

**REDBIRD MINE
PRELIMINARY ASSESSMENT REPORT
CUSTER COUNTY, IDAHO**

**STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY**

February 2004

Submitted To:
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

1.11.8.21



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

May 25, 2004

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D.E.Q. STATE WASTE
MANAGEMENT & REMEDIATION DIVISION

Reply To
Attn Of: ECL-115

Redbird Company LLC
c/o Bill Presley
2806 Dill Drive
Boise, Idaho 83705

Dear Mr. Presley:

The Idaho Department of Environmental Quality (DEQ) has completed a report summarizing the findings of a visit conducted at the Redbird Mine site in August, 2003. A copy of the report, called a Preliminary Assessment, is enclosed.

Based on a review of this assessment, EPA has determined that no further action is warranted at the site. A no further action designation means that no additional steps under the Federal Superfund Program will be taken at the site unless new information warranting further Superfund consideration is discovered. EPA's no further action designation does not relieve your facility from complying with appropriate Idaho state regulations.

In accordance with EPA's decision regarding the tracking of no further action sites, the above named site will be removed from the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) data base and placed in a separate archival data base as a historical record. Archived sites may be returned to the CERCLIS site inventory if new information necessitating further Superfund consideration is discovered.

We appreciate your cooperation during the site visit. If you have any questions, please feel free to contact me at (206)553-2782.

Sincerely,

Ken Marcy
Site Assessment Manager

Enclosure

cc: Bruce Schuld, Idaho Department of Environmental Quality
Monica Lindeman, US EPA, ECL-115
Craig Conant, EPA SF Records Center, ECL-076

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LIST OF ACRONYMS

<u>Acronym</u>	<u>Definition</u>
amsl	above mean sea level
bgs	below ground surface
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
gpm	gallons per minute
MCL	Maximum Contaminant Level
PPE	Probable Point of Entry
TC	Thompson Creek Mine
TDL	Target Distance Limit
TMDL	Total Maximum Daily Load

1.0 INTRODUCTION

The Department of Environmental Quality (DEQ) was contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of a preliminary assessment (PA) at the Redbird Mine site located near Clayton, Idaho, in Custer County. DEQ completed PA activities in accordance with the goals listed below.

The specific goals for the Redbird Mine PA, identified by the DEQ, are to:

- Determine the potential threat to public health or the environment posed by the site.
- Determine the potential for a release of hazardous constituents into the environment.
- Determine the potential for placement of the site on the National Priorities List.

Conducting the PA included reviewing existing site information, collecting receptor information within the site's range of influence, determining regional characteristics, and conducting a site visit. This document includes a discussion of site background information (Section 2), a discussion of migration/exposure pathways and potential targets (Section 3), a summary and conclusions section and a list of pertinent references. Photographic documentation is included in Appendix A and sample analyses are included in Appendix B.

2.0 **SITE BACKGROUND**

2.1 **SITE LOCATION**

Site Name: Redbird Mine

CERCLIS ID No.:

Location: Custer County, Idaho

Latitude: 44° 18' 36" N

Longitude: 114° 28' 30" W

Legal Description: Parts of Sections 4, 5, 8 & 9, Township 11N, Range 17E,
Boise Meridian

