



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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C.L. "Butch" Otter, Governor
Toni Hardesty, Director

June 10, 2011

Mr. Stacy Nagy
P.O. Box 111
Oxbow, OR 97840-0111

Subject: Site Assessment of the River Queen Mine, Hells Canyon Area,
Adams County, Idaho

Dear Mr. Nagy:

The Idaho Department of Environmental Quality (DEQ) has completed a review of historical mining data and geological information for the above referenced mine near Oxbow, Idaho. During the review, DEQ conducted a site visit, with your assistance, to the River Queen Mine. During the visit, mine site activities such as tunnels, adits, tailings piles/waste dumps, and a spring were observed and mapped in order to provide a comprehensive analysis necessary to complete an Abbreviated Preliminary Assessment (APA).

The APA is used to help site investigators determine if their findings result in a determination of No Remedial Action Planned (NRAP), or if additional analysis is warranted. The APA documents the rationale for the decision on whether further steps in the site investigation process are required under the Federal Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA). If additional analysis was warranted a Preliminary Assessment (PA) would have been prepared for this site.

PAs are conducted in accordance with CERCLA. The reasons to complete a PA include:

- 1) To identify those sites which are not Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) caliber because they do not pose a threat to public health or the environment (No Remedial Action Planned (NRAP));
- 2) To determine if there is a need for removal actions or other programmatic management of sites;
- 3) To determine if a Site Investigation, which is a more detailed site characterization, is needed; and/or

Mr. Stacy Nagy
River Queen Mine
June 10, 2011
Page 2

- 4) To gather data to facilitate later evaluation of the release of hazardous substances through the Hazard Ranking System (HRS).

DEQ has also completed PAs under contract with the U.S. Environmental Protection Agency in order to identify risks to human health and the environment and make recommendations to land owners regarding how risks might be managed, if necessary.

DEQ offers the following health and safety recommendations relating to the aforementioned mine. Open adits pose a safety hazard to the general public who often wish to enter and explore them. Although DEQ did not find substantial toxicological risks associated with the heavy metals concentrations in the waste dumps present at this mine, repeated contact with soil and dust from these waste dumps is not advised and should be managed.

Attached is the APA for the River Queen Mine. This APA contains mine history, limited geological information, sample results, and maps of the property. Based on this information, DEQ is recommending the River Queen Mine property status be designated as No Remedial Action Planned (NRAP).

If you have any comments or questions about these sites, the reports, DEQ's recommendations, or if I may be of any other assistance, contact me at (208) 373-0563.

Sincerely,



Tina Elayer
Mine Waste Specialist
Waste Management and Remediation Division

Attachment

cc: Ken Marcy – U.S. Environmental Protection Agency
River Queen Mine File

ABBREVIATED PRELIMINARY ASSESSMENT

This is an Abbreviated Preliminary Assessment (APA) for the River Queen Mine in Idaho but near Homestead, Oregon. This document provides the rationale for the determination of No Remedial Action Planned (NRAP) or if additional analysis or site investigation is necessary for the River Queen Mine. Additional sheets are attached which contain relevant information including historical data, site photographs, and maps generated during the site visits or desktop research.

Preparer: Tina L. Elayer **Date:** 6/10/11
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706
(208) 373-0563
tina.elayer@deq.idaho.gov

Site Name: River Queen Mine

Previous Names (aka): Little Queen Patent, River Queen Patent, Little Queen Group Lode Claim

Site Owner: Stacy Nagy

Address: P.O. Box 111
Oxbow, OR 97840

Site Location: Access to the site is best obtained by traveling on Highway 71 from Cambridge for approximately 50 miles. Highway 71 runs through the town of Homestead, Oregon. From Homestead travel approximately 2.5 miles to a bridge that crosses the Snake River. The River Queen mine site is located approximately 0.6 miles north from the bridge on the east side. Highway 71 turns into National forest development road 454. The workings are located on private property.

Township 20 North, Range 4 West, Section 22

Latitude: 45.05485°N **Longitude:** -116.80360°W

Describe the release (or potential release) and its probable nature:

This site was investigated for potential releases of heavy metals and sediment from mine waste dumps and potential discharges of other deleterious materials, such as petroleum products and ore processing chemicals. No evidence or indications of these materials were located on site.

Part 1 - Superfund Eligibility Evaluation

If all answers are “no” go on to Part 2, otherwise proceed to Part 3.	YES	NO
1. Is the site currently in CERCLIS or an “alias” of another site?		x
2. Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		x
3. Are the hazardous substances that may be released from the site regulated under a statutory exclusion (e.g., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?		x
4. Are the hazardous substances that may be released from the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		x
5. Is there sufficient documentation to demonstrate that there is no potential for a release that constitutes risk to human or ecological receptors? <i>(e.g., comprehensive remedial investigation equivalent data showing no release above ARARs, completed removal action, documentation showing that no hazardous substance releases have occurred, or an EPA approved risk assessment completed)?</i>	x	

Please explain all “yes” answer(s):

A site inspection involving direct observations confirmed contaminants of concern do not exist in concentrations that present a threat to human health or environments.

There are two adits; one is open, and one is collapsed. There were no signs of water running from the adits. The landowner said the open adit does have standing water inside the tunnel.

Two waste dumps are located on the site.

River Queen Waste Dump 1 is <500 yards of waste rock. A composite soil sample RQWD1SS1 was collected from this dump and sieved to -9 mesh. Laboratory results are located in the attachments of this report. Waste Dump 1 appeared to be dominated by altered volcanoclastic rocks, containing the minerals malachite, chalcopyrite, and copper. Vegetation appears to be well established on the toe of the waste dump. DEQ will be working with the land owner by providing guidance on how to install best management practices (BMPs) focused on establishing a vegetative cover on the top of the waste dump(s).

River Queen Waste Dump 2 contains <200 yards of waste rock. The rock is mainly composed of volcanoclastics. Vegetation is established on the waste dump. Mullen plants (*Verbascum Thapsus*) seem to thrive on the top of the dump.

There is a spring located above the land owner’s cabin. Vegetation, mostly poison ivy, was well established around the spring. Land owner stated the flow from the spring was approximately 30-40 gpm. Ground water samples RGSPR1GW1 (D) and RGSPR1GW1 (T) were collected from the spring. Sample results are included as an attachment to this report.

The results of ground water sample RQSPRIGW1 for total recoverable metals indicate no exceedance of the DEQ ground water standard, DEQ drinking water standard, DEQ acute cold water biota standard, or the DEQ chronic cold water biota standard.

The results of ground water sample RQSPRIGW1 for dissolved metals indicate no exceedance of the DEQ ground water standard, DEQ drinking water standard, DEQ acute cold water biota standard, or the DEQ chronic cold water biota standard.

The land owner maintains an orchard on the property and uses the spring water for irrigation. He sells his produce at the McCall Farmer’s Market.

Part 2 - Initial Site Evaluation

For Part 2, if information is not available to make a “yes” or “no” response, further investigation may be needed. In these cases, determine whether an APA is appropriate. Exhibit 1 parallels the questions in Part 2. Use Exhibit 1 to make decisions in Part 3.

If the answer is “no” to any of questions 1, 2, or 3, proceed directly to Part 3.	YES	NO
1. Does the site have a release or a potential to release?		x
2. Does the site have uncontained sources containing CERCLA eligible substances?		x
3. Does the site have documented on-site, adjacent, or nearby targets?		x

If the answers to questions 1, 2, and 3 above were all “yes” then answer the questions below before proceeding to Part 3.	YES	NO
4. Does documentation indicate that a target (e.g., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site?		x
5. Is there an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site?		x
6. Is there an apparent release and no documented on-site targets or targets immediately adjacent to the site, but there are nearby targets (e.g., targets within one mile)?		x
7. Is there no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site?		x

Notes:

During the site assessment, DEQ used references from several different documents including USGS maps, county tax rolls, and historical reports that have spelled numerous claim names, town sites and/or geographic features differently from one and another. DEQ’s use of the different spellings is to remain in context with the reference used for each given section of text written in this report.

Exhibit 1 – Site Assessment Decision Guidelines for a Site

Exhibit 1 identifies different types of site information and provides some possible recommendations for further site assessment activities based on that information. The assessor should use Exhibit 1 in determining the need for further action at the site, based on the answers to the questions in Part 2. Please use your professional judgment when evaluating a site. Your judgment may be different from the general recommendations for a site given below. **(Circle or highlight responses)**

Suspected/Documented Site Conditions		APA	Full PA	PA/SI	SI
1. Releases or potential to release are not documented at the site.		Yes			
2. Uncontained sources with CERCLA-eligible substances have not been documented as being present on the site. (i.e., they do exist at site)		Yes			
3. On-site, adjacent, or nearby receptors are not present.		Yes			
4. There is no documentation or observations made leading to the conclusion that a sensitive receptor is present or may have been exposed (e.g., drinking water system user inside four mile TDL) 5. There is documentation that a sensitive receptor has been exposed to a hazardous substance released from the site.	Option 1: APA	Yes			
	Option 2: Full PA or PA/SI	No			
6. There is an apparent release at the site with no documentation of targets, but there are targets on site or immediately adjacent to the site.	Option 1: APA SI	No			
	Option 2: PA/SI	No			
7. There is an apparent release and no documented on-site targets and no documented targets immediately adjacent to the site, but there are nearby targets. Nearby targets are those targets that are located within one mile of the site and have a relatively high likelihood of exposure to a hazardous substance migration from the site.		No			
8. There are: no indications of a hazardous substance release; uncontained sources containing CERCLA hazardous substances; but there is a potential to release with targets present on site or in proximity to the site.		No			

Part 3 - EPA Site Assessment Decision

When completing Part 3, use Part 2 and Exhibit 1 to select the appropriate decision. For example, if the answer to question 1 in Part 2 was “no,” then an APA may be performed and the “NRAP” box below should be checked. Additionally, if the answer to question 4 in Part 2 is “yes,” then you have two options (as indicated in Exhibit 1): Option 1 -- conduct an APA and check the “Lower Priority SI” or “Higher Priority SI” box below; or Option 2 -- proceed with a combined PA/SI assessment.

