Draft Plan

Mine Contingency Plan for the Bunker Hill Mine Kellogg, Idaho

Prepared for

U.S. Environmental Protection Agency Region 10

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Prepared by

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Contents

SECTION 1

Introduction

This Mine Contingency Plan (MCP) describes operations and maintenance (O&M) activities needed to operate the Bunker Hill Mine for control of the mine water. The mine water has low pH and contains high concentrations of dissolved metals that, if not managed, will detrimentally affect the environment. The U.S. Environmental Protection Agency (EPA) will implement this Mine Contingency Plan in the event that the current owner of the Bunker Hill Mine is no longer willing or able to operate the mine and the associated mine water control systems.

EPA began environmental investigation and cleanup actions at the Bunker Hill site in 1983 pursuant to Section 107(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Since that time, EPA has conducted numerous investigations regarding those persons or parties that may be responsible for the cleanup costs at the site. A list of potentially responsible parties (PRPs) developed by EPA included Bunker Limited Partnership (BLP), the mine owner at that time.

On September 27, 1991, EPA issued a Unilateral Administrative Order (UAO) to the Bunker Limited Partnership and other PRPs that directed immediate actions for cleanup and to prevent releases of hazardous substances at specific areas at the Bunker Hill site. One aspect of this UAO directed that the mine owner control the potential release of acid mine drainage (AMD) to the environment. Should the current mine owner not be able to maintain the mine, CERCLA authorizes EPA to implement immediate measures to ensure that public health and the environment are protected from potential environmental damage.

1.1 Plan Purpose

The purpose of this plan is to provide guidance for operating the Bunker Hill Mine to control the mine water in the event that the current owner is unable or unwilling to do so. Because it is possible that EPA would have little or no prior notice of the need to implement mine water management activities, this MCP describes actions necessary for the first 30 days of EPA-controlled operations; it then presents contracting options for obtaining a contractor for longer term operation.

1.2 Plan Goals and Objectives

The goals and objectives of this MCP are as follows:

- Develop and identify a list of critical mine management activities and associated key pieces of equipment and mine infrastructure that are crucial to the initial 30 days of EPA operations for controlling the mine water.
- Describe contracting options for procurement of a longer term mine O&M contractor.

1.3 Plan Basis

This plan is written assuming that someone familiar with both underground mining and the Bunker Hill Mine, such as Bill Hudson of DJN Inc. (a CH2M HILL subcontractor), would be responsible for the initial 30 days of operations. If Mr. Hudson is not available or is unable to assume this responsibility, another individual or organization would implement the MCP. This other individual or organization should have the following qualifications, at a minimum:

- Familiarity with underground mining operations
- Demonstrated supervisory experience
- Knowledge of rail, hoisting, and underground mine infrastructure systems
- Completion of appropriate training required by the Mine Safety and Health Administration (MSHA)

Familiarity with the Bunker Hill Mine would also be helpful.

1.4 Plan Organization

This plan is organized as follows:

- Section 1—Introduction
- Section 2—General Description of the Bunker Hill Mine
- Section 3—Plan for First 30 Days of Operation
- Section 4—Contracting Options for Longer Term O&M

SECTION 2

General Description of the Bunker Hill Mine

2.1 History

The history of mining at the Bunker Hill site starts in 1885, when Noah Kellogg set out to discover gold in the Silver Valley of the South Fork of the Coeur d'Alene River. Kellogg staked a claim on land that was subsequently called Bunker Hill, built a mill, and started a small mining operation in 1886. Figure 1 shows the location of the Bunker Hill Mine.

At its peak, Bunker Hill was the largest silver mine in the world. The mine and associated facilities also produced corroding lead, antimonial lead, special high-grade zinc, zinc die casting alloys, cadmium, specification lead alloys, leaded zinc oxides, ore metal, super-purity antimony, sulfuric acid, and phosphoric acid. The mine was part of the Bunker Hill Mining Complex that was an integrated mining, milling, and smelting operation. In addition to the mine, the complex included a milling and concentrating operation, a lead smelter, a silver refinery, an electrolytic zinc plant, a phosphoric acid and fertilizer plant, sulfuric acid plants, and a cadmium plant. The complex occupied approximately 350 acres between the towns of Kellogg and Smelterville.

The Bunker Hill Mine encompasses 620 claims totaling 6,200 acres. From the discovery cuts, some 3,600 feet above sea level, more than 20 major ore zones were mined to nearly 1,600 feet below sea level, a vertical distance of about 1 mile. The mine contains more than 150 miles of drifts and 6 miles of major inclined shafts, and it encompasses about 5 cubic miles of disturbed ground. Figure 2 shows a cross section of the mine and helps convey the magnitude of the underground workings. This figure was developed by the Bunker Hill Company during the 1950s; thus there are even more workings than depicted in as the mine has been extended down to the 31 Level.

Growing public concern about the environment in the 1970s compelled the owners of the Bunker Hill Mine to implement improvements to comply with federal air and water pollution control standards. Several pollution control systems were put in place, including acid mine drainage (AMD) control. A water treatment plant called the Central Treatment Plant (CTP) was completed in 1974 to treat the AMD.

In 1982, a 21-square-mile area of the Silver Valley, including the Bunker Hill Mining Complex, was placed on EPA's National Priorities List (NPL). The NPL site is referred to as the Bunker Hill Superfund site. A 1992 Record of Decision (ROD) specified required remedial design and remedial actions. Starting in 1994, the milling, processing, smelting, and other associated facilities with the Bunker Hill Mining Complex were demolished as part of a series of remedial actions.

BLP shut down the mine on January 17th, 1991, and had pulled pumps from all of the main pump stations by July 25, 1991. The deepest pump station prior to shutdown was located at the 23 Level. Upon pulling the last pumps, all power was turned off to the mine. About August 23, 1991, an auction was held for sale of all materials at the complex. On

December 20, 1991, Robert Hopper purchased the Bunker Hill Mine from BLP, and the transaction closed on the rest of the property on April 29, 1992. Robert Hopper is the current mine owner.

From the time the power was turned off until April 20, 1992, all water from the Milo Gulch side of the mine above 9 Level (Wardner water) was diverted down the No. 2 Shaft, and all other water on the 9 Level discharged out the Kellogg Tunnel to the Central Impoundment Area (CIA). On April 20, Mr. Hopper diverted the Wardner water to the CIA as well. By July 15, 1992, power to the mine was reestablished. On approximately December 10, 1992, the water level in the mine was three sets above the 18 Level. In January 1993, the No. 3 Hoist was again in operation; however, a cave-in within the shaft kept access to a minimum until March. By then the water level was just below the 17 Level. About October 30, 1993, the mine water line to the CIA was shut down and the mine waters were diverted into the deeper underground workings. A reading during the summer of 1993 showed the water level at about 20 feet below the 16 Level, and the water level was still below the 15 Level in October 1993. In December 1994 the pumps at the 11 Level were started and all water was again discharged to the CIA for treatment. Prior to the third week of July 1995, water below the 11 Level had risen 2 feet per day; during that week the water rose at a rate of 4 feet per day. In December 1996, the rate jumped to 6 feet per day, where it stayed until the last week of November 1998, when it once again dropped back to 4 feet per day.

The mine and mine water pumping system are currently operated by a company owned by Mr. Hopper. Approximately 9 to 11 employees work at the mine on day shift during the week, and employees are on call for night shifts, weekends, and holidays, as necessary. Job classifications at the mine include electrician, mechanic, hoistman, and laborer. The employees are non-union, and one employee is a designated foreman.

The mine is currently being worked on a small scale. Approximately 500 tons per month is being produced. It has been reported that Mr. Hopper does not intend to initiate larger production at this time because of financial issues; instead he is focusing on refurbishing the mine for sale or larger scale production in the future if financing issues are resolved.

2.2 Mine Setting and Geology

The Bunker Hill Mine is located in the panhandle of northern Idaho in the Silver Valley of the South Fork of the Coeur d'Alene River. The Silver Valley is a steep mountain valley that trends from east to west approximately 2,250 feet to 4,000 feet above mean sea level (msl).

The strata of the Bunker Hill Mine are broken by many major faults. These faults strike in a northwesterly to westerly direction and dip to the southwest between 50 degrees to 80 degrees. The underground workings of the Bunker Hill Mine lie almost entirely within the Revett and St. Regis formations of the Precambrian Belt Supergroup; these formations are made up primarily of quartzites, siltites, and argillites. The stratigraphy of the mine may be described in general terms as repeated and intermixed sections of the Revett and St. Regis formations as controlled by the extensive faults in the area.

2.3 Mine Water

Water movement in the Bunker Hill Mine occurs through a variety of interrelated hydrologic and hydrogeologic mechanisms. This complex flow system can be simplified into three main components: water sources, inflow mechanisms, and intra-mine flow. A fourth component, exit flow, occurs through the Kellogg Tunnel but is included in the intra-mine discussion. Each of these components is discussed in the following subsections. A generalized flow model is presented in Figure 3.

2.3.1 Water Sources to the Mine

The majority of water sources in the vicinity of the mine are above ground, mainly from rainfall or snowfall runoff. The precipitation eventually is collected in creeks (Milo or Deadwood) or infiltrates into the ground and recharges local groundwater. Peak flow periods correspond with heavy precipitation and spring snowmelt.

Water enters the mine through three primary mechanisms: surface water inflow, inflow from the groundwater system into the upper workings, and inflow from submerged workings. Surface water inflows occur where workings have come close enough to intercept a portion of the surface water. Surface cavings of underground stopes (such as the Guy Caving area in Milo Gulch) and workings in the vicinity of surface water flows (such as Deadwood Creek through the Inez shaft and Milo Creek through Small Hopes) are examples of some of the larger known surface water inflows.

Inflow from the groundwater system to the upper Level workings (above 9 Level) occurs according to a series of tiered hydraulic conductivities within the surrounding bedrock aquifer. A shallow groundwater system also exists at the mine. However, the shallow system is closely related to surface water and recharges surface water or the bedrock aquifer.

The primary hydraulic conductivity of the quartzite bedrock is thought to be very low. A second hydraulic conductivity exists as a result of the regional deformation and faulting of the quartzite bedrock. This hydraulic conductivity depends on the amount of fracturing associated with a particular fault. In the vicinity of the mine, the Cate Fault is probably a higher conductivity fault, followed by the Buckeye, Sullivan, Dull, Katherine, and Marblehead faults, in no particular order.

A third tier of hydraulic conductivity is associated with northeast-southwest trending faults. These faults are less extensive than the northwest-southeast trending faults discussed above, and, therefore, most likely transmit less water. A fourth tier of hydraulic conductivities exists in blocks bound by the faults. The blocks contain bedding fractures and jointing but probably have low conductivities. The mine workings intersect these water-bearing features through a variety of drifts, stopes, drill holes, and raises. The volume of water transmitted by an individual feature is a function of the conductivity of the feature and the area that is intersected by mine workings. Although the bedding planes probably have the lowest conductivity, they intersect throughout the mine workings and, therefore, may transmit the largest volume of water (Lachmar, 1989).

The extent of inflow into the submerged workings (below 11 Level) is not easily quantified. The mine requires pumping to dewater to the 11 Level, indicating that the mine acts as a drain for local groundwater. This probably occurs in a fashion similar to a groundwater pumping well, because of the cone of depression created by the pump drawdown. It is likely that the groundwater drawdown created by pumping from below 11 Level affects both the upper workings and the regional groundwater in contact with the submerged workings. This is supported by the relative elevation of the pumping level (approximately 1,970 feet above mean sea level) versus the elevation of the South Fork Coeur d'Alene River (approximately 2,240 feet).