Congressional District: Idaho

Site Owner: Redbird Company LLC
P.O. Box 202
Clayton, Idaho 83227

Site Contact: Bill Presley
2806 Dill Drive
Boise, Idaho 83705
(208) 344-4128

FIGURE 2-1. Vicinity Map of Redbird Mine

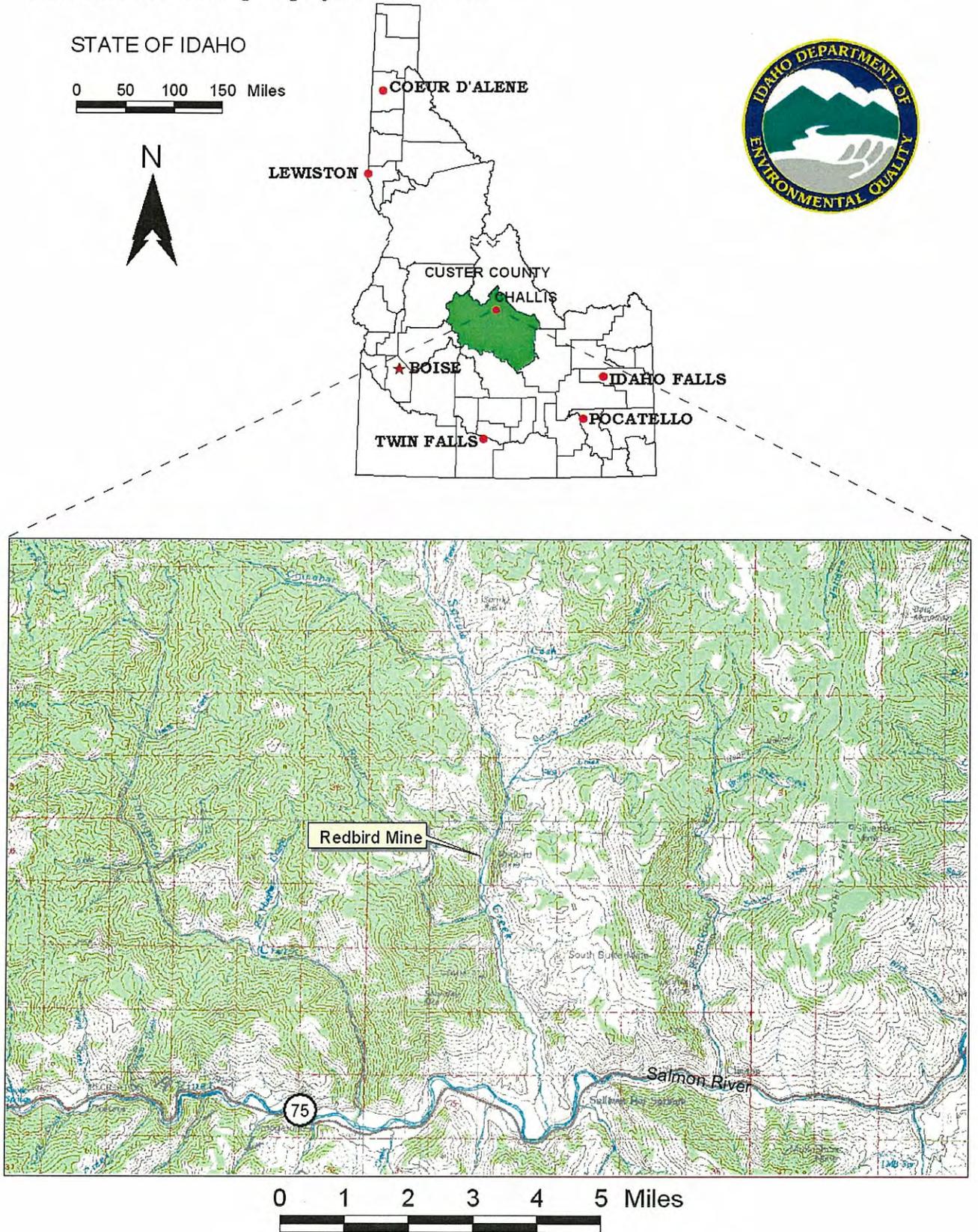


Fig 2-2. Aerial Photograph Redbird Mine



2.2 SITE DESCRIPTION/OWNERSHIP HISTORY

The Redbird Mine (Redbird) is located within the Bayhorse Mining District in Custer County, Idaho, approximately 28 miles northeast of Stanley, Idaho, 7 miles southwest of Clayton, Idaho, and 4.0 miles north of state highway 75 and the Main Salmon River (Figure 2-1). The Redbird, which is comprised of fifteen patented lode mining claims and of three patented mill site claims, approximately 300 acres, lies on the eastside of Forest Road 041 adjacent to Squaw Creek. The former site and surviving structures lie at an elevation of 5,900 feet above mean sea level (amsl), while the uppermost workings lie at 7,000 feet amsl.

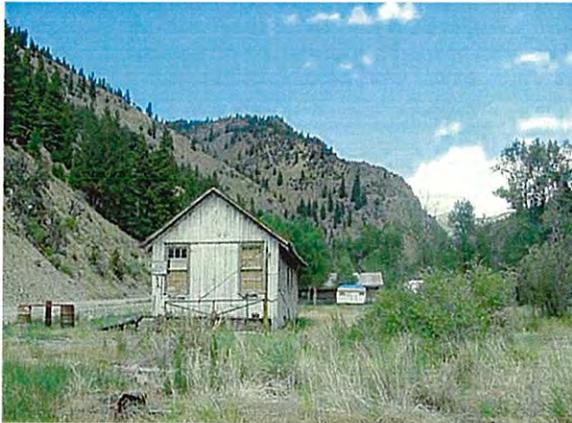


Photo 1

Shop building (left), office beyond small trailer



Photo 2

Dry shed (left), powerhouse beyond

At the time of the site visit, one tunnel or “adit” was identified and determined to be open. The main level (9th) is located on the eastside of Squaw Creek, approximately 250 feet up slope from the former mill site. According to Mr. Presley, the caretaker, the 9th extends approximately 900 feet before unstable ground caused cave-ins. Additional adits, including the 3rd, have collapsed at the portals, thus leaving the 9th, as the only accessible tunnel. The 10th level, which can be reached by a two-compartment shaft from the 9th, is below creek level and flooded. Additional prospect pits lie along the ridgeline, above the uppermost workings.



Photo 3

9th level portal, steel door removed for access

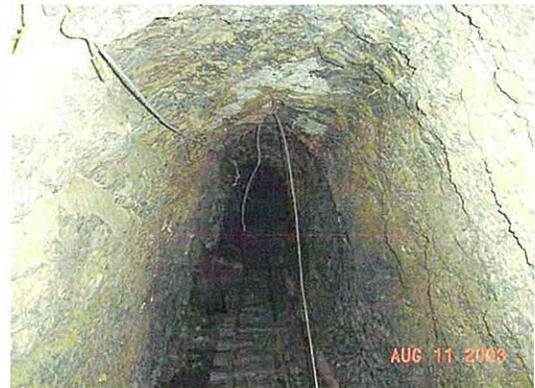


Photo 4

9th adit, electrical cable, haul track (center).

Originally located by a prospector traveling with two bay horses in 1864, mining in the Bayhorse area did not commence until W.A. Norton and S. A. Boone located a lode near Bayhorse Creek on September 1, 1873 (Wells, 1983). The Redbird ore body, located approximately 6 miles southwest of Bayhorse Creek, was discovered in 1878, but extensive operations did not begin until 1884. The original owners, the Omaha and Grant Company, located 10 claims and operated the property until 1904 (Tailleur, 1948). The Redbird was accessed via five tunnels on eight levels, raises connected all levels and "the total development aggregating 10,000 to 15,000 feet" (ibid.). Unsuccessful operations were conducted by the Idaho Mining & Smelting Company, which opened the mine in 1912. The following year, Red Bird Smelting Company, despite the installation of a 100 ton jig mill, failed to operate the mine successfully (Tailleur, 1948).

"The Success Mining Company acquired an option and operated the property during the winter of 1916-1917. During the summer of 1917 the Clayton Mining & Milling Company produced several hundred tons of carbonate ore. Lessees worked the mine intermittently from then until 1924, although in that time a 30 ton flotation mill was built and enlarged to a 50 ton plant. The Idaho Mine Development Company figured prominently in these later improvements but apparently met with little success. The report for 1923 credited leasors with shipping several thousand tons of hand jigged ore" (ibid. p. 20).

The Ford Motor Company optioned the mine in 1924 and purchased the Redbird and several nearby properties in 1926. Tailleur (1948) states that the new owners launched extensive exploration operations including diamond drilling, drifting, and cross-cutting, primarily on the 3rd and 9th levels, though sparse mining activity ensued. The American Smelting & Refining (A. S. & R.) operated the mine on Ford's behalf through World War II. In 1945, the Monangahela-Mount Washington Company of Helena, Montana acquired a lease and recovered 1,500 tons of oxidized ore before relinquishing the lease in February 1946. The Red Bird Mining and Milling Company of Spokane, Washington acquired the property in 1947 and shipped most of the tailings dump to smelters in Salt Lake City, Utah. However, according to Louis Buchman, Ford Motor Company sold the Redbird to Mr. Buchman, L.S. Breckon and J.A. Norden (BBN) in 1946 (ibid.).

The Bunker Hill Company purchased the Redbird in 1957 from BBN and operated the mine through various lessees until 1995. In the 1980's, a two-compartment shaft was sunk to the 10th level. Silver assays showed 50 ounces or more per ton from ore taken between the 9th and 10th levels. The current owner, Redbird Mining Company LLC, acquired the property in 1995, but has now listed the property for sale.

2.3 SITE OPERATIONS AND WASTE CHARACTERISTICS

Geology: The Bayhorse anticline is "one of the largest and longest anticlines in this part of Idaho" (Ross, 1937, p.75). However, Patton (1946) and Tailleur (1948) interprets the structural geology near the Redbird and Clayton mines as a separate anticlinal feature and named it the "Clayton" anticline. The Clayton anticline encompasses the southern portion of the Bayhorse mining district and includes the Saturday Mountain (upper Ordovician), the Kinnikinic Quartzite including South Butte Quartzite and Ella Dolomite members (middle Ordovician) and the Ramshorn Slate (lower Ordovician) formations. The Clayton anticline, north of the Salmon River, generally lies between Kinnikinic and Squaw Creeks, paralleling them on a N 20°W trend

(Patton, 1946). The Ramshorn slate is only exposed north of the Clayton Mine, where the Clayton anticline appears to be faulted into the southern portion of the Bayhorse anticline.