Check the box that applies based on the conclusions of the APA:

<input checked="" type="checkbox"/>	No Remedial Action Planned (NRAP)	Defer to NRC
<input type="checkbox"/>	Higher Priority SI	Refer to Removal Program
<input type="checkbox"/>	Lower Priority SI	Site is being addressed as part of another CERCLIS site
<input type="checkbox"/>	Defer to RCRA Subtitle C	Other:

DEQ Reviewer:


Tina L. Elayer

6/15/11
Date

Please Explain the Rationale for Your Decision:

There are no direct airborne, surface or ground water pathways to any potable water sources or residences. There is one full-time resident on the site, but the pathways are incomplete as the waste dumps appear to be stable and are not blowing fugitive dust. The spring water the land owner uses doesn't exceed DEQ ground water standard, DEQ drinking water standard, DEQ cold water biota standard (acute), or DEQ cold water biota standard (chronic).

As a result of our observations, DEQ is recommending this site be designated as “No Remedial Action Planned” (NRAP).

Attachments:

- APA Notes
- Historical Information
- Maps
- Sample Analysis
- Laboratory Report
- Site Photographs (Note: pictures were taken for this site but were unfortunately lost.)

APA Notes: River Queen Mine

9/2/10, 10:30amMDT

DEQ Staff: Bruce Schuld and Tina Elayer accompanied by land owner Stacy Nagy

River Queen Adit 1:

GPS Coordinates: 45.05485, 116.80360

- Open adit, no sign of water running from adit, Stacy mentioned there is standing water inside the tunnel.
- Vegetation is established in front of the open adit, poison ivy and willow? Trees.

River Queen Waste Dump1:

- Approximately <500yds of waste rock on RQWD1.
- There is evidence of massive sulfides located in the rock on the dump.
- The dump is dominated by volcanoclastic rocks, some examples are malachite, chalcopyrite, and lots of copper.
- Vegetation appears well-established on the toe of the dump.
- Stacy Nagy's cabin is located below this dump, over on the southern edge.
- Soil sample (RQWD1SS1) collected from this dump, composite soil sample, sieved to -9 mesh, 11:00am MDT by Bruce Schuld.

River Queen Adit 2, Point of Discovery:

- Collapsed tunnel, no access.
- Stainless steel tank used for watering orchard located in front of collapsed tunnel.

River Queen Waste Dump 2:

GPS Coordinates: 45.05452, 116.80332

- Approximately <200 yds of waste rock.
- Composed mainly of volcanoclastics.
- Vegetation is established on the dump, mullen plants seemed to thrive on the top of the dump.

Exploration Pit above Waste Dump 2:

- <20 cy of material.
- Composed of country rock.

River Queen Spring 1:

GPS Coordinates: 45.05405, 116.80314

- PVC pipe with an on/off valve.
- Vegetation well established around spring, mostly poison ivy noted.
- Landowner stated the flow from the spring was approximately 30-40 gpm.
- Ground water samples collected from the spring, RGSPR1GW1 (D), and RGSPR1GW1 (T). Samples collected by Bruce Schuld at 11:30am on 9/2/10.

Horiba Parameters for River Queen mine spring:

Parameters	River Queen Mine Spring
pH	8.3 std. units
Specific Conductance	.198 μ siemen/cm
Turbidity	<10 NTU
Dissolved Oxygen	11.46 mg/L
Temperature	13.1°C
Salinity	.00%

River Queen Background Samples:

- RQBGSW-1 (T & D), GPS Coordinates: 45.05177, 116.79090
- RQBGSS-1, GPS Coordinates: 45.05193, 116.79063

Parameters	River Queen Mine Background Unnamed Creek
pH	7.0 std. units
Specific Conductance	.252 μ siemen/cm
Turbidity	<10 NTU
Dissolved Oxygen	6.08 mg/L
Temperature	12.4°C
Salinity	.00%

General comments:

- Orchard on-site, GPS points logged into Arc GIS database.
- Owner sells fruit from the orchard at the McCall Farmers market
- 1 year-round resident
- Creek is unnamed above the River Queen mine.

Historical Information

Mine History: The following history of the River Queen Mine was taken from *Mining Geology of the Seven Devils Region; Idaho Bureau of Mines and Geology Pamphlet No. 97, Earl F. Cook, 1954, 31 p:*

The River Queen mine, about three miles north of Homestead, has produced an estimated \$20,000 in copper ore. The latest production was in 1936-40; about 200 tons of hand-sorted ore containing 15-17 per cent copper were shipped. The mine has been developed by several hundred feet of workings on three levels.

A series of northeast fractures cut altered andesitic tuffs, rhyolite, and sedimentary rocks of the Seven Devils volcanics and these fractures are irregularly filled with chalcopyrite and some bornite. There is no gangue. The rhyolite appears to be associated with the chalcopyrite and is full of pyrite crystals and grains (Laney and Livingston, 1920, p. 24). Some of the greenstone is silicified and the rhyolite probably is also.

A few thousand tons of low-grade ore, containing about three per cent copper; constitute the probable reserves. The complexity of the mineralized fractures makes exploration difficult and the irregularity of the mineralization within the fractures makes the future of the River Queen appear unpromising.

METAL PRODUCTION, SEVEN DEVILS REGION, 1936 - 53
from Minerals Yearbooks, 1936 - 49, other sources 1950 - 53

YEAR	Number of Mines	Tons of ore	Gold (oz.)	Silver (oz.)	Copper (lbs.)	Lead (lbs.)	Total Value	Principal producing properties
1936	2	883	1291	757	759	525	\$ 45,815	Placer Basin
1937	7	4224	3984	1775	74843	—	149,869	Placer Basin
1938	5	227	274	379	17745	—	11,574	River Queen, Lockwood, Helena, Placer Basin
1939	2	401	507	358	14154	—	19,460	Placer Basin, Helena
1940	3	442	303	436	23000	—	13,514	Placer Basin, Helena, S. Peacock
1941	4	294	241	647	37000	100	13,267	Placer Basin, Helena, S. Peacock
1942	4	89	16	547	35900	—	5,293	Helena, S. Peacock
1943	2	88	9	959	37200	—	5,833	South Peacock, Helena
1944	3	203	7	426	48000	—	7,028	Arkansas-Decorah, Helena, Lockwood
1945	3	68	3	329	22600	—	3,390	Arkansas-Decorah, Lockwood, S. Peacock
1946	2	28	4	198	13500	4000	2,923	Helena, Lead Zone
1947	3	124	8	505	42000	—	9,557	Arkansas-Decorah, Helena, S. Peacock
1948	1	13	2	95	6400	—	1,545	Helena
1949	2	54	5	326	29000	—	6,183	Helena, South Peacock
1950	1	44	—	182	—	30850	4,032	Lead Zone
1951	2	116	4	381	18000	24830	8,502	S. Peacock, Lead Zone
1952	2	73	—	108	—	16800	4,621*	Alaska Tungsten mine, Lead Zone
1953	1	241	—	—	—	—	14,183**	Alaska Tungsten mine

* Includes value of 1312 pounds Wb.
** Value of 8878 pounds Wb.

The River Queen Mine was identified in the *Mining properties in Idaho that were involved in the DMA (Defense Minerals Administration), DMEA (Defense Minerals Exploration Administration), or OME (Office of Minerals Exploration) Mineral Exploration Programs, 1950-1974*” USGS Open File Report 97-439 Thor H. Kiilsgaard, 1997. The document is included in the attachments. There is a case number associated with this mine, however DEQ contacted the records department and found that the exploration effort was canceled for the River Queen mine.

Geologic Features: The following information was taken from *Mineral Resources of the Hells Canyon Study Area: Adams, Idaho, and Nez Perce Counties, Idaho and Wallowa County, Oregon, United State Department of the Interior (Bureau of Mines) MLA 41-82, Terry J. Close, et. al, 1982:*

A mineral resource survey of the 940-square-mile (2,434 km²) Hells Canyon study area, which includes Hells Canyon Wilderness, Snake and Rapid Wild and Scenic Rivers, and adjoining roadless lands in Oregon and Idaho, indicates the area is highly mineralized. Thirty-four lode deposits within the study area have resources totaling about 31 million tons (28 million t) containing copper, silver, zinc, gold, and lead; another 42 lodes, not sufficiently exposed to allow resource estimates, are believed to have mineral potential. The most important deposits are copper-, silver-, zinc-, gold-, and lead-bearing volcanogenic occurrences, followed by silver-and copper-bearing contact replacement (tactite) deposits; other lode occurrences are relatively unimportant. The most important placer deposits occur at Dry Diggins; placers along the Snake River are small and scattered. The study area has extensive deposits of limestone and sand and gravel; it has little potential for energy resources.

Windy Ridge, in the south end of the study area, is accessible by dirt road from Council, Idaho. Most lode deposits occur along a northeast trending belt from the Iron Dyke Mine to and beyond the Copper Cliff Mine (fig. 1). Most placer claims were on deposits now covered by the Hells Canyon Reservoir; others were on residual placers over tactites.