2.3.2 Intra-Mine Flow

Once water enters the mine workings, it is conveyed to the Kellogg Tunnel through a variety of relatively complex flow paths. The Kellogg Tunnel is the sole drainage conduit from the mine.

In response to an EPA requirement, the mine is currently kept pumped down to approximately 30 feet below 11 Level, which corresponds to about 1,970 feet above mean sea level. The reason for this requirement is to prevent AMD from leaking into the South Fork of the Coeur d'Alene River and to supply vertical buffer separation from the mine pool and the river.

As described earlier, the upper portions of the mine drain by gravity to 9 Level via numerous chutes, stopes, cracks, drill holes, and joints. The ditch in the 9 Level floor (which measures about 2 feet deep and 2 feet wide) collects this water and conveys it out the Kellogg Tunnel. The water below 9 Level is pumped into the 9 Level ditch at the Number 2 Raise. This pump system consists of a submersible pump located about 30 feet below 11 Level, a pump on 11 Level, and a pump on 10 Level. The submersible pump pumps to the 11 Level pump, which boosts to the 10 Level pump, which in turn pumps the water into the 9 Level ditch for gravity flow out the Kellogg Tunnel.

The following subsections describe the gravity flow paths for the water in the upper workings and focus on the 3 Level, the 5 Level, and the 9 Level. These levels serve as major flow paths for water and, therefore, are important in the overall understanding of intra-mine flow. Additional levels also convey flow in the mine, but access to these levels is difficult and a detailed assessment of flow paths has not been conducted.

2.3.2.1 3 Level Flow

The 3 Level consists of the Homestake Workings and the Utz Workings. These workings are located up Milo Gulch. Flow originates from the Cate Fault in this area (Bretherton 1989). The Cate Fault is recharged in part by Milo Creek and the City of Wardner water supply dam. Losses through the bottom of the dam have been measured at 60 gallons per minute (gpm) after the removal of a fine sediment layer (Trexler 1975). This area of the Homestake Workings discharges though fractures to the Cherry 4 Level (Bretherton 1989), and to the workings below. A map showing the major flow paths in the Homestake Workings is presented as Figure 4.

2.3.2.2 5 Level Flow

The direction and quantity of flow on the 5 Level has been studied extensively by Riley, Erikson, Trexler, and Lachmar in thesis and dissertation projects through the University of

Idaho. The current understanding of intra-mine flow on the 5 Level is based on this work and on recent observations during site visits. In the following discussion references are made to flumes. These flumes are wooden cutthroat flumes placed in various locations to measure flow. These flow measurements were first made in the 1980s by various University of Idaho researchers, and more recently by CH2M HILL.

There are two major drainage locations on the 5 level: Williams Flume and the Becker Flume. Each of these is discussed in terms of their tributaries. Figure 5 presents the known 5 Level flow paths.

Williams Flume. Water enters the New East Reed Drift through the New East Reed Drill Holes (most of which are sealed) and through bedding fractures intersected by the drift. Water flows northwest along the drift to the New East Reed Flume (a historical sampling location) and converges with flow from below the Russell Dam. The Russell Dam was built to capture flows from the Old East Reed Drift for use as drill water. The Old East Reed Drift receives flow from bedding fractures, an ore chute, and drill holes near the end of the drift. Flow continues northwest from below Russell Dam past open stopes to the west and converges with flow from the Russell Tunnel. The majority of Russell Tunnel flow comes from the Asher Drift. After converging, water flows to the Williams Flume.

From the Williams Flume, water flows down the Williams Winze and Becker Raise to the 6 Level. It is likely that the majority of this water comes down the Van Raise to the 9 Level, but access to the 6 and 7 Levels has been difficult because of the condition of the workings, and the exact flow path cannot be easily determined.

Becker Flume. Flow at the Becker Flume originates to the west, in the 5 Level workings. This flow is measured upstream of the Becker Flume at the West Reed Flume and at the inoperative West Motor Flume. The West Reed flume measures flow that drains the Ventilation Drift and the Guy Drift, and therefore may be hydraulically connected to the surface water infiltrations through the Guy Caving area. The West Motor Flume flow originates from a stope to the west of the flume, the extent of which is not clear.

From the Becker Flume, water flows down the Becker (Mule) Raise to the 6 Level. It is likely that the majority of this water comes out on the 9 Level via the Van Raise.

2.3.2.3 9 Level Flow

Water on the 9 Level flows northwest on the No. 9 East Drift to the Barney Switch area, where it flows northeast out the Kellogg Tunnel. Pump discharge from the submerged workings is tributary to the No. 9 East Drift at the No. 2 (White) Raise. Figure 6 presents the known water flow pathways on the 9 Level.

No. 9 East Drift. From the Van Raise, which is thought to convey the majority of the flow from above 9 Level, water flows northwest on the No. 9 East Drift to a confluence with the Cherry Crosscut. Water from the Cherry Crosscut originates from the Cherry Raise, the 7 Level Drain (which is no longer working), the Bailey Ore Chute, and the Bailey Drill Holes. Farthest upstream are the Bailey Drill Holes, which are currently flowing. The Bailey Ore Chute receives a majority of flow from a dam on the 7 Level built to hold drill water from Drill Hole 1208. Flow that comes down the Bailey Ore Chute is measured at the Bailey Flume (9BO). The Cherry Raise is tributary to the Cherry Crosscut flow. The origin of this water in not clearly understood. The Cherry Raise on 5 Level is dry. The 7 Level Drain was built to convey poor quality water from the 7 Level around the raise but is no longer working. It is likely that the flow coming down the Cherry Raise originates in part from the 7 Level workings.

From the confluence of the Cherry Crosscut and the No. 9 East Drift, water flows northwest down the No. 9 East Drift until it merges with the Stanly Crosscut. The Stanly Crosscut Flume (9SX) measures flow from the Stanly Crosscut that probably originates from the Flood-Stanly Workings and may be hydraulically connected to the surface water inflow to the Guy Caving area. The flume from the Stanly Ore Chute (9SO) merges after the Stanly Crosscut Flume. The Stanly Ore Chute also drains a portion of the Flood-Stanly Workings. After the confluence of the Stanly Crosscut, water continues northwest on the No. 9 East Drift, where it is measured at the Loadout at 9 Level Flume (9LA), just upstream of the No. 2 Raise.

No. 2 (White) Raise Pump. The water level in the submerged workings is maintained at about 30 feet below the 11 Level with a series of pumps. A submergible pump lifts water to the 11 Level, a stationary pump lifts the water to the 10 Level, and a final pump lifts the water to the 9 Level. The elevation of the water in the submerged workings is maintained at approximately 1,970 feet above mean sea level.

The source of water in the submerged workings is not clearly understood. It is likely that water comes from fractures, faults, and bedding planes intercepted by mine workings and drill holes. In addition, water that is not intercepted by the No. 9 East Drift or the 9 Level workings northwest of the Barney Switch probably flows down to the 11 Level and contributes to the submerged workings. This includes water from Deadwood Creek (west side of the mine) that may enter through the Inez Workings and descend to the 11 Level.

Deeper still, the 23 Level workings are connected to the 3100 Level of the Crescent Mine by the Yreka Crosscut. The Crescent Mine is located about 3 miles to the east. The hydraulic relationship between the Crescent Mine and the Bunker Hill Mine is not fully understood. The elevation of the Kellogg Tunnel portal is about 300 feet below the elevation of the Hooper portal of the Crescent Mine (Hampton 1985). This suggests that, depending on the condition of the Yreka Crosscut and the elevation of water in the Crescent Mine, Crescent Mine water could drain to the Kellogg Tunnel in a nonpumping scenario.

Barney Switch. From the No. 2 Raise, water continues to flow northwest until it gets to the Barney Switch (9BS). The Barney Switch drains the workings to the northwest. Specific flow relationships in this western portion of the mine have not been defined. From the Barney Switch, water flows northeast out the Kellogg Tunnel (9KT) to the Central Treatment Plant. The New Caledonia Workings merge below the Barney Switch and contribute 1 percent to 2 percent of the total Kellogg Tunnel flow (Erikson, 1985).

2.3.3 Kellogg Tunnel Discharge

A Parshall flume is located at the Kellogg Tunnel portal to measure the flow of mine water emanating from the mine. Figure 7 shows the mine water conveyance system from the Parshall flume to the Lined Pond and the Central Treatment Plant. A 24-inch-diameter concrete pipe conveys the mine water from the Parshall flume down the hill from the mine to a 16-inch high-density polyethylene (HDPE) pipeline located in the northern portion of the parking lot of the EPA site offices. This 16-inch HDPE pipeline continues west and discharges into the Lined Pond. A tee and valves in this line allow the option of sending the mine water directly into the CTP via a 12-inch HDPE pipeline. When this direct feed option is not being used, the mine water is pumped from the Lined Pond to the CTP by a pump station located on the northwest side of the Lined Pond. This pipeline is also 16 inches in diameter.

2.3.4 Central Treatment Plant

The CTP has a design treatment capacity of 5,000 gallons per minute (gpm). The CTP uses lime neutralization to raise the pH of the mine water and to precipitate the metals as hydroxides, forming a sludge. The treated water is discharged into Bunker Creek via Outfall 006. Bunker Creek discharges into the South Fork of the Coeur d'Alene River approximately 2,500 feet to the west. The sludge is pumped into a sludge disposal cell on top of the Central Impoundment Area, which is located about 50 feet higher than and about 500 feet west of the CTP.

2.3.5 Mine Water Flow Magnitude and Chemistry

Table 1 provides a summary of the mine water flow rate and chemistry. The maximum expected AMD in the table is the estimated highest flow and poorest water quality that may come from the mine very infrequently and only during spring thaw, when the workings are being flushed with melting snow and spring rains. The annual average AMD is the estimated average annual flow rate and water quality. It is known that the AMD will typically be weaker (of better quality) during fall and winter but stronger (of poorer quality) during late spring and early summer during snowmelt. In addition, water quality varies from one part of the mine to the next, with pH values varying between 1.5 and 6.5. The lowest pH values come from the Stanley Ore Chute, located at the east end of 9 Level, and the higher pH values are associated with the water coming from the west side of the mine (the west of the Barney Switch).

TABLE 1
Bunker Hill AMD Characterization: Kellogg Tunnel Discharge

Design Parameter	Maximum Expected	Annual Average
Flow (gpm)	5,000	1,500
PH	1.5	2.6
Lime Demand (lb/1,000 gal)	80.0	10.0
Solids Formed (lb/1,000 gal)	130	12.5
Zinc (mg/L)	850	250
Cadmium (mg/L)	2.5	0.40
Lead (mg/L)	2.0	0.80
Total Iron (mg/L)	1,550	200
Ferric Iron (mg/L)	1,400	180
Ferrous Iron (mg/L)	150	20
Manganese (mg/L)	400	80
Magnesium (mg/L)	500	150
Sulfate (mg/L)	7,000	2,100
Aluminum (mg/L)	14	10
Calcium (mg/L)	140	100
TSS (mg/L)	400	200
TDS (mg/L)	11,000	3,000

mg/L = milligrams per liter
gpm = gallons per minute
lb/1,000 gal = pounds per 1,000 gallons

2.4 Mine Water Management System O&M

Mine water is controlled through the operation and maintenance of the gravity drainage system and the pumping system described in Section 2.3. Following is a description of the required O&M activities.