Ore Deposits: The lead-silver replacement deposits of the Redbird lie within the shear zones along contacts between the Ella dolomite and the overlying South Butte quartzite. Umpleby (1913) identified five separate ore bodies, including the “Potato Patch shoot, was 60 to 80 feet long by 20 to 30 feet wide and was worked to a depth of more than 400 feet” (p. 74). Other shoots were discovered on the 2nd level, the 7th level and later on the 9th level. The Redbird’s mineralized zones are “localized along a steeply dipping and partially overturned section of the west limb of the Clayton anticline” (Tailleur, 1948, p. 21). “The ore horizon of the Red Bird Mine lies 700 feet stratigraphically above the South Butte quartzite, within the Saturday Mountain formation” (ibid. p.39).

Production: Umpleby (1913) described Redbird’s early production (1180-1902): “During this period from 1,000 to 1,500 tons of ore which ran from 30 to 40 per cent of lead and 40 to 60 ounces of silver to the ton were delivered to the Clayton smelter annually” (p. 73). By 1948, Tailleur estimated “... the total production, excluding the recent operations by the Red Bird Mining and Milling Company, of 35,000 tons is believed to be conservative. In terms of metals, the production is close to 33,000,000 pounds of lead and 1,800,000 ounces of silver. Recovery from the jig tailings must have been considerable for the value was high enough to exceed the haulage costs and a fleet of 20-25 trucks was operating continuously for over a month” (p. 21).

The Redbird continued to produce, as recorded by Louis Buchman: “During the 10 years we have operated mostly under split-check system and have shipped during that period close to (1) million in Smelter returns before freight and haulage...the ore shipped to date has average about 12 lead and 12 silver” (BBN, 1957). The current owner, Redbird Company LLC, summarizes its production as: “Production records are very scanty due to a major fire where all the A.S.& R. and Ford Motor Company production records were lost. Personal communications with former owners and mine workers reveal that it is probable that at least one or two million ounces of silver have been produced at the Redbird and that the dollar percentage of ore value taken out so far has been about 50% lead, 40% silver, and 10% gold” (Personal Communication, 2003).

2.4 DEQ ACTIONS

DEQ conducted a site visit on August 11, 2003. The caretaker for the property, Bill Presley, accompanied us during the site visit. The site was not fenced and easily accessible from Forest Road 041, though “Private Property” signs were prominently displayed. Several structures survive in good condition within the camp compound including a maintenance shop, dry shed, powerhouse, office cabin, and gazebo that was used for butchering game. At the time of the site visit, two travel-trailers were parked in the compound for Mr. Presley’s use. The Redbird’s workings, which are located across Squaw Creek, are now accessed via a footbridge.

The mine camp includes a maintenance shop, living quarters, a powerhouse, a dry shed and a game processing area, housed in a gazebo. The buildings remain in good condition. The mine plant consists of the 9th portal that is sealed by a locked steel door; a small waste dump and track rail, adjacent to the 9th adit; waste rock scattered on the hillside below the 3rd level; an

electric powered substation enclosed by fencing; and three electrical transformers stored on a pallet, adjacent to the fence. The jig and flotation mill structures were dismantled and removed from the site, though the date(s) of removal are not known.



Photo 5

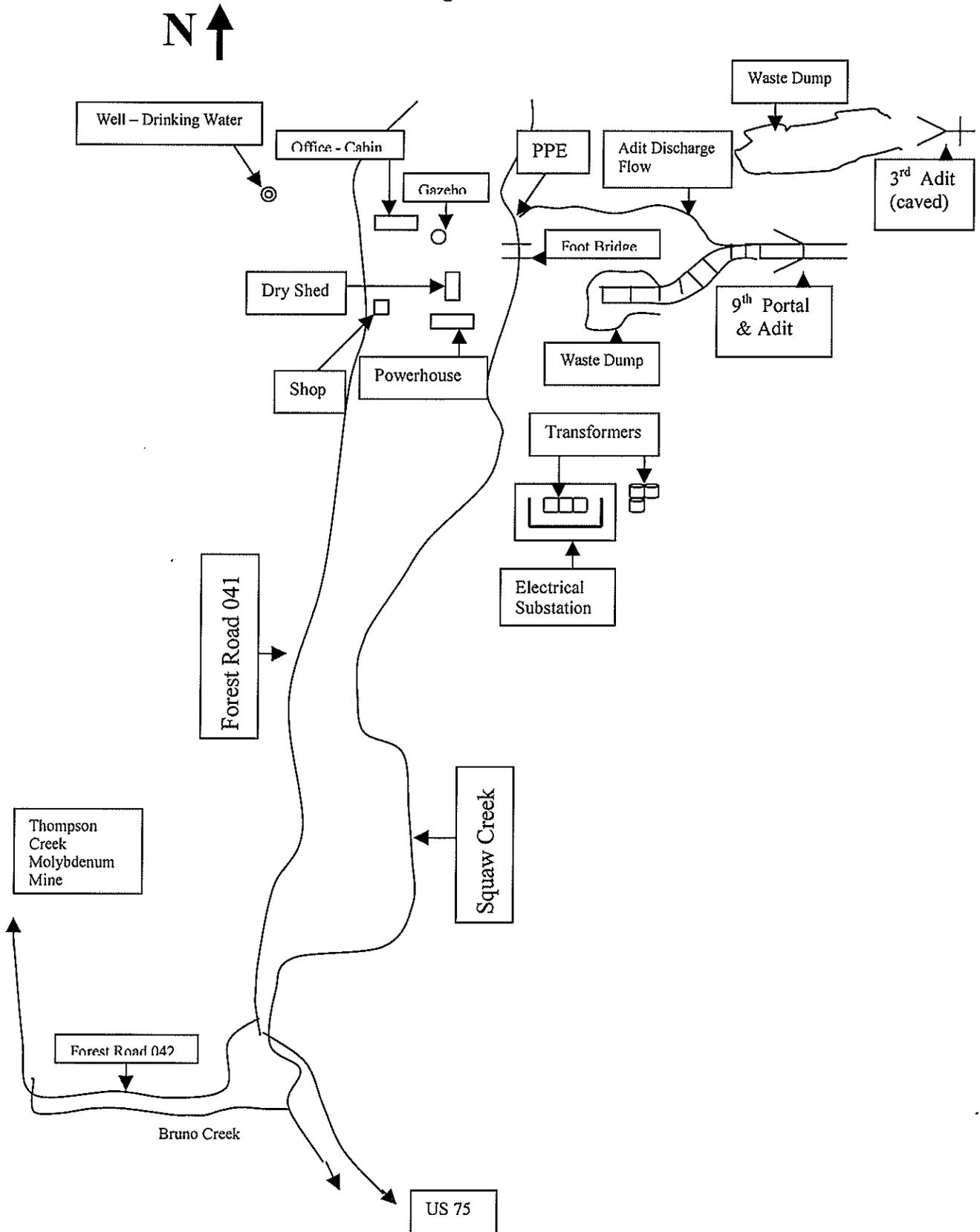
Haul track & waste rock dump below 9th adit, dry shed visible in background beyond rail



Photo 6

Waste rock dump scattered below 3rd adit

SITE MAP
Figure 2-3



3.0 MIGRATION/EXPOSURE PATHWAYS AND TARGETS

The following sections describe migration/exposure pathways and potential targets within the site's range of influence (Figures 3-1 and 3-2). Receptors in the area have been identified as part-time workers (Redbird's owners and caretaker), recreationists including occasional tourists, hikers, campers, hunters and snowmobilers, four (4) domestic-single residences and two (2) potable wells serve the nearby Thompson Creek Mine.