The residual placers were claimed in the 1870's. They were depleted, and development of the underlying tactite copper deposits began in the 1880's. Before 1906, 30,000 tons (27,200 t) of ore containing copper, silver, and gold worth \$1.3 million at dates of production were produced. Most came from the Peacock and South Peacock Mines (fig. 1, Nos. 84, 85). Production was sporadic after 1906.

Small, high-grade volcanogenic deposits were mined intermittently from the 1890's until the 1965 discovery and development of the Copper Cliff Deposit. The discovery encouraged exploration for similar deposits by nine major mining companies. Work on the Nix Group and the Red Ledge Prospect (fig. 1, Nos. 113, 81) resulted in the discovery of mineral resources.

Development of Windy Ridge deposits was hampered by: 1) high transportation costs; 2) inability to make a salable concentrate from the low-grade, complex ores; and 3) the small sizes and irregularities of high-grade deposits. As a result, a minimum copper

content of 10 percent was required before mining was profitable. Development of concentration techniques and better transportation have improved mining potential.

Most tactite deposits near Windy Ridge are along the north side of a limestone unit that trends northwest from Landore to the Peacock Mine. The deposits consist of malachite- and azurite-coated pods in limestone which is partially-to-completely replaced by garnet, epidote, specular hematite, magnetite, and quartz. The pods contain bornite, chalcocite, covellite, and minor amounts of pyrite, chalcopyrite, and native copper. Minor amounts of the tungsten minerals, scheelite and powellite, are also present at some prospects. Attempts to market tungsten were not successful because of the high molybdenum content of the tungsten minerals. Windy Ridge tactite deposits were mined to shallow depths; drilling indicates they extend below the workings. Other tactite deposits may be found at depths along the limestone unit. Drilling and sampling indicate copper concentrations also occur in surrounding granodiorite. Identified tactite resources total about 2.2 million tons (2 million t) of copper-and silver bearing material.

Volcanogenic occurrences are between the Red Ledge Prospect and Antz Creek Mine (fig. 1, Nos. 81, 116). They are associated with pyrite-bearing rhyolite intrusions; lenses and veins are concentrated near contacts between the intrusive rocks and intercalated andesitic clastics and flows. Disseminated deposits occur mainly in the intrusions.

Table 1.--Estimate of metallic mineral resources in study area lode deposits
(Source: Bureau of Mines Summary Report, MLA 41-82, 1982)

[--, insignificant amounts]

Name	Type of occurrence	Classification ^{1/}	Tons ^{2/}	Gold (ounce per ton) ^{2/}	Silver (ounce per ton) ^{2/}	Copper (percent)
<u>Windy Ridge</u>						
Allison Creek Prospect	Volcanogenic lens	Submarginal resource	2,620	--	--	0.72
Brooklyn-Allen Group	Tactite	do-----	750	--	--	1.7
	Volcanogenic lens	do-----	30,420	--	--	1.1
Cliff Prospect	Volcanogenic vein	Paramarginal resource	20,800	0.3	1.9	2.2
Crackerjack Mine	do-----	do-----	3,600	--	7.2	1.4
Dry Gulch Prospect	Volcanogenic lens	Submarginal resource	830	--	--	.67
Eureka Group	do-----	do-----	96,000	--	.32	.9
Golden Star Claim	do-----	Paramarginal resource	600	--	--	1.6
Lime Peak Mine	Volcanogenic lens	Submarginal resource	4,150	--	0.15	1.4
Lower Devil's Hollow Prospect	Fissure vein	do-----	1,140	--	--	1.2
Nix Claim Group	Volcanogenic lens and vein	do-----	45,600	0.03	.2	0.4
Peacock Mine	Tactite	Paramarginal resource	450,000	--	.7	1.35
Pepperbox No. 2 Claim	do-----	Submarginal resource	650	--	--	.35
Red Ledge Prospect ^{3/}	Volcanogenic lens and disseminated sulfides	Paramarginal resource	25,298,000	.02	1.21	.51
River Queen Mine	Volcanogenic lens	Do-----	7,100	--	--	1.7
South Peacock Mine	Tactite	Do-----	<u>1,700,000</u>	--	.56	1.59
Subtotal			27,662,260			

^{1/} Resources have been classified according to definitions adopted by the U.S. Bureau of Mines and the U.S. Geological Survey (U.S. Geological Survey Bull. 1450-A).

^{2/} Metric conversions: tons x 0.9072 = metric tons; ounce per ton x 34, 285 = grams per metric ton

^{3/} Also average 1.32 percent zinc

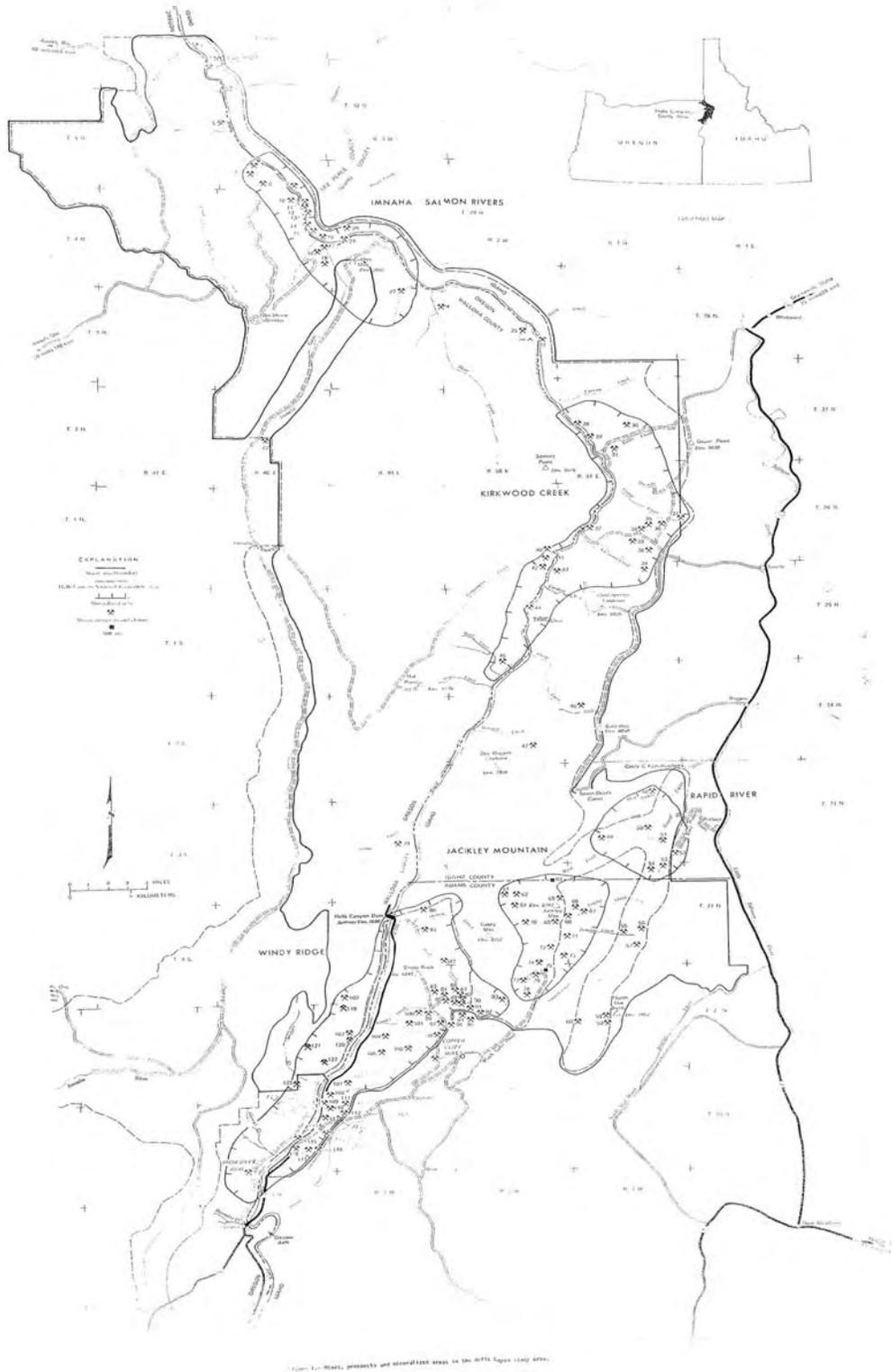
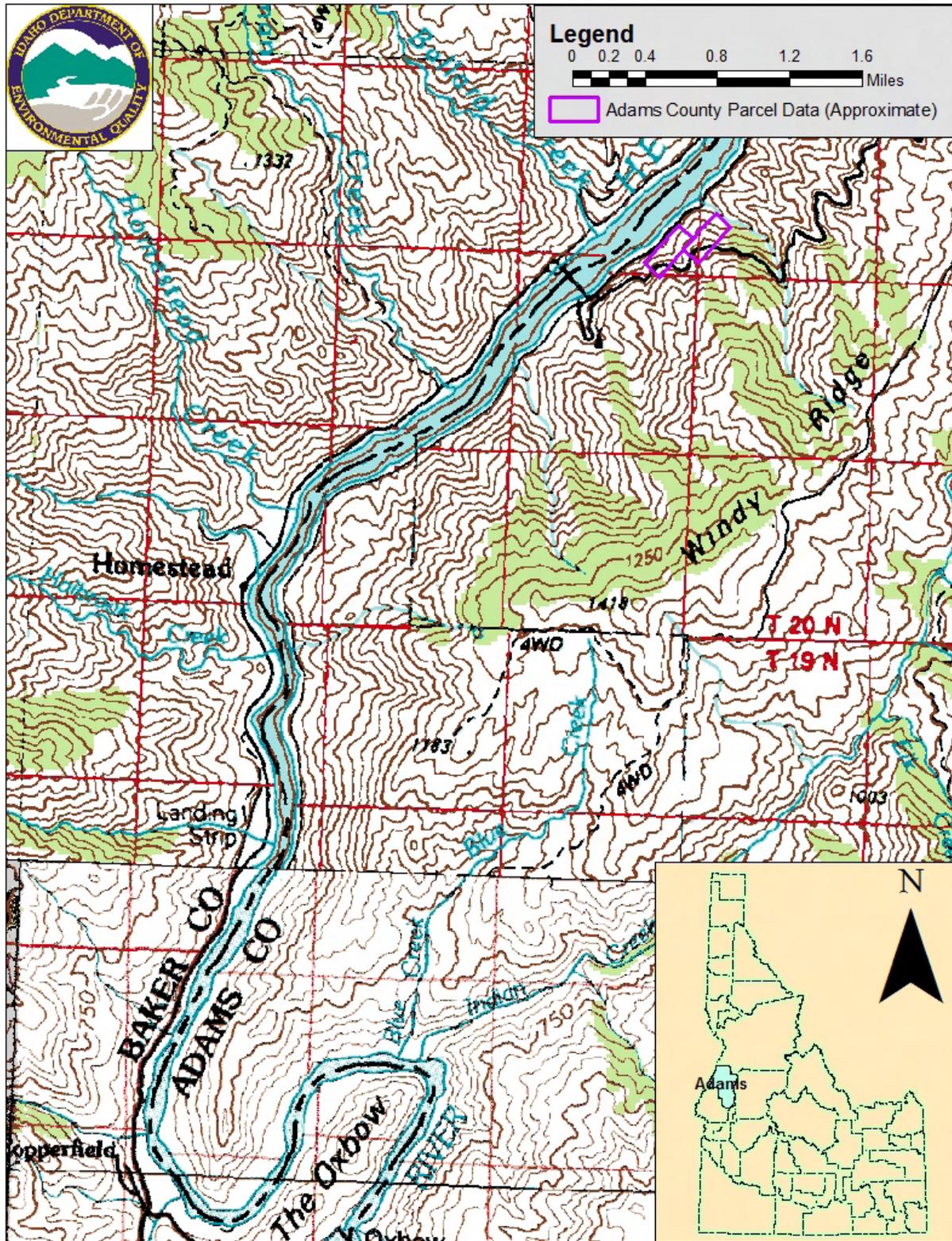