2.4.1 Pumping System O&M

Three electrical pumps in series, operating almost full-time, maintain the mine water at about 30 feet below the 11 Level. These three pumps have a capacity of between 550 to 750 gpm, depending on wear condition. The lowest pump, which is submersible, is installed and operating in the No. 2 Shaft in a sump located approximately 60 feet below the 11 Level. A centrifugal pump located adjacent to the No. 2 Shaft on the 11 Level takes suction from the submersible pump's discharge hose. The 11 Level centrifugal pump discharge is carried by a 6-inch-diameter steel pipe up a pump column in the side of the No. 2 Shaft to a centrifugal pump on the 10 Level (a pump column consists of sections of steel pipe to convey mine water between levels). The discharge pipe from the 11 Level centrifugal pump feeds the 10 Level pump's suction. The 10 Level pump's output flows through a 6-inch-diameter steel pipe in the side of the No. 2 Shaft up a pump column; the mine water is then delivered to the Kellogg Tunnel Ditch at the 9 Level adjacent to the No. 2 Shaft (see Figure 9 for location), where it flows by gravity out of the mine.

Another partially completed pump column is located in the No. 1 Shaft. This pump column is also 6-inch steel and extends from the 9 Level down to the 10 Level. A pump has been installed at the 10 Level, and the mine owner has plans to extend this pumping system down to the 11 Level to serve as a backup system to the one in the No. 2 Shaft.

Typical O&M activities related to the pumping system include inspection of the pump columns for leaks, cleaning intake screens, pump lubrication, and pump and pipe replacement. The type and size of the pumps and motors are not known.

Temporary shutdowns of the pump system are due primarily to a loss of power. The pump system is also sometimes shut down to repair or replace pumps and pipes. Typically the mine has a backup pump available. Pipe and other materials needed for the pump system are readily available locally.

2.4.2 Gravity Drainage System O&M

Maintenance for the gravity drainage system consists of inspection and cleanout.

2.4.2.1 Inspection

Ideally all the unsubmerged drifts would be periodically inspected for cave-ins or blockages that interfere with the drainage of mine water. In reality this is infeasible because of the extent of the workings, the potentially unsafe condition of the inactive workings, and the fact that the precise direction of all the intra-mine flows is unknown. However, the major flow directions of the upper workings are fairly well documented, in particular that portion that accounts for the majority of the dissolved metals that emanate from the Kellogg Tunnel. These workings, which are described in Section 2.3, are primarily located on the 5 and 9 Levels. Figures 5 and 6 depict the main flow pathways. These drifts should be inspected regularly, and records should be kept on their condition and ability to convey the mine water. It is recommended that these be inspected at least quarterly, and more often as needed during the spring high-flow conditions.

Even with a regular inspection system, it is possible that a flow blockage will occur in some portion of the workings. A blockage could be caused be muck buildup, a collapse, or a combination of both. There is the potential for water to build up behind the blockage until the pressure causes the blockage to break, potentially causing a flood.. Depending on its size and location, such a flood could either be very localized or affect a large section of the workings. The result could be a relatively sudden increase in water flows both within the mine and from the Kellogg Tunnel, ditches being filled in with muck, and track being buried.

2.4.2.2 Clean Out

Mine water gravity conveyance corridors should be cleaned out as needed to ensure uninterrupted flow of the mine water and to allow access and inspection. This cleaning is especially critical during spring runoff or following a storm event; however, it is necessary throughout the year. For example, Mr. Hopper estimates that during October 1998, a relatively dry time of year, 20 man-days of work was expended in cleaning the KT ditch. Mr. Hopper has also reported that during the spring of 1997 the mine water flows were so high that his entire crew spent nearly 6 months cleaning the workings.

2.5 Critical Mine Infrastructure

The following critical mine infrastructure systems are needed for mine water management:

- Surface facilities
- Rail system
- Hoisting facilities
- Electrical system
- Ventilation systems
- Shaft/level repair

These systems are described below.

Figure 8 shows the layout of the surface facilities and Figure 9 shows the location of 9 Level mine infrastructure required for mine water control. Most regulations governing mine infrastructure are found in Title 30 Code of Federal Regulations (CFR) Part 57.

2.5.1 Surface Facilities

Surface facilities at the mine include an office building, a shop, a motor barn/change room, and maintenance shops. The buildings are in good condition. Some of the piping has friable asbestos, and the buildings have transite siding. There are no known underground storage tanks (USTs), and petroleum products are stored in drums and containers. The buildings and equipment have accumulations of dust from the ore crushing activities.

The current mine owner has a temporary mobile crusher and conveyor system set up to crush and stockpile ore. There is approximately 5,000 tons of low-grade ore stockpiled, but the mine owner was in the process of crushing and shipping this ore offsite when this plan was prepared. The crushing arrangement is not a component of the mine water control system, but the need for control of stormwater runoff from the stockpiled ore should be evaluated if ore is present if and when this plan is enacted.

2.5.2 Rail System

A rail system is installed in the 9, 10, and 11 Levels of the Bunker Hill Mine. This rail system is used for hauling ore and transporting personnel, equipment, and materials to and from the mine. Underground mining is not expected to occur during the initial 30 days of EPA operations, as the primary concern will be mine water management. However, the 9 Level rail system must be maintained in order to transport personnel, equipment, and materials to and from the mine for mine water control.

Electric locomotives are the main transport vehicles. There are four electric locomotives and one small diesel locomotive. The electric locomotives are battery powered. Battery charging stations are located in the car barn, at the 10 Level, and at the 11 Level. The track and ties for the rail system are standard gauge.

The majority of the O&M activities for the rail system are focused on keeping the ditches clear so that water flows in the ditch. Rails and ties are replaced infrequently.

2.5.3 Hoisting Facilities

Hoisting facilities are necessary in order to raise or lower personnel, equipment, and materials between levels and to provide the means for escape from the mine. Hoists are installed in the No. 2 Shaft, the No. 1 Shaft, the Cherry Shaft, the Last Chance Shaft, and the No. 3 Shaft. All these hoists are operational, with the exception of the No. 1 Shaft hoist. The current mine owner is in the process of rehabilitating this hoist. The hoist in the Cherry Shaft is in the process of being repaired.

All hoists are composed of steel drums and wire rope. The hoists that must be maintained for mine water control are those in the Cherry and No. 2 shafts. It is believed that the wire rope in these hoists is in good condition. The No. 2 Shaft hoist is the primary hoisting facility for the mine and provides access to the pump column. A temporary hoist in the No. 1 Shaft was installed for secondary access to the pump column. The hoist in the Cherry Shaft is used as a secondary escape route from the mine.

Typical O&M activities associated with the hoist system are inspections of the hoist systems; lubrication of the motors, pulleys, and wire rope; and replacement of motors. Periodically a specialist is brought in to do a complete inspection of the hoist ropes. If the ends of the wire rope become frayed, they are cut and resocketed.

2.5.4 Electrical System

The electrical distribution system consists of a main surface transmission line, substations, and distribution feeder cables inside the mine. There are four substations: a surface substation at the Cherry Shaft and underground substations near the No. 2 Shaft, between the No. 1 and No. 2 shafts, and near the No. 3 Shaft. The main surface substation for the mine is located near the EPA Superfund Office building.

Electricity is stepped down from 13.8 kilovolts to a service use of 220 volts and 440 volts. The electrical cable inside the mine is suspended from the walls of the drifts. Reportedly the electrical equipment at the mine does not contain regulated levels of polychlorinated biphenyls (PCBs).

Typcial O&M activities related to the electrical system are primarily for the pumps and hoisting systems. Wiring harnesses, breakers, and fuses need to be replaced or fixed on an ongoing basis. The electrical cable sometimes gets damaged or goes bad, and the bad section must be removed and the electrical cable spliced back together. Splicing electrical cable can take as long as a half-day to complete. There are generally lots of spare pieces of electrical equipment available from previous demolition of other structures. Much of the electrical equipment is quite old, and, if spares are not available, it can be expensive and time-consuming to locate replacements.

2.5.5 Ventilation and Air Systems

The Bunker Hill Mine is naturally ventilated on the 5, 9, 10, and 11 Levels. The Last Chance Shaft, located west of the Barney Switch and extending between the 9 Level and the Arizona Tunnel, is used as a fresh air ventilation shaft. There are several raises between levels that circulate the air between levels. If the mine were to be drained to below the 11 Level, air would need to be forced by fans to these lower areas because they do not naturally ventilate.

An air compressor that serves the entire mine is located on the 9 Level. This compressor is used to provide air in areas where supplemental oxygen is necessary and to operate some of the mine equipment. Steel pipelines are used to distribute compressed air around the mine.

There are very few O&M activities associated with the ventilation and air systems. The motor for the air compressor must be greased and checked regularly.

2.5.6 Shaft/Level Repair

Shaft and level repair and maintenance activities consist of the following:

- Cleaning ditches
- Maintaining air and water lines and electrical cables
- Repairing and replacing timber roof supports and roof bolts
- Scaling of loose rock from the mine walls and roofs
- Repairing, replacing, and aligning the rail and wood ties
- Lubricating hoisting equipment and other mine-related equipment
- Repairing and replacing pumps, air compressors, and other equipment

These maintenance-related activities occur on daily. Not all activities are necessary each day; a typical shift may entail one or two of these items.

2.6 Record Keeping

Operation of the mine water control systems requires record keeping. The types of records and monitoring information collected include the following:

- Weekly or daily inspections of hoists, electrical, and pumping systems. These inspections are typically documented in shift reports and are required by MSHA.
- Inspections of the working areas of the mine. These are required prior to each shift and must be documented.
- Records of periodic air readings. In addition, ventilation maps must be up updated as necessary.
- Maintenance records that track the status and condition of equipment.
- Records of employee training. These records are required by the MSHA.

2.7 Mine Security

The current mine security system consists of several gates that are locked to prevent unauthorized access to the mine and related areas. There are no security guards. A number of roads exist around the area that provide access to different parts of the mine. Access to the mine and related areas is controlled by locked gates.

SECTION 3

Plan for First 30 Days of Operation

As described in Section 1, this plan addresses activities and O&M work that EPA would need to conduct in the event that the current owner of the Bunker Hill Mine is no longer willing or able to operate the mine and control the mine water. Two basic time frames are triggered if this set of circumstances occurs. First, EPA must implement the MCP, which covers the initial 30 days of operations. The second phase is the arrangement put into affect to manage the mine water control systems after the initial 30 days.

Mining operations related to the production of ore will not occur during the time the MCP is being implemented, as the focus of the MCP is mine water management. Following the initial 30 days of operations, a longer term contractor will be needed. EPA will need to pursue one of the contracting options described in Section 4.

Described below are the regulatory requirements and both administrative and O&M actions needed during the first 30 days of operation. The following is not intended to be a step-by-step procedure, as the specific required steps cannot be determined at this time because the specific mine conditions will not be known until the plan is enacted. In addition, specific step-by step procedures are not provided for operation of specific mine equipment or systems, as these procedures are beyond the scope of this planning document.

3.1 Regulatory Requirements

There is a strong measure of government control and inspection of mines under legislation specific to the mining industry that is intended to safeguard the health and safety of the miners. The MSHA is the major federal agency responsible for the enforcement of mining regulations, which are described in 30 CFR, Parts 1 to 99 (see Appendix A). Mine Safety and Health Administration (MSHA) also has provisions for technical support of the enforcement branch, training support for mining personnel, and testing and certification of new equipment for the mining industry.