3.1 GROUND WATER MIGRATION PATHWAY

The Redbird is located at the contact between the Ella dolomite and Saturday Mountain chert and quartzite horizons within the steeply dipping and partially overturned section of the west limb of the Clayton anticline. Many of the ore shoots lie within breccia zones of irregular shape, often steeply dipping. Tailleir (1948) notes the presence of free-flowing water in the upper workings which appears to descend along the breccia and sheer zones to the bottom of the mine, where the ground water concentrates oxidized minerals. Structurally, shear zones, steeply dipping beds, drag folds and brecciated zones controlled these ore-forming solutions. Additionally, the Redbird may be significantly influenced by one transform fault, located approximately 0.25 miles northwest of the mine, and a second transform fault located approximately 1.0 miles south at Bruno Creek (Tailleur, 1948).

“In igneous and metamorphic rocks, water is present primarily in fractures, faults, and weathered zones that developed on exposed surfaces. The aquifers in all rock types generally yield only from 1 to 100 gallons per minute of water to wells. In all rock types, but especially in igneous and metamorphic rocks, yields of wells tend to decrease as depth increases and open spaces become fewer, smaller, or are filled with secondary minerals; for example, there generally are few open spaces in igneous and metamorphic rocks below a depth of about 300 to 400 feet” (Whitehead, 1994).

The EPA, conducting a site visit at the nearby Thompson Creek Mine in 1992, concluded: “The area is mountainous with steep slopes along drainages. The primary sources of ground water include: (1) infiltration of runoff into surface soils, (2) stream channel underflow within alluvial deposits, and (3) water in fracture and fault zones of bedrock formations.

Relatively small quantities of ground water are contained within the surface soils and decomposed bedrock comprising the soil mantle. Alluvial deposits occur in stream channel bottoms; ground water in the alluvium is in direct connection with surface water within the stream courses. The major stream channels in the project area are Squaw and Thompson Creeks, which are tributaries of the Salmon River. The direction of surface water flow is generally to the south. The mine site is characterized by narrow, steep-sided and V-shaped valleys. Based on existing information, alluvial deposits are probably less than 100 feet in thickness and 300 feet in width along the stream courses (USFS 1980). According to Cyprus (Thompson Creek), an alluvial aquifer is found at depths ranging from 0 to 20 feet below ground in the vicinity of the creek beds.

The well-consolidated, and in some locations metamorphosed, nature of these rocks creates low porosity, preventing the production of significant amounts of ground water from pore spaces.

However, these formations are extremely folded and at some locations are nearly vertical (USFS 1980).

In general, there is a continuous supply of baseflow to the streams throughout the year from the alluvial and bedrock aquifers. Larger quantities of baseflow occur during periods of high precipitation and snow melt; however, this contributes a smaller percentage to total surface water runoff. Baseflow may constitute 90 percent or more of the total stream flow during dry periods of the year (USFS 1980). The shallow alluvial aquifer is used for livestock drinking water on nearby ranches. The uppermost bedrock aquifer is encountered at a depth of 150 feet” (page 7).

No precipitation data is available for the Redbird. Therefore, precipitation data, maintained from 1931 through 1996, was used from Challis located seven miles northeast and at an elevation of 5,288 feet amsl. The mean annual precipitation is 7.40 inches, and the 100-year, 24-hour event is 1.85 inches (WRCC, 2003). In 1980, the US Forest Service reported that the “average annual precipitation at the project site (Thompson Creek Mine) is estimated to be 10 to 20 inches or greater, depending on the altitude”. As the Thompson Creek (TC) Mine lies approximately 3.0 miles west from the Redbird in similar terrain, the higher annual precipitation values appear more relevant.

There are six (6) drinking water wells located within the 4-mile Target Distance Limit (Figure 3-4). The TC Mine has “two potable water wells on the site at a depth of 250 feet. These wells are approximately one mile apart and produce 15 and 20-25 gallons per minute (gpm), respectively. Other than the on-site wells, the nearest drinking water well is at the Red Bird Mine three miles from the mine site” (EPA, 1992, p.7).

Mr. Presley believes that this well, which is located approximately 0.1 miles west from the 9th level adit, was installed to support initial construction needs of the TC Mine, though no additional information was available from neither the Idaho Department of Water Resources (IDWR, 2003) nor the TC Mine records. Mr. Presley and the Redbird’s owners obtain their drinking water from this well (Figure 3-3), though on a limited basis. The fourth well is located at the May ranch approximately 3.75 miles south of the mine. The fifth well is located at the Richmond residence, just north of the Salmon River, approximately 0.5 miles west from the May ranch. According to TC Mine records, the sixth well is located approximately 3.9 miles south, but TC transferred ownership to the state Department of Fish and Game to supply water for fishery ponds, rather than for drinking water usage. Therefore, the population served by the sixth well has been excluded from consideration.

Based upon U.S. Census Bureau data, an average of 2.41 people per household reside in Custer County (USCB, 2000). Therefore, seven people are estimated to consume drinking water from wells at the Redbird, the Richmond residence and the May ranch, while the two potable water wells at TC Mine serve 150 workers.

Based upon the structural geology and stratigraphy underlying the TC Mine as compared to the Redbird, the likelihood of ground water exposure to these potable wells appears remote. The primary target is the drinking water well, located adjacent to Forest Road 041, approximately 0.1 miles west from the 9th level adit.

3.2 AIR MIGRATION PATHWAY

There are two permanent residences, the May's ranch and the Richmond's, within the 4-mile TDL. The ranch lies south of the Redbird near the confluence of Squaw Creek and the Salmon River, while the Richmond residence lies approximately 0.5 miles west of the May ranch along the north bank of the river. The TC Mine, which currently employs approximately 150 workers, lies approximately three miles west from the Redbird. The owners and caretaker of the Redbird occupy the site intermittently throughout the summer months.

"The prevailing air flow over the local area near the project (TC Mine) is from the west, however, local topographic features considerably influence surface wind velocity and direction. The canyons and ridges probably cause channeling and lee eddies. The maximum sustained wind velocity recorded by an on-site weather station (in operation since 1972) has been 15 mph. Wind gusts have not been measured; however, strong gusts estimated to be in the range of 40-60 mph have occurred. On-site wind direction tends to be north-south approximately 50 percent of the time and variable the remainder of the time" (EPA, 1992, p. 4).