Figure 1.- Mines, prospects and mineralized areas in the Hells Canyon study area
 (Source: Bureau of Mines Summary Report MLA 41-82, 1982)

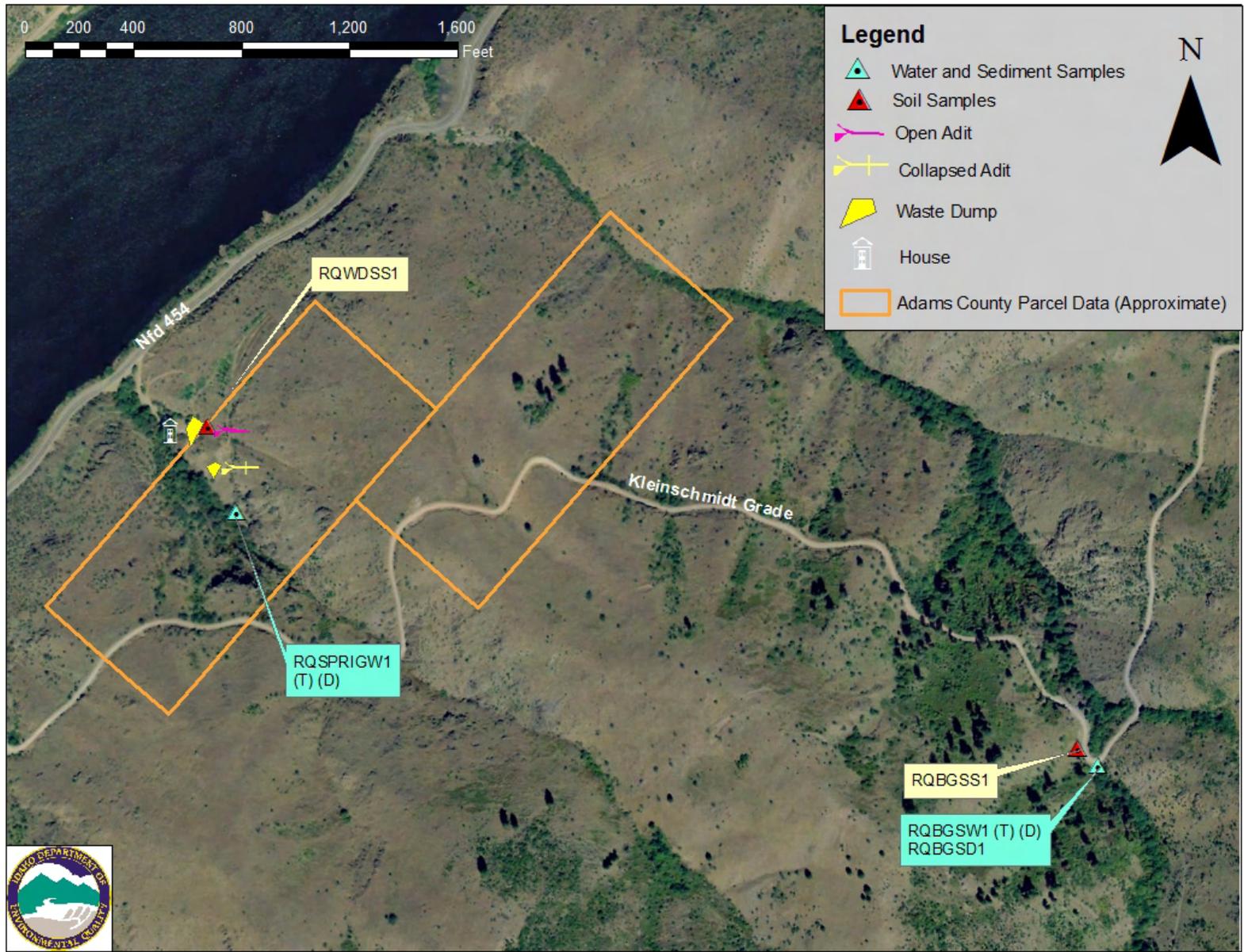
Maps



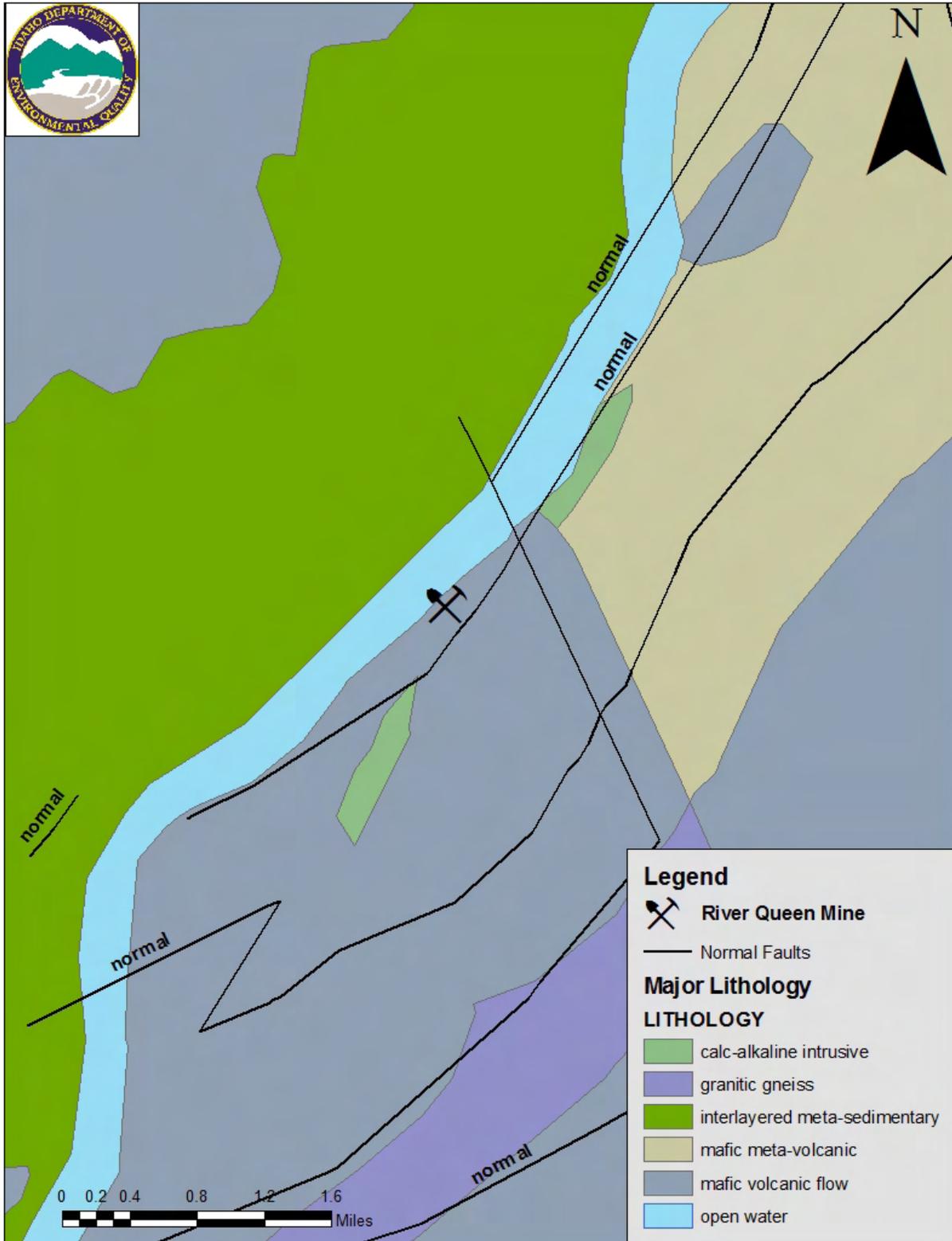
Map 1. Location of the River Queen Mine property with Adams County 2010 Parcel Data Overlay (Map Source: USGS 100k Quads)