MSHA regulations dealing with mine infrastructure requirements that apply to the Bunker Hill Mine are found in 30 CFR Subchapter N, "Metal and Nonmetal Mine Safety and Health," Part 57, "Safety and Health Standards-Underground Metal and Nonmetal Mines." Other sections of the code that apply to operating the mine are: (1) Subchapter G-Filing and other administrative requirements, Part 40-Representative of Miners, Part 41-Notification of Legal Identity, (2) Subchapter H-Education and Training, Part 48-Training and Retraining of Miners, Part 49-Mine Rescue Teams, and (3) Subchapter M-Accidents, Injuries, Illnesses, Employment, and Production in Mines.

A health and safety plan has been approved by MSHA for operation of the Bunker Hill Mine. In the event that this MCP is implemented, the existing health and safety plan would continue to be used to govern MCP operations. A copy of the health and safety plan would be acquired from MSHA.

3.2 Administrative Actions

This section describes administrative actions to be conducted if implementation of the MCP becomes necessary.

3.2.1 Notice to Proceed

This MCP will be initiated following notice to proceed by EPA.

3.2.2 Notifications

The MSHA and the Occupational Safety and Health Administration (OSHA) must be contacted to inform them of the change in operator. Companies that provide utility services, equipment, and materials to the mine need to be contacted to inform them of the change in operator. Names, addresses, and phone numbers of government contacts and service providers are shown in Appendix B.

3.2.3 Site Briefing Meeting

A site briefing meeting will be arranged with EPA, the state of Idaho, and MSHA to brief them on the condition of the mine, familiarize their staff with the mine, obtain direction from them as needed, etc. This meeting will be held as soon as possible at the site.

3.2.4 Record Keeping and Reporting

A weekly report will be prepared describing activities conducted at the mine. The records described in Section 2.6 will be maintained at the mine office.

3.3 Operation and Maintenance Actions

3.3.1 Initial Assessment

The first action will be to conduct an initial assessment of the aboveground and belowground facilities. The focus of the initial inspection will be to determine the condition of the mine infrastructure and determine what actions are necessary to meet MSHA safety requirements in order to resume operation of the mine water control system.

For underground systems, the initial assessment should focus on the Kellogg Tunnel, the track and rail system, the electrical system back to the No. 2 Hoist, the No. 2 Hoist, the pumping system, the 9 Level ditch out to the Kellogg Tunnel, and the Cherry Shaft for access and secondary escape. Follow-on underground assessment should be made of the 5 Level and the Barney Switch side, including the No. 3 Hoist, and other areas. The initial emphasis should be on the safety systems required for safe entry and operation of underground equipment, followed by other areas of the mine.

For aboveground systems, the initial assessment should focus on the electrical substation, the locomotives and cars, site security gates, and the condition of the surface buildings.

3.3.2 Assemble Operations Crew

Priority will be given to contacting and hiring personnel currently employed at the mine by Mr. Hopper. Most of these employees live in the immediate area. The hiring process will be done immediately after receiving notice to proceed, and in coordination with other activities.

Mr. Hopper's current employees are MSHA trained and can start work quickly. New employees require initial safety training (as required by MSHA) before they assume their duties. All employees are required to attend an annual refresher training in general safety practices and procedures. Additionally, before miners start performing a new task or operate a new piece of equipment, they must be instructed in the various safety and operational aspects of the new task or new piece of equipment.

3.3.3 Initial Maintenance

Maintenance will be conducted as needed, based on the initial assessment. Priority will be given first to safety issues, second to mine water control issues, and then to auxiliary systems as needed. Appendix B identifies the major material suppliers that support operation of the mine.

3.3.4 Systems Startup

Necessary systems will be brought on line as soon as possible. These will be electrical, rail, and mine water pumping. It may be that these will not be turned off, but the exact conditions of these systems won't be known until they are assessed.

3.3.5 Site Security

An initial site security assessment will be conducted as described in Section 3.3.1. Follow-on site security measures should include changing the locks on the gates that provide access to the mine and related areas, and placing signs.

Although not required during the first 30 days of operations, control of access to the Cherry Shaft needs to be improved by installing a better fence and locked gate. The area around the Cherry Shaft is sometimes used for uncontrolled skiing and snow boarding.

3.4 Post-30-Day Operations and Maintenance

Although this MCP does not address issues related to post-30-day operations and maintenance, requirements for operating the mine beyond the initial 30 days are likely to be similar to what has already been described. At some point after the initial 30 days, costs may need to be incurred to maintain some of the infrastructure that is not necessary for the operation and maintenance of the mine water control systems. This could be necessary to keep the mine in a state that makes it appealing to prospective purchasers, should EPA decide this is a prudent option.

3.5 Estimated Costs for First 30 Days of Operations

Estimated capital and O&M costs for operating the mine for the first 30 days are described below.

3.5.1 Capital Projects

There are no expected capital projects necessary to implement the MCP during the first 30 days of operation. However, fairly substantial expenditures may be needed, depending on the state of repair of the workings when EPA takes over operations. Costs could be incurred for hoists and shaft repairs, pump columns, electrical substations, compressor purchases, track locomotives and rolling stock, main electrical feeder lines, substations, and lighting.

3.5.2 O&M Costs

The following costs are based on estimates of the costs of current operations. The costs for the initial 30 days of operation by the EPA may vary substantially, depending on the condition of the workings, the availability of labor, the wage scale used, and the engineering management and support needed.

3.5.2.1 Labor

Labor necessary to maintain the mine to manage the mine water includes a mine foreman/backup hoistman, a hoistman, a three-man repair crew, an electrician, a mechanic, and one laborer. Labor costs incurred by the current owner are estimated to average $4,160 per week with a 40 percent benefits package of $1,664 per week, for a total of $5,824 per week or a yearly cost of $302,848. These costs are based on wages the current mine owner pays. These costs would probably increase to Davis Bacon wage rates if they were paid by EPA.

3.5.2.2 Power

Power costs average $7,000 per week, or $84,000 annually. This includes power to run the surface facilities as well as all underground equipment (hoists, pumps, lights, compressors, and other equipment).

3.5.2.3 Level Repair and Maintenance

Because they are so interrelated, repair and maintenance costs are combined for maintaining the necessary levels within the mine from the Cherry Shaft in Milo Gulch to the 11 Level for access, ventilation, and control of water paths. These include the costs associated with timber repairs, bolts and mats, track and ties, ditch cleanout, repairs, and piping. All of these items are necessary to maintain ventilation pathways and access for the control of mine water. These costs are an estimated $81,000 per year, on average.

3.5.2.4 Compressor Maintenance

Compressor maintenance repair costs average $20,000 per year. These costs are necessary for the running of drift repair drills and the running of hoists at the No. 1 Shaft and the South Chance Shaft.

3.5.2.5 Hoist Maintenance

Hoists currently being used to run the mine and provide for secondary escape include the Cherry Shaft, the No. 2 Shaft, the No. 1 Shaft temporary hoist, and the No. 3 Shaft. Costs include weekly service inspections, repairs, maintenance, shaft repairs, and hoist cable replacement. These costs are estimated to average about $160,000 per year. The hoists needed for mine water control are the hoist in the No. 2 Shaft, which is needed to access and maintain the pumping system, and the hoist in the Cherry Shaft, which is used for secondary escape and for access to the east side of the mine.

3.5.2.6 Pumps and Pipe Columns

The current owner incurs costs for pumps and pipe columns, including the pumps at the Reed Tunnel, pumps at the No. 2 Shaft, pumps at the No. 1 Shaft, the 9 Level pumps, and all necessary level piping for the transport of mine water. Costs include daily inspections, maintenance, and repair or replacement of pumps and piping. Costs are estimated to average about $100,000 per year. The pumps and pipe columns considered absolutely necessary for mine water control are those associated with the No. 2 Shaft.

3.5.2.7 Electrical

Electrical maintenance costs include replacement or repair of substations, control panels, and electrical feeder lines. This equipment covers all surface and underground facilities. Costs are estimated to average about $40,000 per year.

3.5.3 O&M Cost Summary

In summary, estimated O&M costs to run the mine in a standby mode by the current owner are estimated at $800,000 in an average year, or approximately $67,000 per month. Costs can increase as a result of unforeseen events such as the flooding that occurred in the spring of 1997. If EPA were to take over operations, costs could vary significantly from those presented, depending on the condition of the above ground and underground infrastructure.

SECTION 4

Contracting Options for Longer Term O&M

This section summarizes contracting options that are readily available to EPA for longer term O&M of the Bunker Hill Mine, past the initial 30 days of operation.

4.1 U.S. Army Corps of Engineers Contracting Options

Discussions with the U.S. Army Corps of Engineers (USACE) suggest that the following contracting options would be available, if EPA were to use the USACE to implement the longer term O&M of the mine.

4.1.1 Rapid Response Contract

This cost-reimbursable contract mechanism is used by the Corps for environmental response actions that require immediate mobilization. Because this contract is cost reimbursable, the USACE typically requires a higher level of oversight to ensure cost control than what it generally uses for competitive bid fixed-price contracts. In addition to quick mobilization, this contract mechanism is often used when the scope of work cannot be defined sufficiently for a fixed competitive bid. The advantages of this contract mechanism are its quick response and the ability to address a less-defined scope. The disadvantages of this contract mechanism can be higher management costs and potentially higher remedial costs resulting from lack of competition.

A Rapid Response Contract was used at the Bunker Hill site from December 1994 through May 1995 for demolition of select structures at the abandoned lead smelter and zinc plant, removal of select principal threat materials, and for general site maintenance and security.

4.1.2 Multiple Award Remediation Contract

Multiple Award Remediation Contracts (MARCs) are currently being put into place by the USACE. This contract mechanism prequalifies a number of contractors (typically three to four) who the USACE can then go to for competitive bids on scopes of work that are definable. MARC contracts can also be used for cost-reimbursable work. MARC contracts typically have a maximum contract ceiling of around $4 million to $5 million dollars. The advantage of these contracts is that they provide a relatively rapid response and also a competitive bid process.

4.2 EPA Contracting Options

Based on discussions with EPA, the following contracting options are available for longer-term O&M of the mine.

4.2.1 Emergency Response & Remedial Services Contracts

Emergency Response & Remedial Service (ERRS) contracts are designed for rapid response and generally short duration. Discussions with EPA indicated that a 6-month to 1-year duration may be possible with this type of contract; however, the need for regional emergency response capacity would also have to be balanced because EPA Region 10 has only one ERRS contractor. For an ERRS contract, an EPA on-scene coordinator (OSC) is assigned for daily cost management. Typically, the OSC has the authority to approve expenditures of up to $250,000 without the involvement of higher EPA management. For expenditures greater than $250,000, the OSC is required to obtain EPA management concurrence along with a justification of the imminent and substantial risks of environmental and health threats.

4.2.2 Site-Specific Contracting

EPA has the ability to initiate site-specific contracts for technical and remedial support on an as-needed basis. These types of contracts are typically used in emergency situations where an existing EPA contractor (such as an ERRS contractor) cannot respond in a timely manner or where the required expertise is significantly different from the normal capabilities of the existing EPA contractor.

4.2.3 Response Action Contract

The Response Action Contract (RAC) is EPA's typical contracting mechanism for technical and remedial action support for CERCLA work. The RAC contract for Region 10 was awarded in the fall of 1998 and is currently being transitioned into place in early 1999 as a replacement for the Alternative Remedial Contract (ARC). CH2M HILL's work to date at the Bunker Hill site has been through the ARC contract and will continue with site involvement via the newly awarded RAC contract. The RAC contract is a cost-reimbursable contract.