The site is comprised of mixed coniferous species (i.e., pine, fir) and established brush, talus material assumed to consist of the Saturday Mountain formation (slate, dolomite, quartzite) and unconsolidated, medium-grained waste rock dumps. The tailings associated with historic milling practices have been largely removed, though an unknown quantity of tailings may remain buried amid stream gravels and beneath vegetation. The likelihood of exposure from aerial dispersal from the minor waste rock dumps and any unidentified remnant tailings appears remote.

3.3 SOIL EXPOSURE PATHWAY

The Redbird is readily accessible from Forest Road 041 (Squaw Creek Road), though the site is posted as "Private Property". The road closely parallels Squaw Creek until the Redbird's property boundary is reached. On-site, Squaw Creek bisects the former mine's workings and the remaining buildings and structures. The workings can be accessed via a footbridge across Squaw Creek. There are no permanent workers or residences within 200 feet from the site, but the Redbird's owners and their caretaker occupy the site occasionally during the summer months. No schools or day-care facilities are located within 200 feet from the site.

Three (3) pole-mount and three (3) pad-mount types of transformers were identified within and adjacent to an electric powered substation. The transformers were not labeled "No PCBs" and dates of manufacture were not determined. Consequently, since the date of manufacture and the type of dielectric fluid are unknown, it must be assumed that the transformers are PCB Transformers (CFR, 2003).



Photo 7

Electrical Power Substation (fenced), three transformers beyond fence (lower left)



Photo 8

Close-up of electrical transformers

Transformer oils based on polychlorinated biphenyls (PCBs) were widely used in industry up until 1977. PCBs are mixtures of synthetic organic chemicals with the same basic chemical structure and similar physical properties ranging from oily liquids to waxy solids. Due to their non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were readily suited for electrical power transmission.



Photo 9

Transformers on pallet, oil residue on side of canister, active leak not identified

The three pole-mount types of transformers were equipped with a sight glass to indicate the volume of oil contained. Oil levels were observed in each transformer, while one appeared to have leaked. The soils surrounding the pallet and the adjacent fenced enclosure were scrutinized, but no obvious oil staining was observed.

The Redbird site is posted as Private Property, but is not fenced or otherwise protected from access. The site did not appear affected by vandalism, due no doubt to caretaker activities. The apparent lack of mill tailings and minimal volumes of waste rock would generally indicate a remote likelihood of exposure from the soil pathway. However, the presence of the PCB transformers potentially elevates the level of concern.

3.4 SURFACE WATER MIGRATION PATHWAY

“Squaw Creek has a mean annual flow of about 20 cfs, and gradients are over 4% with a predominance of Rosgen B-type channels. There are A-type channels in headwaters and C-type channels near the mouth of Squaw Creek. Elevations within the sub-watershed vary from 8,200 feet to 5,570 feet. Squaw Creek and one of its tributaries, Martin Creek, have bull trout present in them (USDA FS, 1999a)” (DEQ, 2003, p.23). Surface water is primarily used for agriculture irrigation and to water livestock.

Redbird’s underground workings are sufficiently interconnected to channel ground water through the workings to the 9th level portal. The resulting adit discharge flows westward to Squaw Creek. DEQ collected an aqueous sample directly from the adit flow. Analytical results (total metals) identified an elevated level of lead (0.010 mg/L).



Photo 10

Adit discharge flows at left of track rail, flowering plants growing at margin (bottom left)

The TC Mine collects runoff from all areas in unlined channels that convey runoff to a sediment pond located adjacent to Squaw Creek downstream of the confluence with Bruno Creek. “This pond discharges to Squaw Creek at NPDES outfall 003” (EPA, 1992, p. 28). The TC Mine is required to monitor Squaw Creek upstream and downstream of this outfall for turbidity.

“Metals concentrations in Thompson Creek and Squaw Creek are generally higher downstream of discharges from the Thompson Creek Mine....Cadmium, selenium and zinc tended to be higher in Thompson Creek than Squaw Creek, whereas lead concentrations may be higher in Squaw Creek than Thompson Creek. These elevated lead concentrations may be associated with the Redbird Mine, which is located near the Squaw Creek monitoring site SQ-3 and produced Pb, Ag, Zn, Cu, Au, and fluorite. Sediment lead concentrations from Squaw Creek upstream of Thompson Creek Mine discharges were extraordinarily elevated...The sediment chemistry suggests an upstream lead source and the sediment-sorbed lead would presumably be released into the water column under some conditions. Copper concentrations were similar in Thompson Creek and Squaw Creek” (Mebane, 2000, p.20).

Known to populate the Salmon River, the bull trout (*Salvelinus confluentus*) are listed as a threatened species, while sockeye (*Oncorhynchus (=Salmo) nerka*) and chinook salmon

(*Oncorhynchus* (=Salmo) *tshawytscha*) are listed as both threatened and endangered species (FWS, 2003). Bull trout is known to populate the entire reach of Squaw Creek below the mine and salmon are known to populate the Salmon River, including 10.3 miles of the 15-mile downstream distance. Though commercial and subsistence fishing are not conducted within the downstream distance limit, sport fishing occurs on the Salmon River. Fish catch data, however, could not be determined.

The gray Wolf (*canis lupus*) is listed as a threatened species and known to populate 100 percent of the area within a 4-mile radius of the mine and within 93 percent of the 15-mile downstream distance. The North American Wolverine (*Gulo gulo luscus*) which is listed as a watch specie is known to populate the area 4.0 miles south of the Redbird. The Canada lynx (*Lynx canadensis*), which was listed as a threatened specie is known to populate the area 1.82 miles north-northeast of the mine. Deer and raptors were noted by direct observation.

There are no drinking water intakes within the 15-mile downstream distance. The surface water pathway (Squaw Creek) traverses southward from the Redbird where it is enjoined by several tributaries: at 0.7 miles by a west flowing unnamed stream; at 1.0 miles by an east flowing Bruno Creek; at 1.6 miles by an east flowing unnamed stream; at 1.8 miles and 3.04 miles by two west flowing unnamed streams. Squaw Creek merges with the eastern flowing Salmon River at 4.7 miles. The Salmon River continues to the east for an additional 7.4 miles before traversing in a north-northeasterly direction for the duration of the TDL. Following its merger with Squaw Creek, the Salmon River is enjoined by Sullivan Creek at 5.3 miles from the south, by Kinnikinic Creek at 7.5 miles from the north and by East Fork Salmon River at 12.1 miles from the southeast. Additionally, numerous unnamed streams and seeps merge with the Salmon River along its course to the 15-mile downstream distance limit.

EPA has designated the entire reach of Squaw Creek downstream from the Redbird as a 303(d) listed stream (temperature) under the Total Maximum Daily Load (TMDL) program. The Salmon River from its confluence with Squaw Creek to the North Fork Salmon River has also been designated as a 303(d) listed stream. TMDL pollutants of concern are sediment and temperature on the Salmon River.