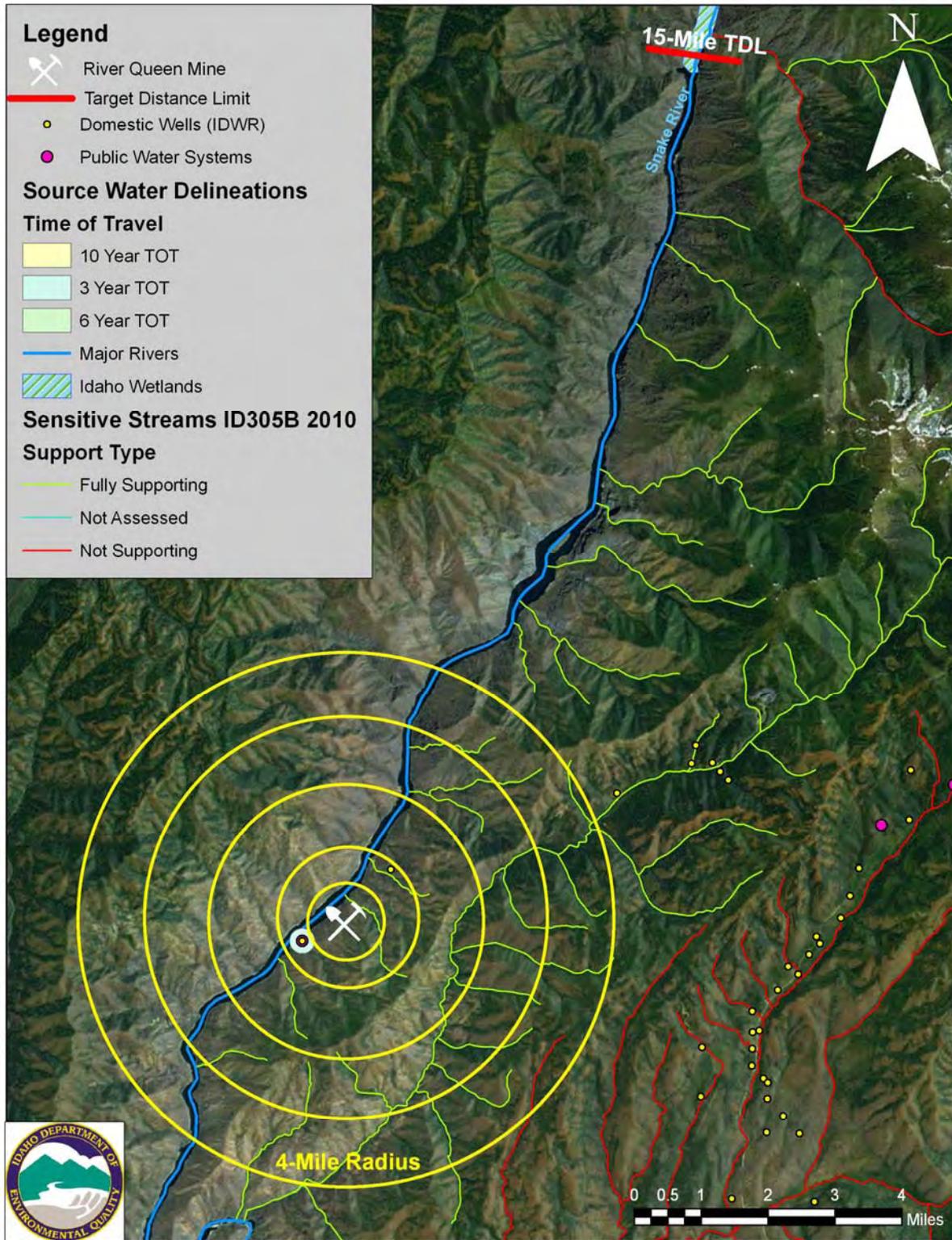
Map 2. Close-up view of River Queen Mine open adit and adjacent claims (Map Source: 2009 Natural Color 1-meter National Agriculture Imagery Program (NAIP) Idaho Map)



Map 3. River Queen Mine Sample Locations
 (Map Source: 2009 Natural Color 1-meter NAIP Idaho Map)



Map 4. Major lithology of River Queen Mine and surrounding area (Map Sources: SDE Feature Class, USGS 1995 and Idaho DEQ GIS ArcSED 9.2 Geodatabase)



Map 5. One public water system is located within the four mile radius; however it is located up gradient from the site. No wetlands are located within the 4-mile radius. The edge of one wetland is located within the 15-mile target distance limit (TDL). (Map Source: World Imagery ArcGIS)



Map 6. Sensitive Species within four mile radius and surrounding area. Species of Concern: non-game animals and plants. (Map Sources: SDE Feature Dataset, Animal Conservation Database and Idaho DEQ GIS Arc SDE 9.2 Geodatabase)

Sample Analysis

Soil samples were analyzed at Silver Valley Lab (SVL) located in Kellogg, Idaho utilizing EPA 6000/7000 method 6010B for all metals except mercury where method 7471A was utilized. Laboratory analytical results have been compared to and will be discussed below relative to Idaho's *Initial Default Target Levels* (IDTLs), EPA Region 6 Human Health Medium Screening Levels (HHSLs), and the BLM Wildlife and Livestock Risk Management Criteria for Metals in Soils (Technical Note 390 rev.2004). Analytical data will also be discussed relative to background concentrations found in soil sample RQBGSS1.

The IDTLs are risk-based target levels for certain chemicals that have been developed by DEQ using conservative input parameters, a target acceptable risk of 10^{-5} , and a *Hazard Quotient* of 1. These numbers, although used for comparison even at remote locations, are more applicable to sites where "unrestricted uses" such as residential development are expected. Similarly, the EPA Region 6 HHSLs are human health based risk derived for screening where residents are at risk for exposure.

Table 1 summarizes laboratory analytical results for soil (2) and sediment (1) samples collected. Table 2 provides data from the BLM Wildlife and Livestock Risk Management Criteria for Metals in Soils (Technical Note 390 rev.2004).

Soil Samples

The background soil sample **RQBGSS1** exceeded the IDTLs for arsenic by 6.9 times, chromium by 1.1 times, manganese by 5.2 times and silver by 2.6 times. The sample also exceeded the BLM risk for copper for the robin by 4 times and for zinc for the robin by 1.8 times.

Sample **RQWD1SS1** exceeded the IDTLs for arsenic by 94.3 times, chromium by 2.7 times, copper by 9.6 times, lead by 1.3 times, manganese by 8.7 times, selenium by 4 times, silver by 42 times, and mercury by 34 times.

Sample **RQWD1SS1** exceeded the HHSLs for arsenic by 1.6 times and copper by 3 times.

Sample **RQWD1SS1** exceeded the BLM risk for arsenic for the robin by 9.2 times. This sample also exceeded the BLM risk for copper for elk by 68 times, deer by 87 times, mice by 13.9 times, rabbit by 24.9 times, goose by 55 times, mallard by 63 times, robin by 1,274 times, cattle by 21 times, and sheep 65 times.

Sample **RQWD1SS1** also exceeded a **comparison against background by three times or greater** for arsenic by 13.6 times, copper by 314 times, lead by 22 times, silver by 15.8 times, and mercury by 5 times.

Sediment Sample

Sample **RQBGSD1** exceeded the IDTLs for arsenic by 12.5 times, cadmium by 10 times, chromium by 5.6 times, manganese by 5.3 times, silver by 8.4, zinc by 2 time, and mercury by 343 times. The sample did not exceed the HHSLs for any metals. This sample exceeded the BLM risk "Median Values" for cadmium, zinc, and mercury.

Table 1. Soil, Sediment, and Waste Sample Analysis

River Queen Mine

Metals	IDTLs (mg/kg)	HHSLs (mg/kg)	Background Sediment Sample RQBGSD1 (mg/kg)	Background Soil Sample RQBGSS1 (mg/kg)	Waste Dump Soil Sample RQWDISS1 (mg/kg)
Antimony	4.77	31	4.3	2.7	3.4
Arsenic	0.391	23	4.9	2.7	36.9
Barium	896	1,600	424	150	324
Cadmium	1.35	39	13.5	<0.02	<0.2
Chromium	7.9	210	44.8	9.25	21.6
Copper	921	2,900	70.6	28.4	8,920
Iron		55,000	31,800	35,300	5.6
Lead	49.6		30.8	3.11	69
Manganese	223	3,600	1,190	1,160	1,950
Selenium	2.03	23	<4.0	<4.0	8.3
Silver	0.189	390	1.6	0.5	7.94
Zinc	886	390	1,860	80.8	168
Mercury	0.00509	23	1.75	<.033	0.175

Tan = exceeds Idaho Initial Default Target Levels (IDTLs).