EPA could elect to continue using the RACs mechanism as a way to conduct longer term O&M at the Bunker Hill site. Some of the advantages of this approach would be that there would be no lost transition time between the initial 30-day period and the longer term, and that there would be a stronger interface between the team conducting the mine's O&M and the CH2M HILL technical team evaluating long-term mine water management and treatment.

SECTION 5

Works Cited

Bretherton, Bart. 1989. *Near-Surface Acid Mine Water Pools and Their Implications for Mine Abandonment, Coeur d'Alene Mining District*. Master's Thesis, University of Idaho, December 1989.

CH2M HILL. 1998a. *CH2M HILL Health and Safety Plan: Bunker Hill Superfund Site, Shoshone County, Idaho*. June 1994, updated April 1998.

CH2M HILL. 1998b. "Bunker Hill History." Internal Web site: http://projects.ch2m.com/secure/bunkerhill/page2.html. Viewed November 24, 1998.

Erickson, Daniel. 1985. *Analysis of Water Movement in an Underground Lead-Zinc Mine CDA Mining District, Idaho*. Master's thesis, University of Idaho, June 1985.

Hampton, Kathleen. 1985. *Delineation of Abandonment Procedures for the Bunker Hill and Crescent Mines, Shoshone County, Idaho*. Master's thesis, University of Idaho, May.

Hudson, Bill. 1997. Memo regarding mine contingency plan, from Bill Hudson, CH2M HILL, Kellogg, to Earl Liverman, EPA, Coeur d'Alene. December 10,.

Lachmar, Thomas Edward. 1989. *Analysis of Fracture-Flow Hydrogeology in an Underground Lean-Zinc Mine, CDA Mining District*. Dissertation, University of Idaho, February.

Trexler, Bryson Douglas, Jr. 1975. *The Hydrogeology of Acid Production in a Lead-Zinc Mine*. Dissertation, University of Idaho, June.

Figures

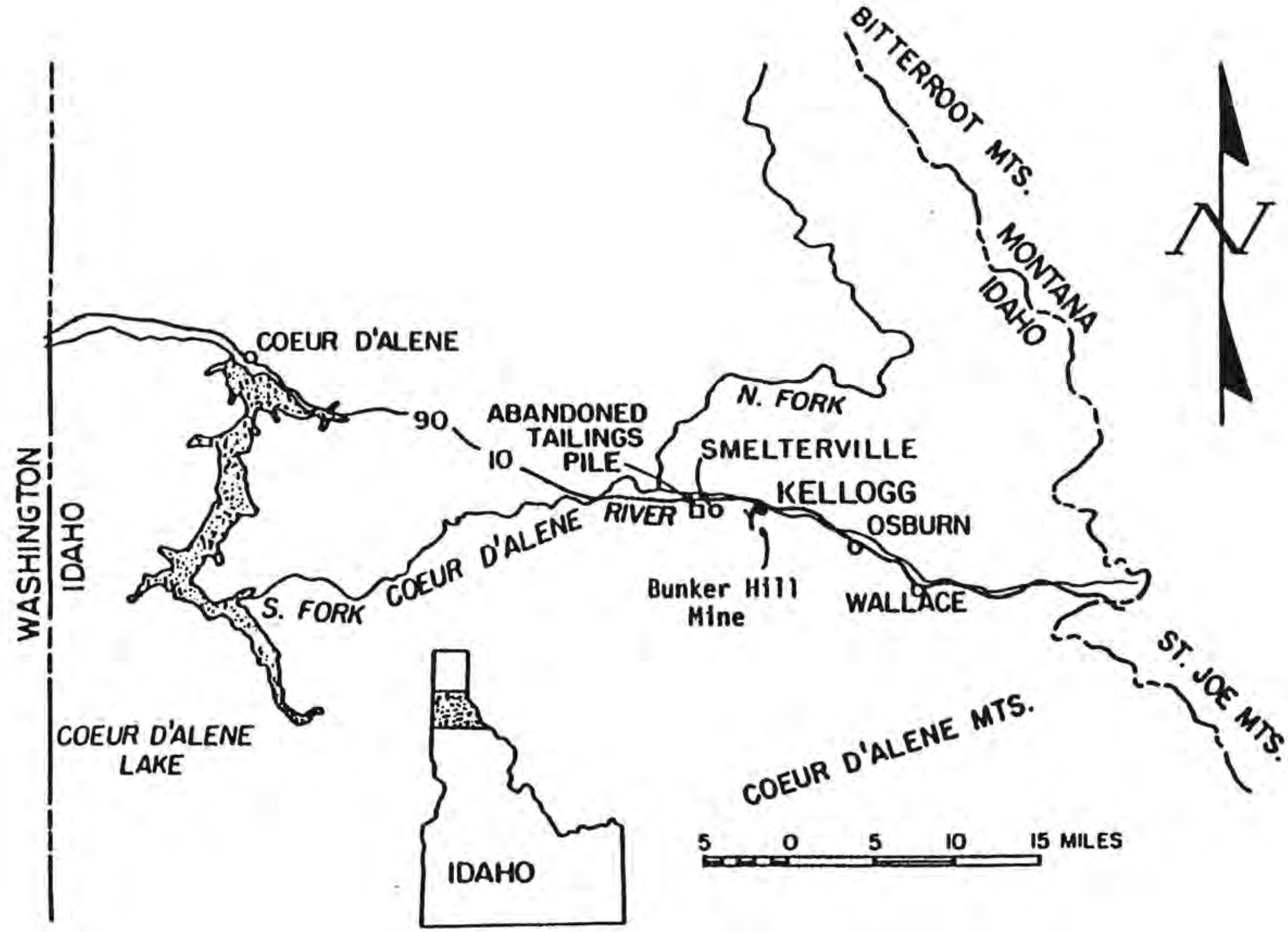

Figure 1. Map of part of Northern Idaho and adjacent areas showing the location of the Bunker Hill Mine (after Eckwright, 1982)