Based upon previous work by Mebane (2000), there appears to be elevated levels of lead, possibly from sediments, in Squaw Creek below the Redbird. At the time of the site visit, DEQ collected one (1) water sample from the adit discharge. Analytical results showed most metal constituents at or near the detection limits of all metals, though lead appeared elevated.

4.0 SUMMARY AND CONCLUSIONS

The Redbird Mine was discovered in 1878, but operations began in 1884 and continued intermittently until 1995. Its most notable owner, Ford Motor Company, operated the mine from 1926 until 1947. The Redbird is attributed to producing close to 33,000,000 pounds of lead, 1,800,000 ounces of silver and lesser amounts of gold, copper and zinc.

Ground Water Pathway: A drinking water well, located approximately 285 feet west from the 9th level adit, is accessed periodically by the owners and caretaker of the property, primarily during the summer. Secondary targets include the Redbird well, two potable wells at the Thompson

Creek Mine (~3.0 miles west), and private wells at the Richmond residence (~ 3.5 miles south) and the May ranch (~3.75 miles south). Structural barriers (faults) coupled with the complexity of local stratigraphy appears to preclude ground water mobility from the Redbird to the secondary targets.

The Surface Water Pathway: One Probable Point of Entry (PPE) was identified on Squaw Creek where ground water, discharging from the 9th level adit, enters the stream. Preliminary sampling of the adit flow indicated 0.010 mg/L result for lead. According to Idaho Water Quality Standards, a threshold (chronic exposure) of 0.0025 mg/L is established for lead, while the MCL for lead is 0.015 mg/L. The immediate surface water body, Squaw Creek, is listed under the TMDL program (303d listed for temperature) and the subsequent Salmon River is listed for temperature and sediment. Previously collected samples (Mebane, 2000) indicated elevated lead values from Squaw Creek in sediment chemistry. The lead was assumed to reside in sediments derived from historical operations of the Redbird.

Air Migration Pathway: The tailings associated with historic milling practices have been largely removed though an unknown quantity of tailings may remain buried amid stream gravels and beneath vegetation. The likelihood of exposure from aerial dispersal from the minor waste rock dumps and any unidentified remnant tailings appears remote.

Soil Exposure Pathway: Special circumstances exist at the Redbird, where six PCB transformers were identified. The Idaho office of the EPA, Region 10, must be notified of the storage of PCB transformers, such that their disposition can be handled under the provisions of TSCA (Toxic Substances Control Act).

FIGURE 3-1. 4 Mile Radius Map

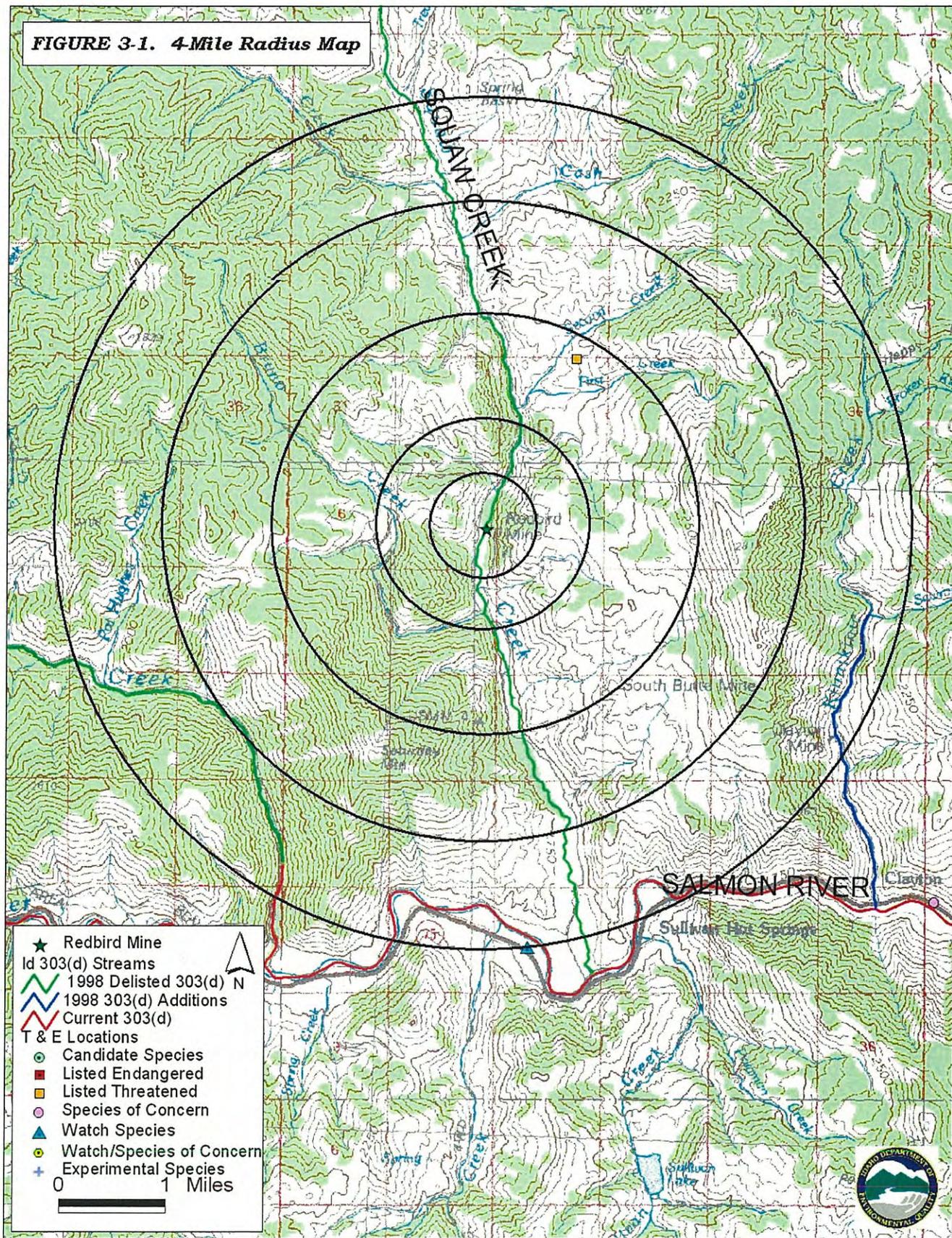


FIGURE 3-2. Total Distance Limit (TDL)