Light Yellow = exceeds Human Health Screening Levels (HHSLs).

Light Green = exceeds both IDTLs and HHSLs.

Bold = exceeds Background Levels by greater than three times.

**Table 2. Wildlife and Livestock Risk Management Criteria for Metals in Soils (mg/kg)
BLM Technical Note 390 Rev. 2004 “Risk Management Criteria for Metals at BLM Mining Sites”**

River Queen Mine

Metals	Elk	Mule Deer	Big Horn Sheep	Deer Mice	Cottontail Rabbits	Canada Goose	Mallard	Robin	Cattle	Sheep	Median Values
Antimony											
Arsenic	328	200	387	230	438	61	116	4	419	275	275
Barium											
Cadmium	3	3	9	7	6	2	1	0.3	15	12	8
Chromium											
Copper	131	102	64	640	358	161	141	7	413	136	136
Iron											
Lead	127	106	152	142	172	34	59	6	244	125	125
Manganese											
Selenium											
Silver											
Zinc	275	222	369	419	373	271	196	43	1082	545	307
Mercury	11	11	6	2	15	6	4	1	45	8	8

Ground Water Samples

Sample **RQSPRIGW1** for total recoverable metals results indicate no exceedance of the DEQ ground water standard, DEQ drinking water standard, DEQ acute cold water biota standard, or the DEQ chronic cold water biota standard.

Sample **RQSPRIGW1** for dissolved metals results indicate no exceedance of the DEQ ground water standard, DEQ drinking water standard, DEQ acute cold water biota standard, or the DEQ chronic cold water biota standard.

Surface Water Samples

Sample **RQBGSW1** for total recoverable metals analysis results indicated this sample exceeded the DEQ cold water biota standards for cadmium, exceeded the acute cold water biota standard by 2.5 times, and the chronic cold water biota standard by 5.6 times. The sample exceeded the cold water biota for zinc, acute cold water biota standard by 3 times, and chronic cold water biota standard by 3.3 times.

Sample **RQBGSW1** for dissolved metals exceeded the cold water biota for zinc, acute cold water biota standard by 2.3 times, and chronic cold water biota standard by 2.5 times.

Table 3. Total Recoverable Metals Analysis (mg/l) in Surface Water
(concentrations expressed in mg/l unless otherwise stated)

River Queen Mine

Description	DEQ Ground Water Standard	DEQ Drinking Water Standard	DEQ Cold Water Biota Standard	DEQ Cold Water Biota Standard	Total Recoverable Metals (T) Ground Water Sample	Dissolved Metals (D) Ground Water Sample	Total Recoverable Metals (T) Surface Water Sample	Dissolved Metals (D) Surface Water Sample
	(T)	MCL	Acute	Chronic	RQSPRIGW1	RQSPRIGW1	RQBGSW1	RQBGSW1
Antimony					<0.020	<0.020	0.021	<0.02
Arsenic	0.05	0.01	0.36	0.19	<0.025	<0.025	<0.025	<0.025
Barium	2	2			0.111	0.135	0.137	0.107
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020	<0.002	0.0021	<0.002
Chromium (Total)	0.1	0.1			<0.0060	<0.006	<0.0060	<0.006
Copper	1.3		0.0046 (H)	0.0035 (H)	<0.010	<0.010	<0.010	<0.010
Iron	0.3*				<0.06	<0.06	<0.06	<0.06
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	0.05				<0.004	<0.004	<0.004	<0.004
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040	<0.040	<0.040	<0.040
Silver	0.1*		0.00032 (H)		<0.0050	<0.0050	<0.0050	<0.0050
Zinc	5*		0.035 (H)	0.032 (H)	<.01	<.01	0.106	0.0819
Mercury	0.002					<0.0002		<0.0002
pH	6.5 – 8.5			6.5 - 9.0				
Conductivity								
Turbidity				Not >50 NTU instantaneous and not >25 NTU over a 10 day period				
Dissolved Oxygen				<6				
Temperature				Cold water aquatic life 22°C or less or a maximum daily average not >19°C Salmonid spawning 13°C or less with a maximum daily average not >9°C				
Salinity								

* Secondary MCL (T) – Standard in Total (H) – Hardness dependent * 25 mg/l

Bold = exceeds cold water biota standard.



CHAIN OF CUSTODY RECORD

SVL Analytical, Inc. • One Government Gulch • Kellogg, ID 83837 • (208) 784-1258 • FAX: (208) 783-0891

Page 1 of 1

FOR SVL USE ONLY
 SVL JOB #
WOIOLole

TEMP on Receipt:

Report to Company: Dept of Environment & Conservation
 Contact: Tina Cleary
 Address: 1400 N. Milton
Boise, ID 83724
 Phone Number: (208) 313-5563
 FAX Number: _____
 E-mail: tina.cleary@deq.idaho.gov

Invoice Sent To: same as report to
 Contact: _____
 Address: _____
 Phone Number: _____
 FAX Number: _____
 PO#: _____

Project Name: River Queen
 Sampler's Signature: Julia Ellyns for Lance Schmitt

Indicate State of sample origination: ID USACE? Yes No

Sample ID	Collection	Date	Time	Collected by: (Int'l)	Misc.	Preservative(s)					Other (Specify)	Analyses Required	Rush Instructions (Days)	Comments		
						Unpreserved	HNO ₃ Filtered	HNO ₃ Unfiltered	HCl	H ₂ SO ₄					NaOH	
1	RQW DSS1	9/21/10	11:00am		5	X						BCR 8			- Total metals on unfiltered H ₂ O samples - All soil/sed samples stored w/ a mesh.	
2	RQ SPR low (D)	9/21/10	11:30		2	X						X				Strickland 9/18/10
3	RQ SPR low (C)	9/21/10	11:30		2	X						X				
4	RQ B6 SW 1 (D)	9/21/10	13:00		2	X						X				
5	RQ B6 SW 1 (C)	9/21/10	13:00		2	X						X				
6	RQ B6 SW 1 (D)	9/21/10	13:05		3	X						X				
7	RQ B6 SW 1 (C)	9/21/10	13:05		3	X						X				
8	RQ B6 SW 1 (D)	9/21/10	13:50		3	X						X				

Relinquished by: Julia Ellyns Date: 9/17/10 Time: 13:30
 Relinquished by: _____ Date: _____ Time: _____

* Sample Reject: Return Dispose Store (30 Days)

White: LAB COPY Yellow: CUSTOMER COPY SVL-COC 9/05

no data on sample label. RS 9/18/10



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
RQWDISS1	W010166-01	Soil	02-Sep-10 11:00	08-Sep-2010
RQSPRIGW1	W010166-02	Ground Water	02-Sep-10 11:30	08-Sep-2010
RQBGSW1	W010166-03	Ground Water	02-Sep-10 13:00	08-Sep-2010
RQBGSD1	W010166-04	Soil	02-Sep-10 13:05	08-Sep-2010
RQBGSS1	W010166-05	Soil	02-Sep-10 12:50	08-Sep-2010

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Client Sample ID: **RQWDISS1**
SVL Sample ID: **W010166-01 (Soil)**

Sampled: 02-Sep-10 11:00
Received: 08-Sep-10
Sampled By:

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	3.4	mg/kg	2.0	0.3		W039156	AS	09/22/10 19:14	
EPA 6010B	Arsenic	36.9	mg/kg	2.5	0.5		W039156	AS	09/22/10 19:14	
EPA 6010B	Barium	324	mg/kg	0.20	0.02		W039156	AS	09/22/10 19:14	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W039156	AS	09/22/10 19:14	
EPA 6010B	Chromium	21.6	mg/kg	0.60	0.07		W039156	AS	09/22/10 19:14	
EPA 6010B	Copper	8920	mg/kg	20.0	4.20	20	W039156	DT	09/23/10 08:44	D2
EPA 6010B	Iron	50600	mg/kg	6.0	1.0		W039156	AS	09/22/10 19:12	
EPA 6010B	Lead	69.0	mg/kg	0.75	0.36		W039156	AS	09/22/10 19:14	
EPA 6010B	Manganese	1950	mg/kg	0.40	0.06		W039156	AS	09/22/10 19:12	
EPA 6010B	Selenium	8.3	mg/kg	4.0	1.4		W039156	AS	09/22/10 19:14	
EPA 6010B	Silver	7.94	mg/kg	0.50	0.04		W039156	AS	09/22/10 19:14	
EPA 6010B	Zinc	168	mg/kg	1.00	0.22		W039156	AS	09/22/10 19:14	
EPA 7471A	Mercury	0.175	mg/kg	0.033	0.010		W037115	JAA	09/16/10 13:23	
Percent Solids										
Percent Solids	% Solids	98.9	%	0.1			W039148	DP	09/22/10 11:11	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Kirby Gray
Technical Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Client Sample ID: **RQSPRIGW1**

SVL Sample ID: **W010166-02 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 02-Sep-10 11:30
Received: 08-Sep-10
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000065		W038132	JAA	09/14/10 12:32	
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Metals (Total Recoverable)

EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.004		W038031	DT	09/20/10 10:15	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.006		W038031	DT	09/20/10 10:15	
EPA 6010B	Barium	0.111	mg/L	0.0020	0.0005		W038031	DT	09/20/10 10:15	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W038031	DT	09/20/10 10:15	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0009		W038031	DT	09/20/10 10:15	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.005		W038031	DT	09/20/10 10:15	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.027		W038031	DT	09/20/10 10:14	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0040		W038031	DT	09/20/10 10:15	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0019		W038031	DT	09/20/10 10:14	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W038031	DT	09/20/10 10:15	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W038031	DT	09/20/10 10:15	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0019		W038031	DT	09/20/10 10:15	