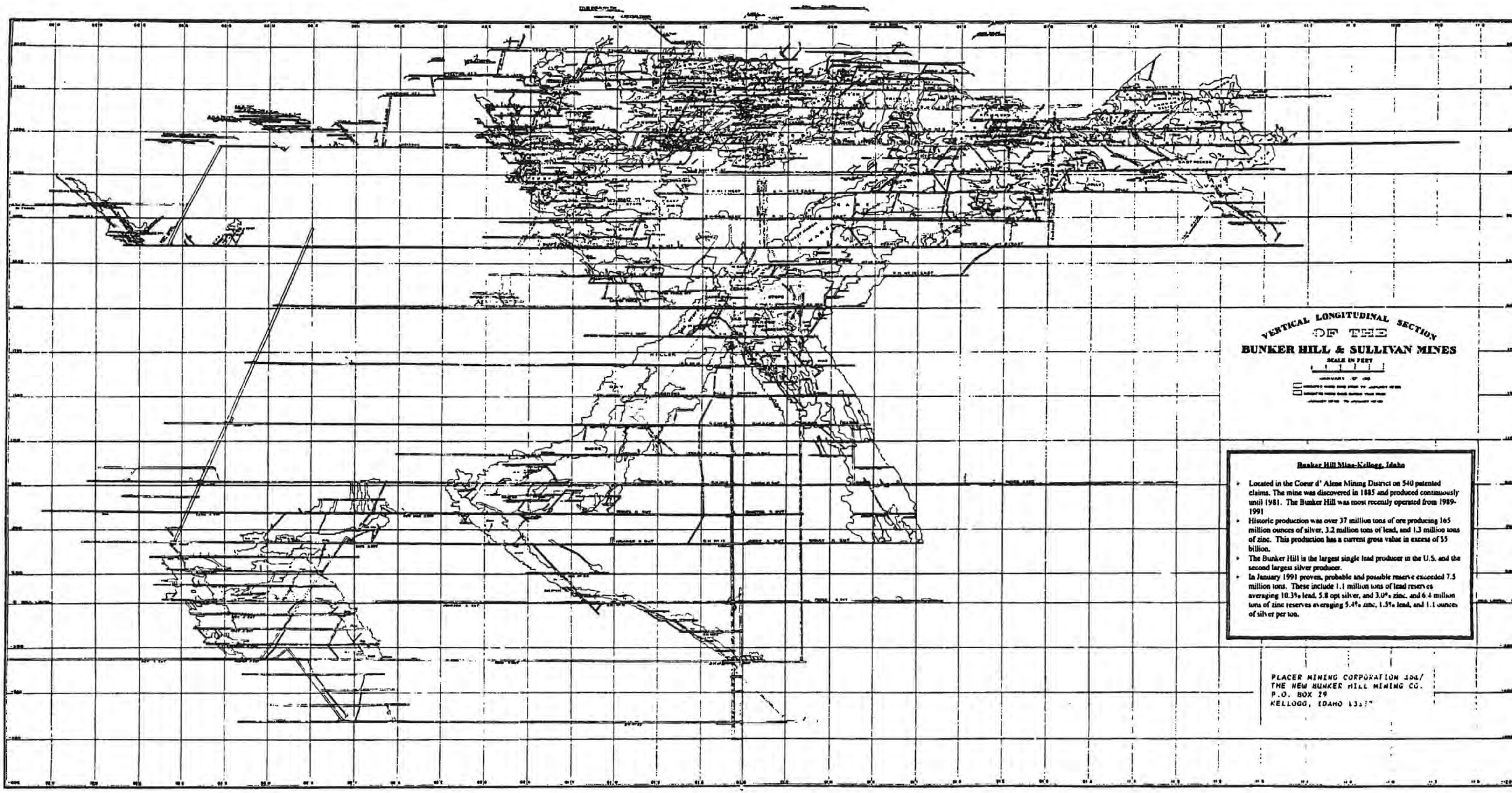

FIGURE 2
CROSS SECTIONAL VIEW OF THE MINE
Bunker Hill Mine Contingency Plan

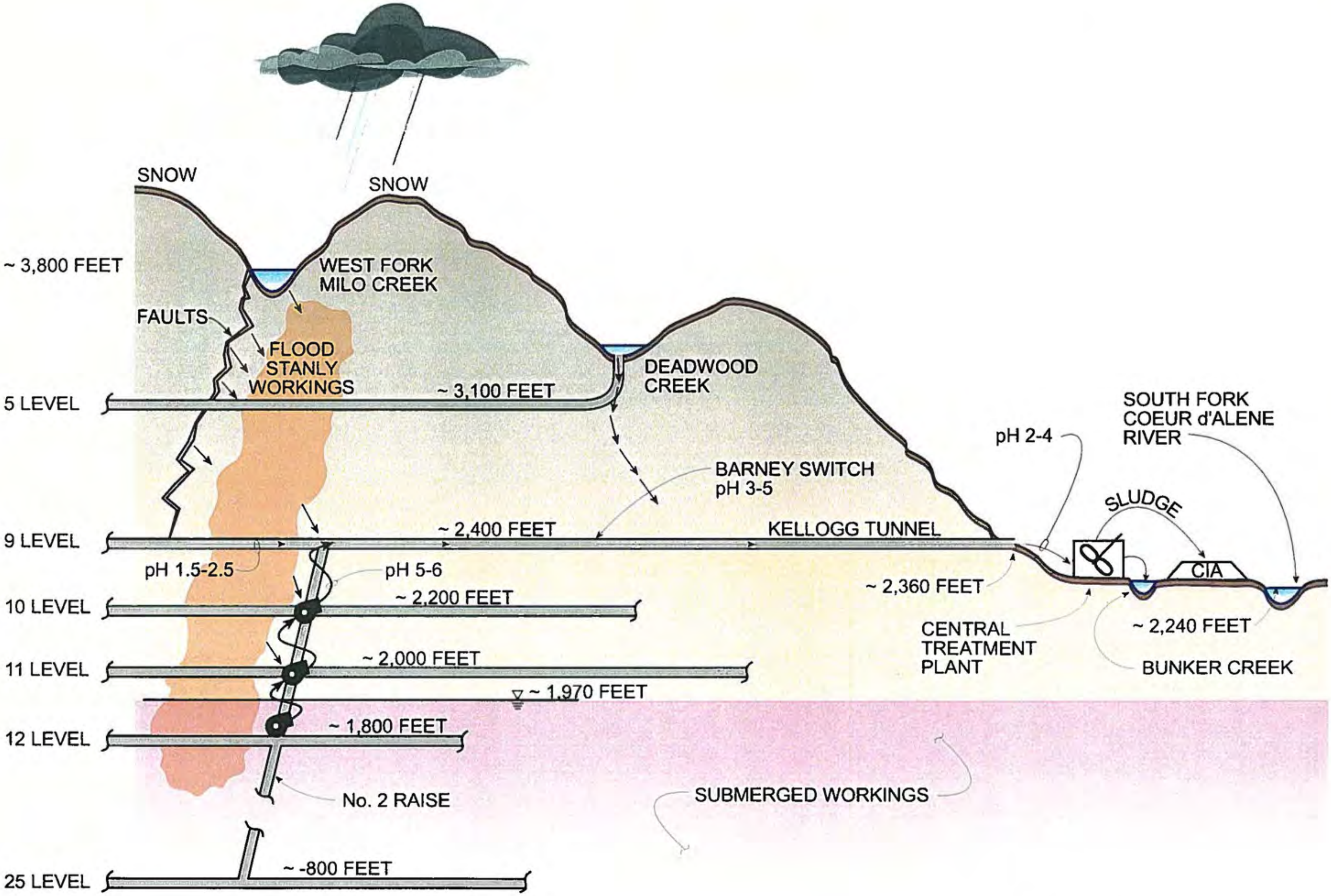

FIGURE 3
GENERAL FLOW MODEL
BUNKER HILL MINE CONTINGENCY PLAN
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2605_16 (1/4/99)

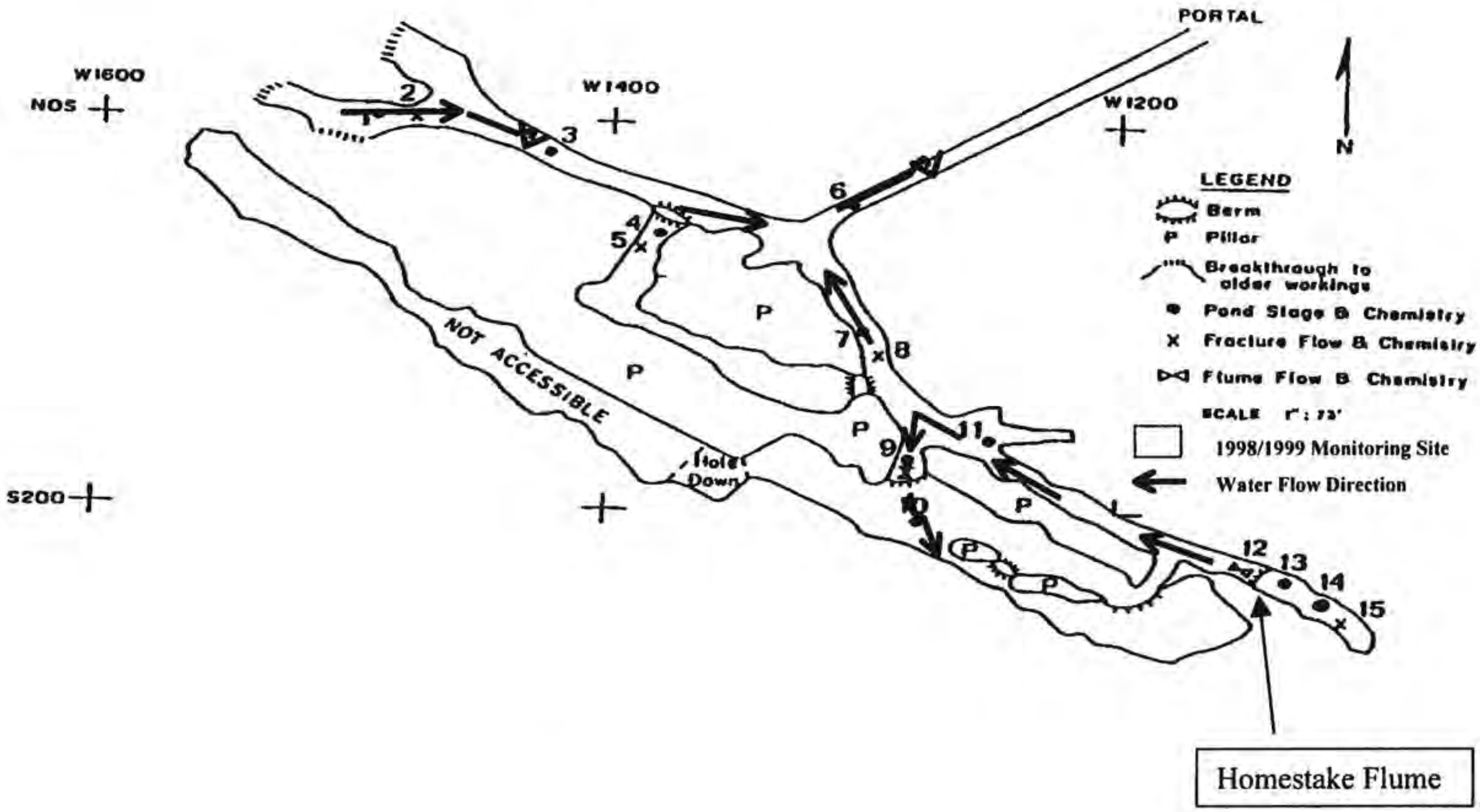

Figure 4
3 Level, Known Mine Water Flow Paths
Bunker Hill Mine Contingency Plan
(Graphic Basis: Bretherton, 1989)

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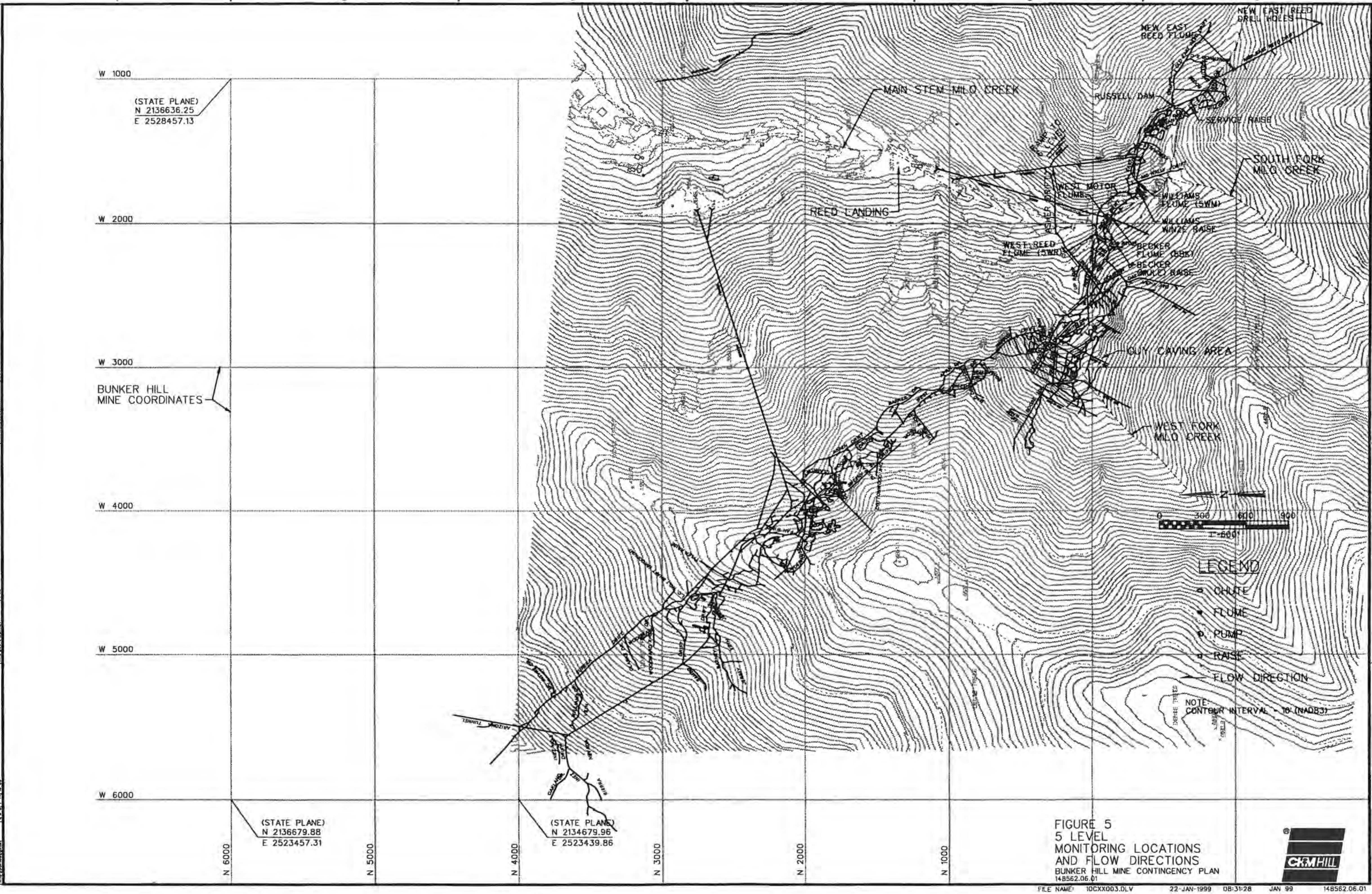