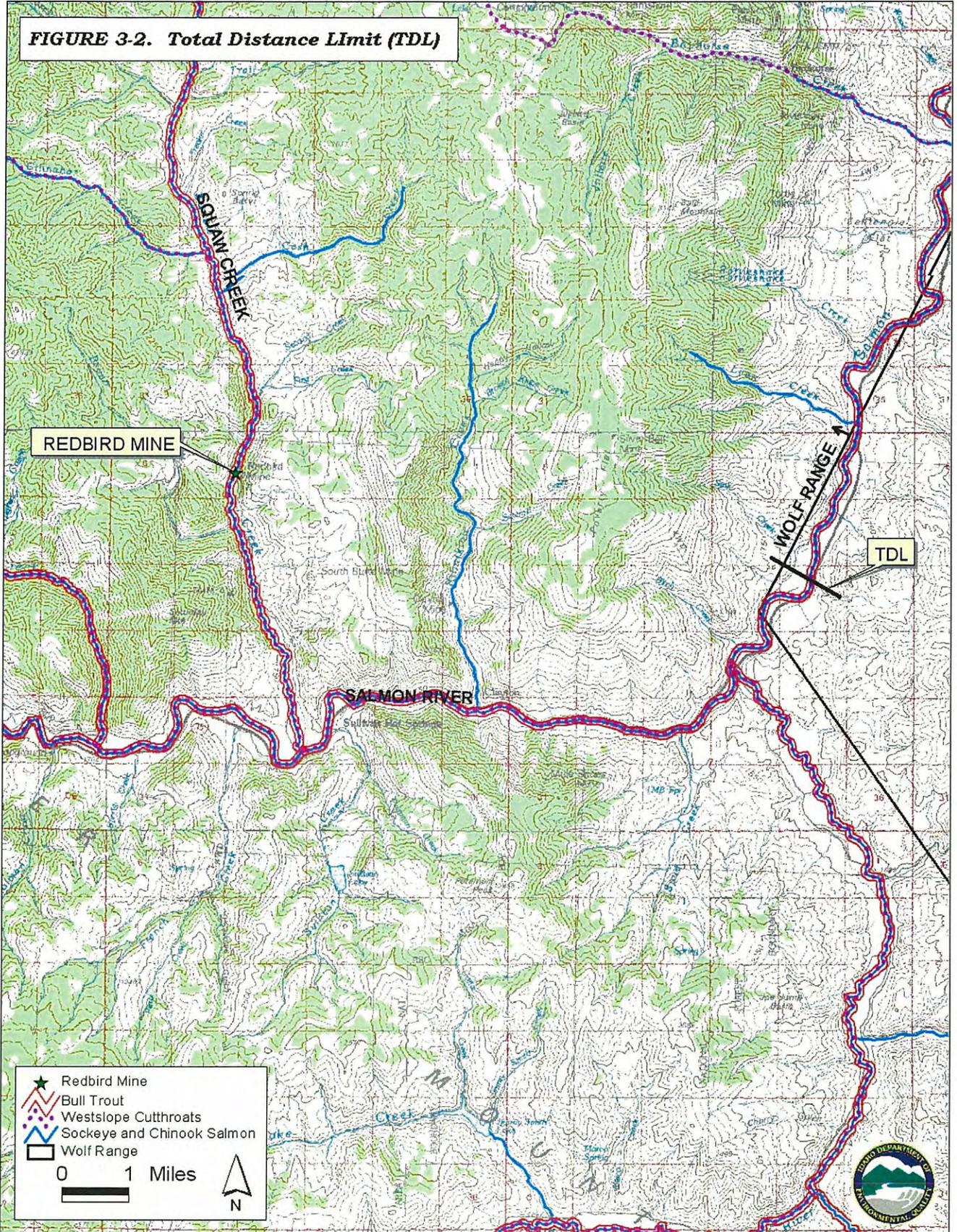


FIGURE 3-3 Redbird Mine One-Mile Radius Map

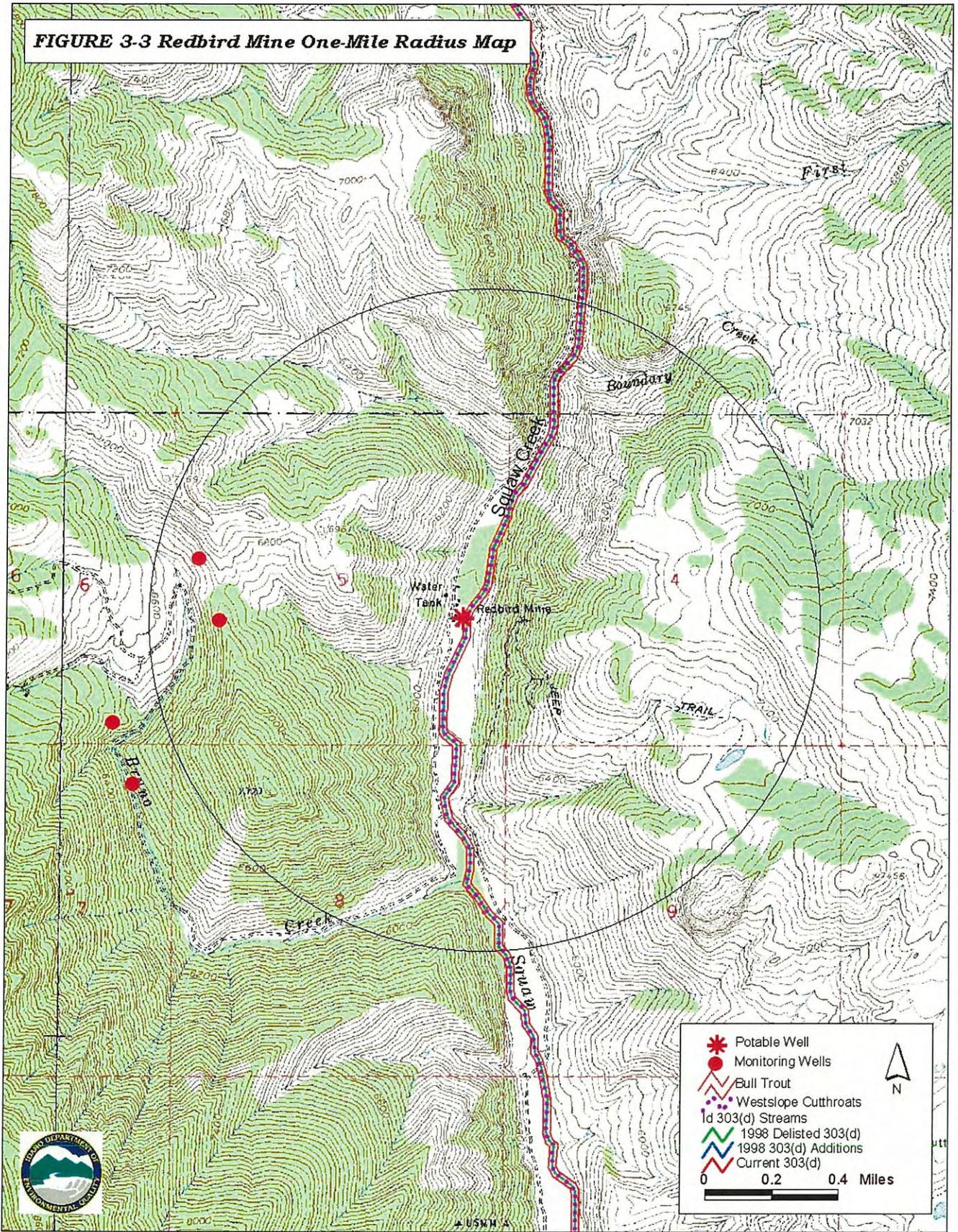
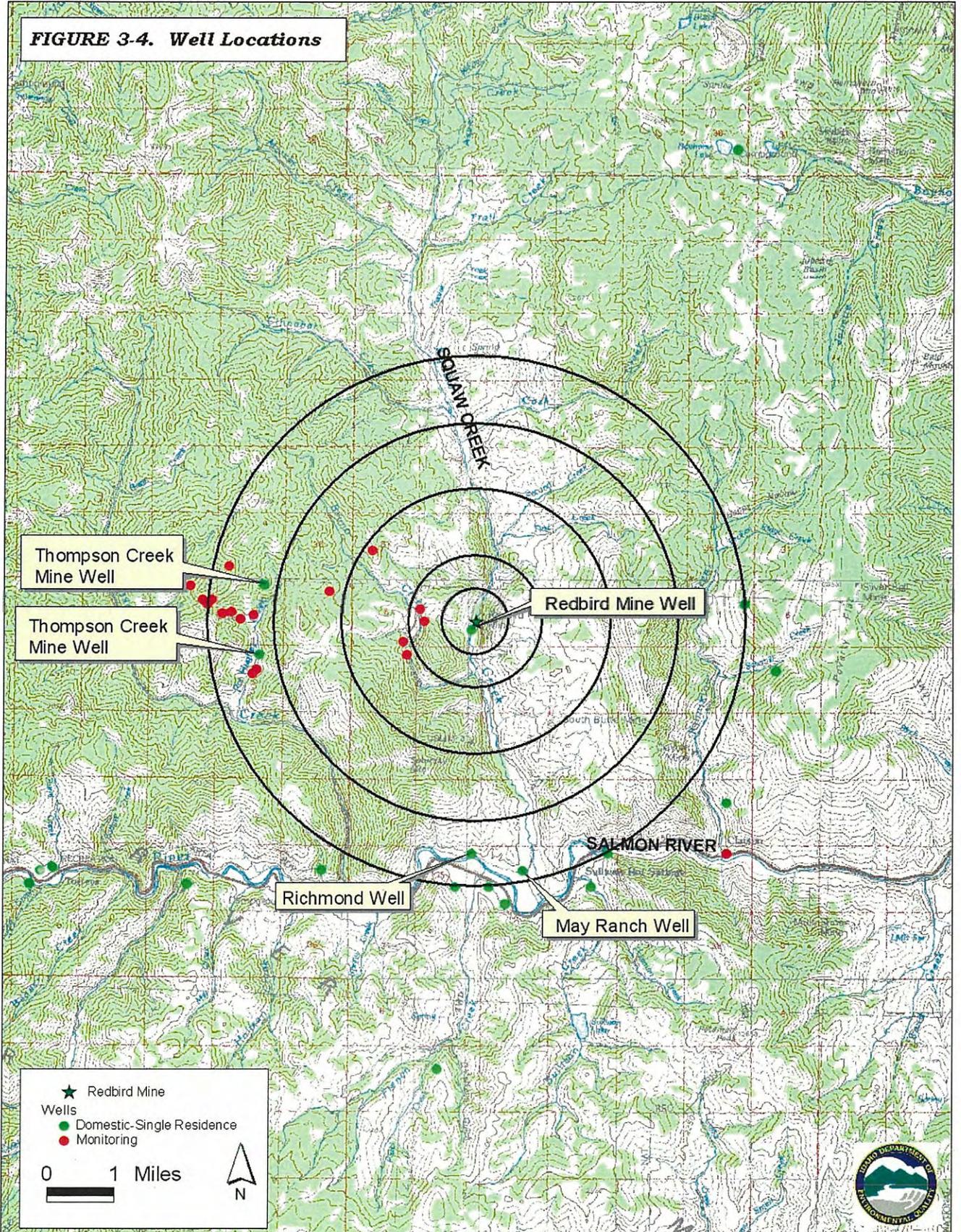


FIGURE 3-4. Well Locations



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APPENDIX A

PHOTO LOG

REDBIRD MINE

- Photo 1 View to north, shop building (left), office beyond small trailer.
- Photo 2 View to south, dry shed (left), powerhouse beyond.
- Photo 3 View to east, 9th level portal, steel door removed for access.
- Photo 4 View to east, 9th level adit, electrical cable, haul track (center).
- Photo 5 View to west, haul track and waste rock dump, located below 9th level adit, dry shed visible in background beyond rail.
- Photo 6 View to east, waste rock dump scattered across hillside below 3rd level adit.
- Photo 7 View to southeast, electric powered substation (fenced area), containing three pad-mounted transformers, three pole-mount type transformers (beyond fence at lower left).
- Photo 8 View to south, close-up of pad-mounted transformers.
- Photo 9 View to southeast, close-up of three pole-mounted type transformers, stored on wood pallet, oil residue on side of canister, historic leak(?)

APPENDIX B
ANALYTICAL DATA



IDAHO DEPARTMENT OF
HEALTH & WELFARE

RECEIVED

OCT 08 2003