Metals (Dissolved)

EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.004		W038027	DT	09/17/10 11:58	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.006		W038027	DT	09/17/10 11:58	
EPA 6010B	Barium	0.135	mg/L	0.0020	0.0005		W038027	DT	09/17/10 11:58	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W038027	DT	09/17/10 11:58	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0009		W038027	DT	09/17/10 11:58	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.005		W038027	DT	09/17/10 11:58	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.027		W038027	DT	09/17/10 11:57	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0040		W038027	DT	09/17/10 11:58	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0019		W038027	DT	09/17/10 11:57	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W038027	DT	09/17/10 11:58	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W038027	DT	09/17/10 11:58	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0019		W038027	DT	09/17/10 11:58	
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000065		W038131	JAA	09/14/10 12:14	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Kirby Gray
Technical Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Client Sample ID: **RQBGSW1**

SVL Sample ID: **W010166-03 (Ground Water)**

Sample Report Page 1 of 1

Sampled: 02-Sep-10 13:00
Received: 08-Sep-10
Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000065		W038132	JAA	09/14/10 12:37	
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Metals (Total Recoverable)

EPA 6010B	Antimony	0.021	mg/L	0.020	0.004		W038031	DT	09/20/10 10:31	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.006		W038031	DT	09/20/10 10:31	
EPA 6010B	Barium	0.137	mg/L	0.0020	0.0005		W038031	DT	09/20/10 10:31	
EPA 6010B	Cadmium	0.0021	mg/L	0.0020	0.0005		W038031	DT	09/20/10 10:31	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0009		W038031	DT	09/20/10 10:31	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.005		W038031	DT	09/20/10 10:31	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.027		W038031	DT	09/20/10 10:30	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0040		W038031	DT	09/20/10 10:31	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0019		W038031	DT	09/20/10 10:30	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W038031	DT	09/20/10 10:31	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W038031	DT	09/20/10 10:31	
EPA 6010B	Zinc	0.106	mg/L	0.0100	0.0019		W038031	DT	09/20/10 10:31	

Metals (Dissolved)

EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.004		W038027	DT	09/17/10 12:03	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.006		W038027	DT	09/17/10 12:03	
EPA 6010B	Barium	0.107	mg/L	0.0020	0.0005		W038027	DT	09/17/10 12:03	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W038027	DT	09/17/10 12:03	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0009		W038027	DT	09/17/10 12:03	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.005		W038027	DT	09/17/10 12:03	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.027		W038027	DT	09/17/10 12:02	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0040		W038027	DT	09/17/10 12:03	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0019		W038027	DT	09/17/10 12:02	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W038027	DT	09/17/10 12:03	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W038027	DT	09/17/10 12:03	
EPA 6010B	Zinc	0.0819	mg/L	0.0100	0.0019		W038027	DT	09/17/10 12:03	
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000065		W038131	JAA	09/14/10 12:19	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Kirby Gray
Technical Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Client Sample ID: **RQBGSD1**
SVL Sample ID: **W010166-04 (Soil)**

Sampled: 02-Sep-10 13:05
Received: 08-Sep-10
Sampled By:

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	4.3	mg/kg	2.0	0.3		W039156	AS	09/22/10 19:33	
EPA 6010B	Arsenic	4.9	mg/kg	2.5	0.5		W039156	AS	09/22/10 19:33	
EPA 6010B	Barium	424	mg/kg	0.20	0.02		W039156	AS	09/22/10 19:33	
EPA 6010B	Cadmium	13.5	mg/kg	0.20	0.03		W039156	AS	09/22/10 19:33	
EPA 6010B	Chromium	44.8	mg/kg	0.60	0.07		W039156	AS	09/22/10 19:33	
EPA 6010B	Copper	70.6	mg/kg	1.00	0.21		W039156	DT	09/23/10 09:01	
EPA 6010B	Iron	31800	mg/kg	6.0	1.0		W039156	AS	09/22/10 19:31	
EPA 6010B	Lead	30.8	mg/kg	0.75	0.36		W039156	AS	09/22/10 19:33	
EPA 6010B	Manganese	1190	mg/kg	0.40	0.06		W039156	AS	09/22/10 19:31	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W039156	AS	09/22/10 19:33	
EPA 6010B	Silver	1.59	mg/kg	0.50	0.04		W039156	AS	09/22/10 19:33	
EPA 6010B	Zinc	1860	mg/kg	1.00	0.22		W039156	AS	09/22/10 19:33	
EPA 7471A	Mercury	1.75	mg/kg	0.330	0.095	10	W037115	JAA	09/16/10 13:50	D2
Percent Solids										
Percent Solids	% Solids	98.4	%	0.1			W039148	DP	09/22/10 11:11	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Kirby Gray
Technical Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Client Sample ID: **RQBGSS1**
SVL Sample ID: **W010166-05 (Soil)**

Sampled: 02-Sep-10 12:50
Received: 08-Sep-10
Sampled By:

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	2.7	mg/kg	2.0	0.3		W039156	AS	09/22/10 19:39	
EPA 6010B	Arsenic	2.7	mg/kg	2.5	0.5		W039156	AS	09/22/10 19:39	
EPA 6010B	Barium	150	mg/kg	0.20	0.02		W039156	AS	09/22/10 19:39	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W039156	AS	09/22/10 19:39	
EPA 6010B	Chromium	9.25	mg/kg	0.60	0.07		W039156	AS	09/22/10 19:39	
EPA 6010B	Copper	28.4	mg/kg	1.00	0.21		W039156	DT	09/23/10 09:07	
EPA 6010B	Iron	34300	mg/kg	6.0	1.0		W039156	AS	09/22/10 19:37	
EPA 6010B	Lead	3.11	mg/kg	0.75	0.36		W039156	AS	09/22/10 19:39	
EPA 6010B	Manganese	1160	mg/kg	0.40	0.06		W039156	AS	09/22/10 19:37	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W039156	AS	09/22/10 19:39	
EPA 6010B	Silver	0.50	mg/kg	0.50	0.04		W039156	AS	09/22/10 19:39	
EPA 6010B	Zinc	80.8	mg/kg	1.00	0.22		W039156	AS	09/22/10 19:39	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.010		W037115	JAA	09/16/10 13:31	
Percent Solids										
Percent Solids	% Solids	97.9	%	0.1			W039148	DP	09/22/10 11:11	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Kirby Gray
Technical Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 7470A	Mercury	mg/L	<0.00020	0.000065	0.00020	W038132	14-Sep-10	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	<2.0	0.3	2.0	W039156	22-Sep-10	
EPA 6010B	Arsenic	mg/kg	<2.5	0.5	2.5	W039156	22-Sep-10	
EPA 6010B	Barium	mg/kg	<0.20	0.02	0.20	W039156	22-Sep-10	
EPA 6010B	Cadmium	mg/kg	<0.20	0.03	0.20	W039156	22-Sep-10	
EPA 6010B	Chromium	mg/kg	<0.60	0.07	0.60	W039156	22-Sep-10	
EPA 6010B	Copper	mg/kg	<1.00	0.21	1.00	W039156	23-Sep-10	
EPA 6010B	Iron	mg/kg	<6.0	1.0	6.0	W039156	22-Sep-10	
EPA 6010B	Lead	mg/kg	<0.75	0.36	0.75	W039156	22-Sep-10	
EPA 6010B	Manganese	mg/kg	<0.40	0.06	0.40	W039156	22-Sep-10	
EPA 6010B	Selenium	mg/kg	<4.0	1.4	4.0	W039156	22-Sep-10	
EPA 6010B	Silver	mg/kg	<0.50	0.04	0.50	W039156	22-Sep-10	
EPA 6010B	Zinc	mg/kg	<1.00	0.22	1.00	W039156	22-Sep-10	
EPA 7471A	Mercury	mg/kg	<0.033	0.010	0.033	W037115	16-Sep-10	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	<0.020	0.004	0.020	W038031	20-Sep-10	
EPA 6010B	Arsenic	mg/L	<0.025	0.006	0.025	W038031	20-Sep-10	
EPA 6010B	Barium	mg/L	<0.0020	0.0005	0.0020	W038031	20-Sep-10	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0005	0.0020	W038031	20-Sep-10	
EPA 6010B	Chromium	mg/L	<0.0060	0.0009	0.0060	W038031	20-Sep-10	
EPA 6010B	Copper	mg/L	<0.010	0.005	0.010	W038031	20-Sep-10	
EPA 6010B	Iron	mg/L	<0.060	0.027	0.060	W038031	20-Sep-10	
EPA 6010B	Lead	mg/L	<0.0075	0.0040	0.0075	W038031	20-Sep-10	
EPA 6010B	Manganese	mg/L	<0.0040	0.0019	0.0040	W038031	20-Sep-10	
EPA 6010B	Selenium	mg/L	<0.040	0.013	0.040	W038031	20-Sep-10	
EPA 6010B	Silver	mg/L	<0.0050	0.0014	0.0050	W038031	20-Sep-10	
EPA 6010B	Zinc	mg/L	<0.0100	0.0019	0.0100	W038031	20-Sep-10	

Metals (Dissolved)