FIGURE 5
5 LEVEL
MONITORING LOCATIONS
AND FLOW DIRECTIONS
BUNKER HILL MINE CONTINGENCY PLAN
148562.06.01

CH2MHILL

PRELIMINARY

FILE NAME: 10CXX003.DLV 22-JAN-1999 08:31:28 JAN 99 148562.06.01

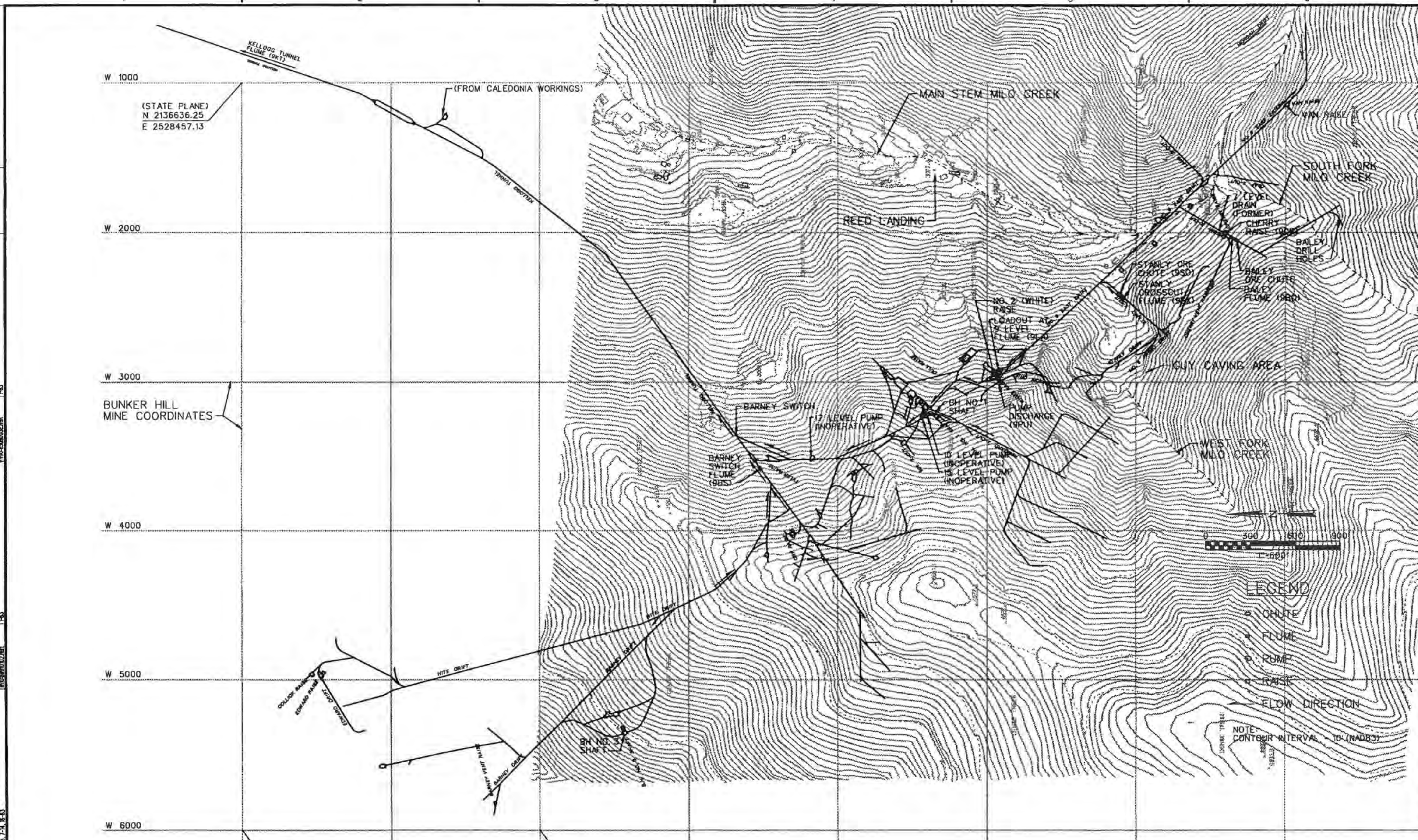

FIGURE 6
9 LEVEL
MONITORING LOCATIONS
AND FLOW DIRECTIONS
BUNKER HILL MINE CONTINGENCY PLAN
148562.06.01

CH2MHILL

FILE NAME: 10CXX004.DLV 22-JAN-1999 08:29:14 JAN 99 148562.06.01

FIGURE 7
MINE WATER PIPELINE

BUNKER HILL MINE WATER CONTINGENCY PLAN

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PRELIMINARY

Surface Plant Site

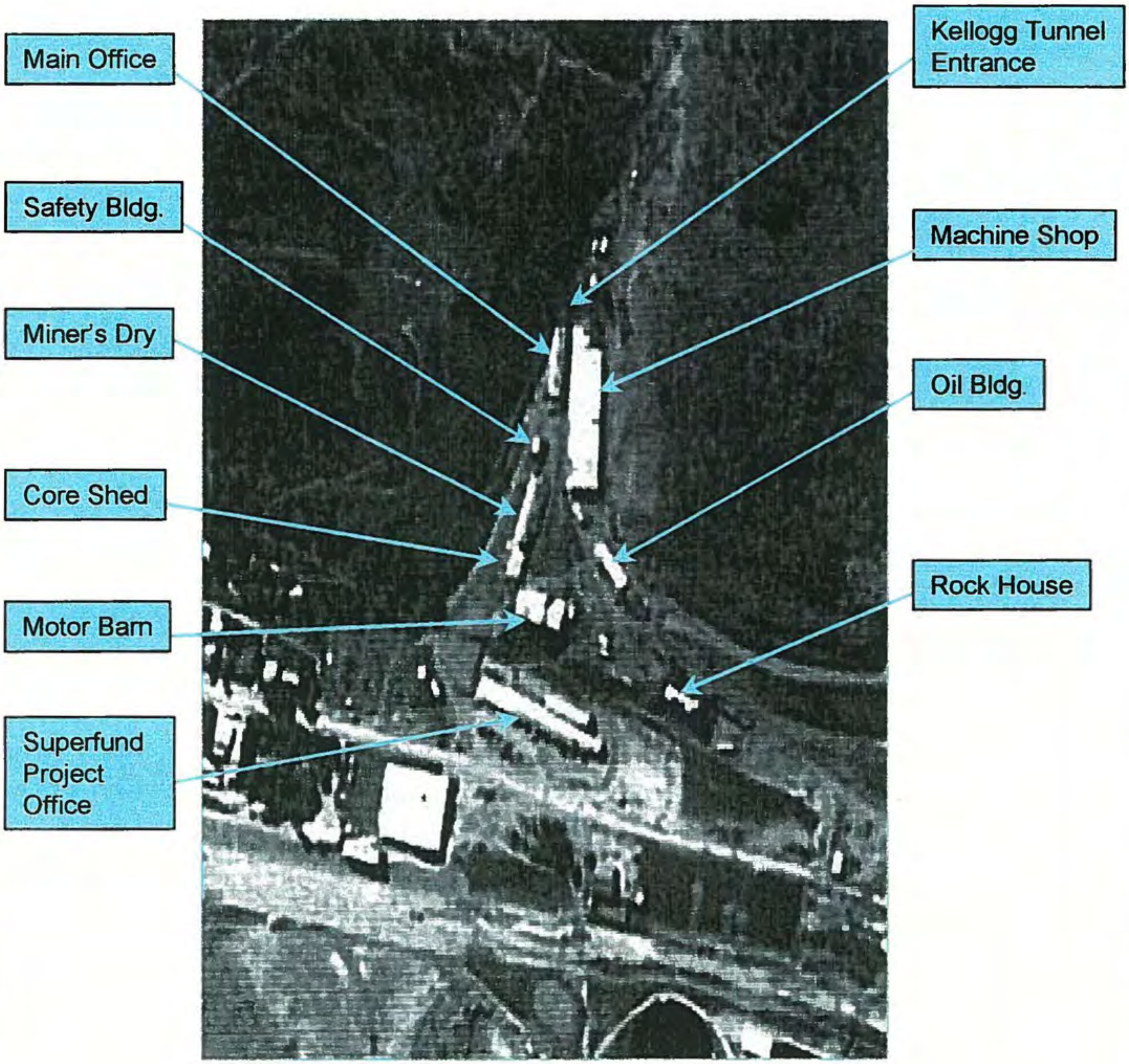

Figure 8
Surface Plant Site
Bunker Hill Mine Contingency Plan

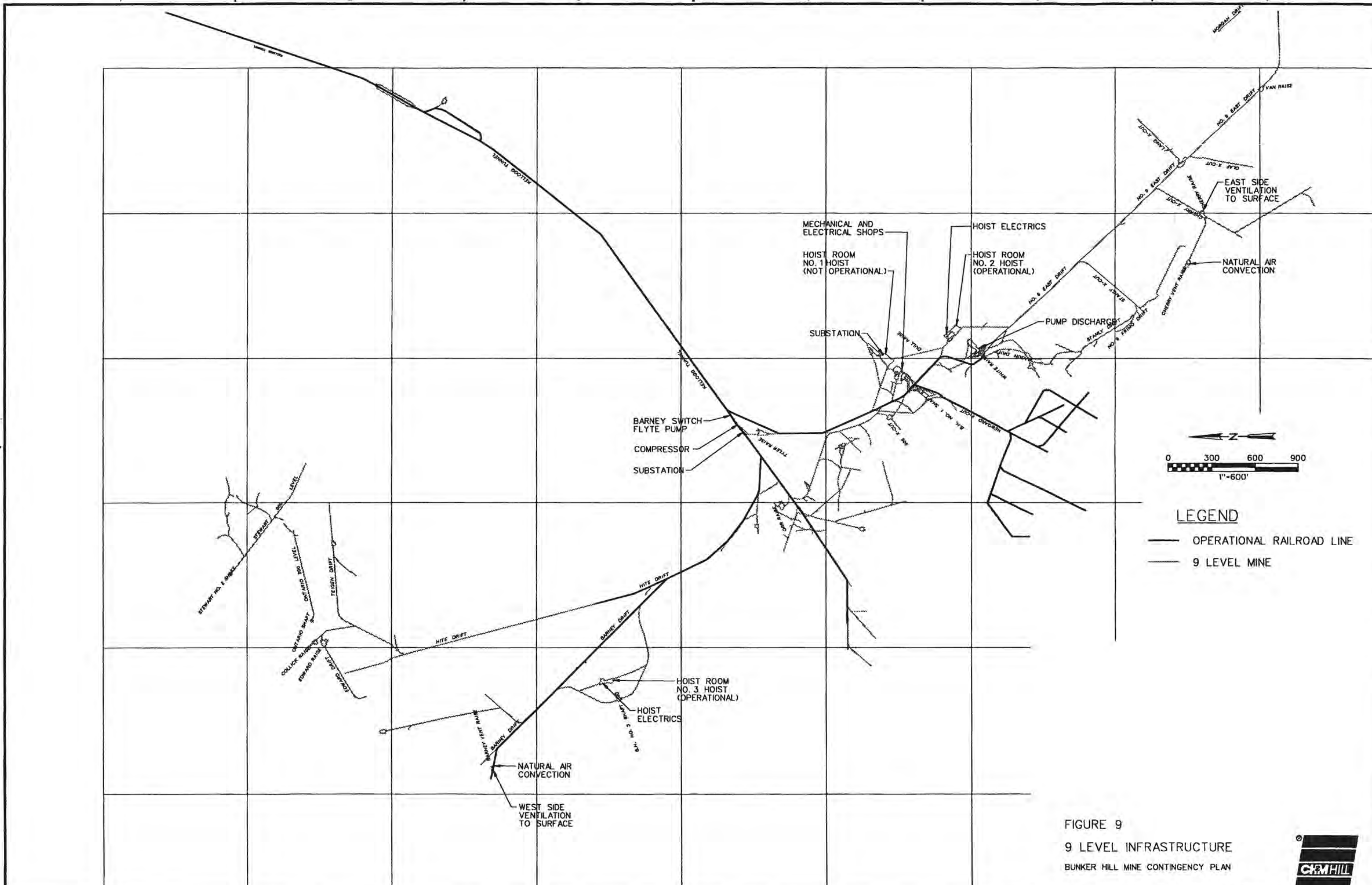

FIGURE 9

9 LEVEL INFRASTRUCTURE

BUNKER HILL MINE CONTINGENCY PLAN

APPENDIX A

30 CFR, Parts 1-99—Mineral Resources

APPENDIX A

30 CFR, Parts 1 to 99—Mineral Resources

Subchapter A—Official Emblem and OMB Control Numbers for Recordkeeping and Reporting

Part

1	Mine Safety and Health Administration; establishment and use of official emblem
3	OMB control numbers under the Paperwork Reduction Act

Subchapter B—Testing, Evaluation, and Approval of Mining Products

5	Fees for testing, evaluation, and approval of mining products
7	Testing by applicant or third party
11	[Reserved]
15	Requirements for approval of explosives and sheathed explosive units
18	Electric motor-driven mine equipment and accessories
19	Electric cap lamps
20	Electric mine lamps other than standard cap lamps

Effective November 2, 1998, Part 21 has been removed.