DEPT. OF ENVIRONMENTAL QUALITY
TECHNICAL SERVICES OFFICE

DIRK KEMPTHORNE - Governor
KARL B. KURTZ - Director

BUREAU OF LABORATORIES
RICHARD F. HUDSON, Ph.D., Chief
2220 Old Penitentiary Road
Boise, ID 83712
PHONE 208-334-2235
FAX 208-334-2382

Attention: Brian Gaber
Dept. of Env. Quality - State Office
1410 N. Hilton Street
Boise, ID 83706-1255

Date Collected: 8/11/2003
Time Collected: 2:30 PM
Date/Time Received: 8/18/2003 8:18:17 AM

Lab Sample ID Number

0308 257

(Please refer to this number when contacting the lab)

DEQ / 4814

Site: Bayhorse District

Collected By: Brian Gaber

Matrix: Ground Water

Sample ID: Red 1

Type / Source:

Test	Method	Result	Units	Date Completed	Analyst
Arsenic, Total	SM 3113B	<0.005	mg/L	9/24/2003	stranskyj
Barium, Total	EPA 200.7	0.033	mg/L	9/26/2003	stranskyj
Cadmium, Total	SM 3113B	<0.001	mg/L	9/25/2003	stranskyj
Chromium, Total	EPA 200.7	<0.005	mg/L	9/26/2003	stranskyj
Digestion	EPA 3005A	Done	N/A	9/2/2003	stranskyj
Lead, Total	SM 3113B	0.010	mg/L	9/25/2003	stranskyj
Mercury, Total	EPA 245.1	<0.0005	mg/L	8/20/2003	stranskyj
Selenium, Total	SM 3113B	<0.01	mg/L	10/1/2003	stranskyj
Silver, Total	SM 3113B	<0.001	mg/L	10/2/2003	stranskyj

Reported: Friday, October 03, 2003

EPA Laboratory ID: ID00018

Laboratory Supervisor