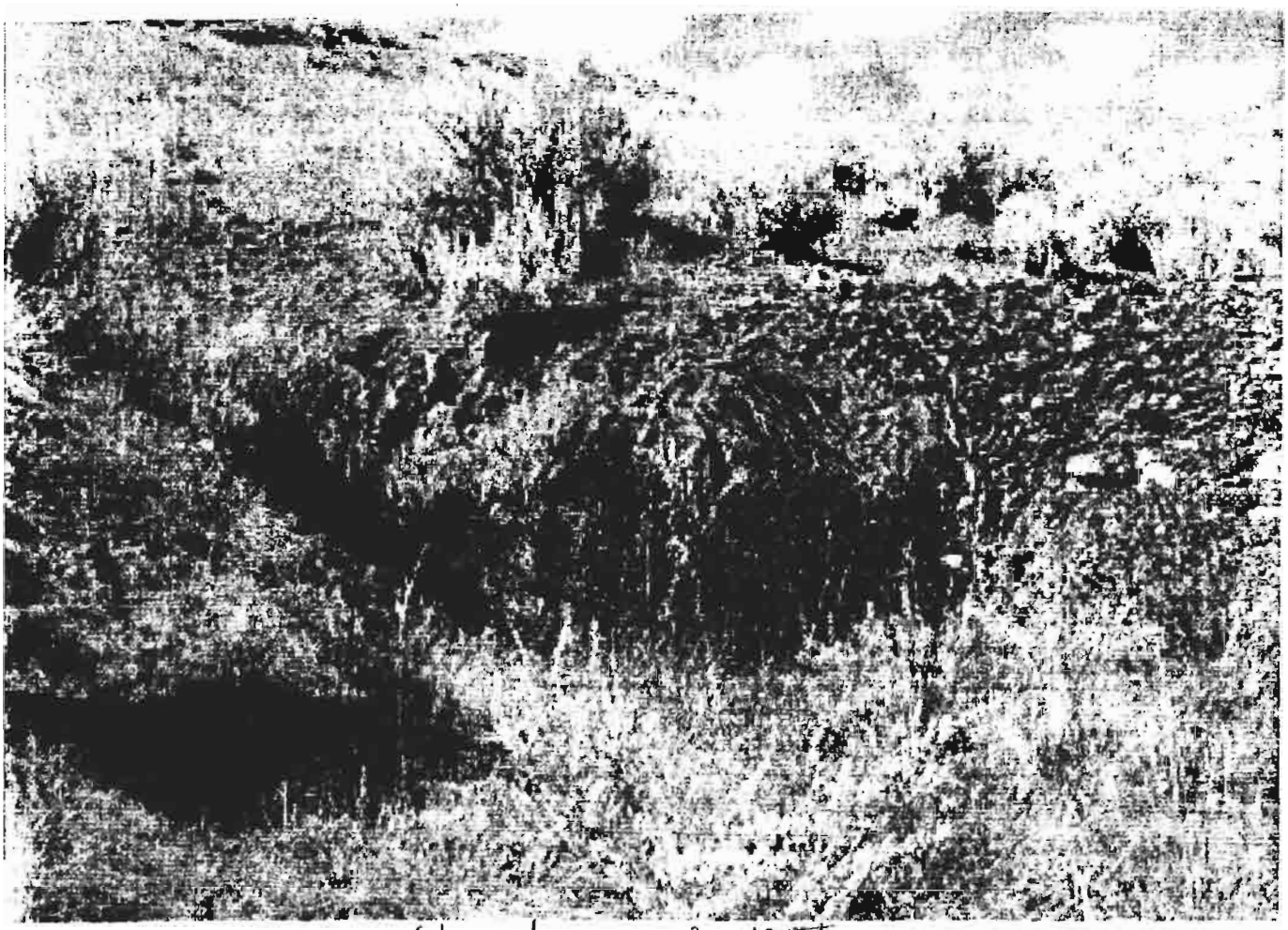
old mine structure





vegetation on cover





Closed mine vent

Closed mine vent

Appendix E

Laboratory Results

VALLEY Environmental Laboratory

Washington State Certified Lab #153 - DOE Accredited Lab C345

Arsenic

Date Collected: 06/26/07	
Lab/Sample No: 15362902	**County: YAKIMA**
Sample Location: seepage water	
	Date Received: 06/29/07
	Date Reported: 7/1107
	Sample Collected By: Brianne Harcourt
Send Report To:	**SAMPLE COMMENTS** **Matrix: Water**
Department of Ecology **Attn: Brianne Harcourt** **15 W Yakima Ave Suite 200** **Yakima, WA 98902**	**Silver Mountain**

Arsenic

DOH#	Analytes	Results	Units	MRL			Method	Analyzed	Analyst
4	Arsenic	0.108	mg/L	0.002			EPA 200.7	07/05/07	46

MRL (Method Reporting Level): Indicates the minimum reporting level required and obtained by the Laboratory (MRL = MRL = RDL).

Trigger: DOH Drinking Water response level. Public Systems in excess of this level must take additional samples. Recommended compliance Level.

MCL (maximum contaminant level): Highest level recommended by the federal government for public water systems.

ND (Not Detected): Indicates this compound was analyzed and not detected at a level greater than or equal to the MRL or RDL.

Approved By: [signature]

CHAIN OF CUSTODY RECORD

Valley Environmental Laboratory
407 N. 1st St., Suite 3
Yakima, WA 98901
(509) 575 – 3999
Fax: (509) 575 - 3068

THIS INFORMATION WILL BE FOR REPORTING/BILLING (SEE BELOW)

CLIENT:

ADDRESS:

ATTN:

PROJECT NAME:

PROJECT NO. / PO#:

TELEPHONE: FAX:

SAMPLED BY:

WORK ORDER ID #:

PAGE 1 OF 1

TESTS TO PERFORM

SAMPLE ID	SAMPLE LOCATION	DATE	TIME	MATRIX (WATER, SOIL OR SPECIFY)	NO. OF CONTAINERS											OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
																Sample not preserved

1. Turnaround time is counted in days unless otherwise marked. 2. The laboratory may not be responsible for missed holding time for samples received with less than 50% of the analytical hold time remaining. Please contact the laboratory for further information.

INSTRUCTIONS

1. USE ONE LINE PER SAMPLE
2. BE SPECIFIC IN TEST REQUESTS
3. CHECK OFF TESTS TO BE PERFORMED FOR EACH SAMPLE

BILLING INFORMATION, IF DIFFERENT THAN ABOVE

NAME

ADDRESS

CITY/STATE/ZIP

* RUSH TURNAROUND IS SUBJECT TO PRIOR LABORATORY APPROVAL

TOTAL NO. OF CONTAINERS

TURNAROUND REQUEST

- [x] Standard 10-14 Days
- [ ] 24-48 Hrs. 100% Rush
- [ ] 3-Day Rush – 80%
- [ ] 1 week Rush – 50%

RELINQUISHED BY (SIGN AND PRINT)	DATE / TIME	RECEIVED BY (SIGN AND PRINT)	DATE / TIME