21	Flame safety lamps
22	Portable methane detectors
23	Telephones and signaling devices

Effective November 2, 1998, Part 24 has been removed.

24	Single-shot blasting units
26	Lighting equipment for illuminating underground workings
27	Methane-monitoring systems
28	Fuses for use with direct current in providing short-circuit protection for trailing cables in coal mines
29	Portable coal dust/rock dust analyzers, and continuous duty, warning light, portable methane detectors for use in coal mines

33 Dust collectors for use in connection with rock drilling in coal mines

35 Fire-resistant hydraulic fluids

36 Approval requirements for permissible mobile diesel-powered transportation equipment

Subchapters C-F—[Reserved]

Subchapter G—Filing and Other Administrative Requirements

40 Representative of miners

41 Notification of legal identity

43 Procedures for processing hazardous conditions complaints

44 Rules of practice for petitions for modification of mandatory safety standards

45 Independent contractors

Subchapter H—Education and Training

47 National Mine Health and Safety Academy

48 Training and retraining of miners

49 Mine rescue teams

Subchapters I-L—[Reserved]

Subchapter M—Accidents, Injuries, Illnesses, Employment, and Production in Mines

50 Notification, investigation, reports and records of accidents, injuries, illnesses, employment, and coal production in mines

Subchapter N—Metal and Nonmetal Mine Safety and Health

56 Safety and health standards--surface metal and nonmetal mines

57 Safety and health standards--underground metal and nonmetal mines

58 Health standards for metal and nonmetal mines

Subchapter O—Coal Mine Safety and Health

70 Mandatory health standards--underground coal mines

71 Mandatory health standards–surface coal mines and surface work areas of underground coal mines

72 Health standards for coal mines

74 Coal mine dust personal sampler units

75 Mandatory safety standards–underground coal mines

77 Mandatory safety standards, surface coal mines and surface work areas of underground coal mines

90 Mandatory health standards–coal miners who have evidence of the development of pneumoconiosis

Subchapter P—Civil Penalties for Violations of the Federal Mine Safety and Health Act of 1977

100 Criteria and procedures for proposed assessment of civil penalties

101-103 [Reserved]

Subchapter Q—Pattern of Violations

104 Pattern of Violations

105-199 [Reserved]

APPENDIX B

Service Providers

CH2M HILL	Name	Title	Address	Phone	Fax
	Jim Stefanoff	Project Manager for Mine Water Control	CH2M HILL 9 So. Washington, Ste 400 Spokane, WA 99201-3709	509/747-2000	509/623-1622
	Bill Hudson	Mine Operator	CH2M HILL Superfund Project Office 1005 W. McKinley Avenue Kellogg, ID 83837	208/783-5781	208/783-4561

Purpose	Contact	Name	Address	Phone	Fax
Change Management					
Verify management change	Environmental Protection Agency (EPA)	Mary Kay Votilla	USEPA 1200 Sixth Avenue ECL-113 Spokane, WA 98101	206/553-2712	206/553-0124
Instigate subconsultant contract	DJN, Inc.	Doug Nierman	DJN, Inc. 8315 Lake City WA NE, #A150 Seattle, WA 98115	206/522-0770	206/522-0770
Authorize interim mine operator to manage operations	Interim Mine Operator	Bill Hudson	CH2M HILL Superfund Project Office 1005 W. McKinley Avenue Kellogg, ID 83837	208/783-5781	208/783-4561
Authorize alternate interim mine operator to manage operations	Substitute for Bill Hudson if Bill is not available	Doug Nierman provides	DJN, Inc. 8315 Lake City Wa NE, #A150 Seattle, WA 98115	206/522-0770	206/522-0770
Notify State of Idaho of management change	Division of Environ-mental Quality (DEQ)	Mike Thomas DEQ Project Manager	DEQ 1410 N Hilton Boise, ID 83706	208/373-0318	208-373-0576
Gain access to site; change locks at Kellogg Tunnel and in Milo Gulch. Secure Cherry Shaft	Castle and Sons Security	Tim Castle Owner/Operator	Castle & Sons Security Corp. P.O. Box 487 Osburn, ID 83849	208/556-8161	208/556-8161

Purpose	Contact	Name	Address	Phone	Fax
Obtain maps and other information from previous owner/ manager	Placer Mining Co.	Bob Hopper	Placer Mining Company P.O. Box 29 Kellogg, ID 83837	208/786-9891	208/786-2581
Notify central treatment plant operator	Morrison—Knudsen	Gene Nelson Treatment Plant Operator	Morrison—Knudsen P.O. Box 359 Kellogg, ID 83837	208/786-5204	208/786-0501
Contact Shoshone County to check for liens, taxes owed, leases, etc.	Shoshone County Courthouse	**County Auditor**—records **County Treasurer**—property taxes, solid waste fees	Shoshone County Courthouse 700 Bank Street **Auditor**—Suite 120 **Treasurer**—Suite 110 Wallace, ID 83873	**Auditor**: 208/752-1264 **Treasurer**: 208/752-1261	Both **Auditor** and **Treasurer**: 208/753-2711
Contact lessees to discuss previous agreement and new arrangement	Lessees	**John Hopper**—machine shop at mine yard **John Hagerman**—Milo Gulch Rock Quarry Others?	**John Hopper** P.O. Box 783 503 Oregon Street Pinehurst, Idaho 83850 **Jon Hagaman**	**John Hopper**: 208/682-3830 **Jon Hagaman**: 208/786-5715 208/661-6987	**John Hopper**: 208/682-3830 **J. Hagaman**: none
Apply for NPDES permit	Environmental Protection Agency (EPA)	Jeanette Carriveau	EPA 1200 Sixth Ave Mail Stop OW130 Seattle, WA 98101	800/424/4372 or 206/553-1214	206/553-1280
Government Agencies					
Schedule "key" personnel to take 40 hour MSHA training course	Mine Safety and Health Agency (MSHA)	**Larry Frisbie** Training Instructor **Michael Weaver** Mine Safety Specialist	**Larry Frisbie**: Eastern WA State University **Michael Weaver**: University of Idaho	**Larry Frisbie**: 509/359-2370 **Michael Weaver**: 208/885-4351	**Larry Frisbie**: 509/359-6420 **M. Weaver**: 208-885-2855
Schedule MSHA courtesy visit after first 30 days	MSHA	Collin Galloway Regional Administrator	MSHA Main Office 205 N 4th Street Rm. 103 Coeur d'Alene, ID 83814	208/667-6680	208/765-3099
Notify OSHA of change	Occupational Safety & Health Agency (OSHA)	Richard S. Terrill	OSHA 1111 3rd Ave. Suite 715 Seattle, WA 98101-3212	206/553-5930	206/553-6499

Purpose	Contact	Name	Address	Phone	Fax
Call OSHA for a courtesy inspection.	OSHA	Ryan Kushmichel Area Director	OSHA 1150 N. Curtis Rd. Suite 201 Boise, ID 83706-1234	208/321-2960	208/321-2966
Register when in a declared disaster area	Federal Emergency Management Agency (FEMA)	Phone Registrar	National Clearing House	800/462-9029	none
Report an emergency (should one occur)	Shoshone County Emergency Services	Bill Scott Coordinator	Shoshone Co. Disaster Services Public Safety Building 717 Bank Street Wallace, ID 83873	208/752-5011	208/753-2711
Utility Companies					
Notify electric power utility of change	The Washington Water Power Company	Service Representative	The Washington Water Power Co. 120 No. Hill Kellogg, ID 83837	800/225-9022	none
Notify phone utility of change	GTE Northwest	Service Representative	GTE's Main Office P.O. Box 1003 Mail Stop WA0104VC Everett, WA 98206	800/483-5100	425/261-5200
Notify water utility of change	Central Shoshone County Water District	Donna Silva or Eileen Johnston	Central Shoshone Co. Water Distr 409 Main St. Kellogg, ID 83837	208/786-9141	208/784-5155
Notify sewer utility of change	So. Fork Coeur d'Alene Sewer Dist.	Julie Crnkovich Office Manager	So. Fork Coeur d'Alene Sewer District Box 68 Wallace, ID 83873	208/753-8041	208/753-1151
Notify solid waste utility of change	City of Kellogg	Terry Sharp City Clerk	City Hall 323 Main Street Kellogg, ID 83837	208/786-9131	208/784-1100
Vendors					
Mine operators	Degerstrom	Paul Hatfield Vice President	N.A. Degerstrom 3303 N Sullivan Rd Spokane, WA 99210	509/928-3333	509/927-2010

Purpose	Contact	Name	Address	Phone	Fax
Mine emergency response	Central Mine Rescue	Bob McPhail Director	Central Mine Rescue Box 1067 Wallace, ID 83873 Physical Address: Mill Road (Johnson Road) Osburn, ID	208/556-2225	208/556-2225
Mining and mine development	Atlas Mining Co. (Fausett Mine Service)	H.D. (Okie) Ross Operating Manager	Atlas Mining Company P.O. Box 968 Osburn, ID 83849	208/556-1181	208/556-6741
Supplies—timber, bolts, nails, tools, etc.	F & H Mine Supply	Joanne White Purchasing Agent	F & H Mine Supply P.O. 747 Wallace, ID 83873 Physical Address: 1016 E. Mullen Ave.	208/752-1294	208/753-1431
Supplies—mining and drilling equipment	Northwest Mine Supply	Service Representative	Northwest Mine Supply 716 Bank Street Wallace, ID 83873	208/752-0022	208/753-4211
Supplies—precut timbers	Whiteman Lumber Co.	Brad Corkill Owner	Whiteman Lumber P.O. Box 179 Caltaldo, ID 83810 Physical Address: 31315 E. Canyon Rd. Caltaldo, ID 83810	208/682-4602	208/682-4784
Security	Spokane Security	Rudy Luna Sales Manager	Spokane Security Systems 1420 N Pines Road Spokane, WA 99206	509/922/9111	509/922-2292
Propane for welding	Oxarc Safety Products Division	Service Representative	Oxarc Safety Products Division 4003 E Broadway Spokane, WA 99202	509/535-7794	509/535-0368
Asbestos Abatement Companies	Options include: Blue Ridge Associates, Environmental Survey Services, MCS Environmental, and others	Blue Ridge Associates: Sherry Paulus, Env. Spec. Env. Survey Services: Eric Ochs, President MCS Environmental: Ron Knutson, Div. Mgr.	Blue Ridge Associates 708 N Argonne Suite 19 Spokane, WA 99212 Environmental Survey Services P.O. Box 10260 Spokane, WA 99209	Blue Ridge: 509/922-1887 Environmental: 509/328-3098 MCS Environ.: 509-924-9236	Blue Ridge 509/922-2664 Environ. 509/328-1001 MCS Environ. 509/924-2287

Purpose	Contact	Name	Address	Phone	Fax
Clean site of ore—principal threat material (PTM)	Hecla Mining	Tom Fudge Mine Manager	Lucky Friday Mine P.O. Box 31 Mullan, ID 83846	208/744-1751	208/744-1317
Assay ore	Haight KC Custom Assay Service	Mark Cowles President	Haight KC Custom Assay Service P.O. 960 Kellogg, Idaho 83837 Physical Address: 123 E. County Road Smelterville, ID 83868	208/786-2111	208/783-2229