EPA 6010B	Antimony	mg/L	<0.020	0.004	0.020	W038027	17-Sep-10	
EPA 6010B	Arsenic	mg/L	<0.025	0.006	0.025	W038027	17-Sep-10	
EPA 6010B	Barium	mg/L	<0.0020	0.0005	0.0020	W038027	17-Sep-10	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0005	0.0020	W038027	17-Sep-10	
EPA 6010B	Chromium	mg/L	<0.0060	0.0009	0.0060	W038027	17-Sep-10	
EPA 6010B	Copper	mg/L	<0.010	0.005	0.010	W038027	17-Sep-10	
EPA 6010B	Iron	mg/L	<0.060	0.027	0.060	W038027	17-Sep-10	
EPA 6010B	Lead	mg/L	<0.0075	0.0040	0.0075	W038027	17-Sep-10	
EPA 6010B	Manganese	mg/L	<0.0040	0.0019	0.0040	W038027	17-Sep-10	
EPA 6010B	Selenium	mg/L	<0.040	0.013	0.040	W038027	17-Sep-10	
EPA 6010B	Silver	mg/L	<0.0050	0.0014	0.0050	W038027	17-Sep-10	
EPA 6010B	Zinc	mg/L	<0.0100	0.0019	0.0100	W038027	17-Sep-10	
EPA 7470A	Mercury	mg/L	<0.00020	0.000065	0.00020	W038131	14-Sep-10	



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 7470A	Mercury	mg/L	0.00539	0.00500	108	80 - 120	W038132	14-Sep-10	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	92.6	100	92.6	80 - 120	W039156	22-Sep-10	
EPA 6010B	Arsenic	mg/kg	90.1	100	90.1	80 - 120	W039156	22-Sep-10	
EPA 6010B	Barium	mg/kg	102	100	102	80 - 120	W039156	22-Sep-10	
EPA 6010B	Cadmium	mg/kg	93.2	100	93.2	80 - 120	W039156	22-Sep-10	
EPA 6010B	Chromium	mg/kg	101	100	101	80 - 120	W039156	22-Sep-10	
EPA 6010B	Copper	mg/kg	97.5	100	97.5	80 - 120	W039156	23-Sep-10	
EPA 6010B	Iron	mg/kg	919	1000	91.9	80 - 120	W039156	22-Sep-10	
EPA 6010B	Lead	mg/kg	93.7	100	93.7	80 - 120	W039156	22-Sep-10	
EPA 6010B	Manganese	mg/kg	98.7	100	98.7	80 - 120	W039156	22-Sep-10	
EPA 6010B	Selenium	mg/kg	83.3	100	83.3	80 - 120	W039156	22-Sep-10	
EPA 6010B	Silver	mg/kg	5.00	5.00	99.9	80 - 120	W039156	22-Sep-10	
EPA 6010B	Zinc	mg/kg	90.7	100	90.7	80 - 120	W039156	22-Sep-10	
EPA 7471A	Mercury	mg/kg	0.858	0.833	103	80 - 120	W037115	16-Sep-10	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.01	1.00	101	80 - 120	W038031	20-Sep-10	
EPA 6010B	Arsenic	mg/L	0.975	1.00	97.5	80 - 120	W038031	20-Sep-10	
EPA 6010B	Barium	mg/L	1.05	1.00	105	80 - 120	W038031	20-Sep-10	
EPA 6010B	Cadmium	mg/L	1.03	1.00	103	80 - 120	W038031	20-Sep-10	
EPA 6010B	Chromium	mg/L	1.02	1.00	102	80 - 120	W038031	20-Sep-10	
EPA 6010B	Copper	mg/L	0.978	1.00	97.8	80 - 120	W038031	20-Sep-10	
EPA 6010B	Iron	mg/L	9.86	10.0	98.6	80 - 120	W038031	20-Sep-10	
EPA 6010B	Lead	mg/L	1.03	1.00	103	80 - 120	W038031	20-Sep-10	
EPA 6010B	Manganese	mg/L	1.03	1.00	103	80 - 120	W038031	20-Sep-10	
EPA 6010B	Selenium	mg/L	1.04	1.00	104	80 - 120	W038031	20-Sep-10	
EPA 6010B	Silver	mg/L	0.0534	0.0500	107	80 - 120	W038031	20-Sep-10	
EPA 6010B	Zinc	mg/L	0.999	1.00	99.9	80 - 120	W038031	20-Sep-10	

Metals (Dissolved)

EPA 6010B	Antimony	mg/L	0.914	1.00	91.4	80 - 120	W038027	17-Sep-10	
EPA 6010B	Arsenic	mg/L	0.878	1.00	87.8	80 - 120	W038027	17-Sep-10	
EPA 6010B	Barium	mg/L	0.969	1.00	96.9	80 - 120	W038027	17-Sep-10	
EPA 6010B	Cadmium	mg/L	0.948	1.00	94.8	80 - 120	W038027	17-Sep-10	
EPA 6010B	Chromium	mg/L	0.939	1.00	93.9	80 - 120	W038027	17-Sep-10	
EPA 6010B	Copper	mg/L	0.897	1.00	89.7	80 - 120	W038027	17-Sep-10	
EPA 6010B	Iron	mg/L	9.30	10.0	93.0	80 - 120	W038027	17-Sep-10	
EPA 6010B	Lead	mg/L	0.932	1.00	93.2	80 - 120	W038027	17-Sep-10	
EPA 6010B	Manganese	mg/L	0.940	1.00	94.0	80 - 120	W038027	17-Sep-10	
EPA 6010B	Selenium	mg/L	0.906	1.00	90.6	80 - 120	W038027	17-Sep-10	
EPA 6010B	Silver	mg/L	0.0483	0.0500	96.6	80 - 120	W038027	17-Sep-10	
EPA 6010B	Zinc	mg/L	0.917	1.00	91.7	80 - 120	W038027	17-Sep-10	
EPA 7470A	Mercury	mg/L	0.00531	0.00500	106	80 - 120	W038131	14-Sep-10	



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 7470A	Mercury	mg/L	0.00102	<0.00020	0.00100	102	75 - 125	W038132	14-Sep-10	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	47.3	3.4	100	43.9	75 - 125	W039156	22-Sep-10	M2
EPA 6010B	Arsenic	mg/kg	130	36.9	100	93.2	75 - 125	W039156	22-Sep-10	
EPA 6010B	Barium	mg/kg	397	324	100	73.7	75 - 125	W039156	22-Sep-10	M2
EPA 6010B	Cadmium	mg/kg	88.4	<0.20	100	88.4	75 - 125	W039156	22-Sep-10	
EPA 6010B	Chromium	mg/kg	120	21.6	100	98.2	75 - 125	W039156	22-Sep-10	
EPA 6010B	Copper	mg/kg	8090	8920	100	R > 4S	75 - 125	W039156	23-Sep-10	D2,M3
EPA 6010B	Iron	mg/kg	53000	50600	1000	R > 4S	75 - 125	W039156	22-Sep-10	M3
EPA 6010B	Lead	mg/kg	113	69.0	100	43.8	75 - 125	W039156	22-Sep-10	M2
EPA 6010B	Manganese	mg/kg	2000	1950	100	R > 4S	75 - 125	W039156	22-Sep-10	M3
EPA 6010B	Selenium	mg/kg	95.0	8.3	100	86.7	75 - 125	W039156	22-Sep-10	
EPA 6010B	Silver	mg/kg	12.3	7.94	5.00	88.0	75 - 125	W039156	22-Sep-10	
EPA 6010B	Zinc	mg/kg	227	168	100	58.9	75 - 125	W039156	22-Sep-10	M2
EPA 7471A	Mercury	mg/kg	0.142	<0.033	0.167	85.0	75 - 125	W037115	16-Sep-10	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.02	<0.020	1.00	102	75 - 125	W038031	20-Sep-10	
EPA 6010B	Arsenic	mg/L	0.986	<0.025	1.00	98.6	75 - 125	W038031	20-Sep-10	
EPA 6010B	Barium	mg/L	1.17	0.111	1.00	106	75 - 125	W038031	20-Sep-10	
EPA 6010B	Cadmium	mg/L	1.03	<0.0020	1.00	103	75 - 125	W038031	20-Sep-10	
EPA 6010B	Chromium	mg/L	1.03	<0.0060	1.00	103	75 - 125	W038031	20-Sep-10	
EPA 6010B	Copper	mg/L	0.990	<0.010	1.00	99.0	75 - 125	W038031	20-Sep-10	
EPA 6010B	Iron	mg/L	9.91	<0.060	10.0	99.1	75 - 125	W038031	20-Sep-10	
EPA 6010B	Lead	mg/L	1.02	<0.0075	1.00	102	75 - 125	W038031	20-Sep-10	
EPA 6010B	Manganese	mg/L	1.03	<0.0040	1.00	103	75 - 125	W038031	20-Sep-10	
EPA 6010B	Selenium	mg/L	1.04	<0.040	1.00	104	75 - 125	W038031	20-Sep-10	
EPA 6010B	Silver	mg/L	0.0538	<0.0050	0.0500	108	75 - 125	W038031	20-Sep-10	
EPA 6010B	Zinc	mg/L	0.987	<0.0100	1.00	98.7	75 - 125	W038031	20-Sep-10	

Metals (Dissolved)

EPA 6010B	Antimony	mg/L	1.14	0.111	1.00	103	75 - 125	W038027	17-Sep-10	
EPA 6010B	Arsenic	mg/L	1.05	<0.025	1.00	103	75 - 125	W038027	17-Sep-10	
EPA 6010B	Barium	mg/L	1.10	0.0791	1.00	102	75 - 125	W038027	17-Sep-10	
EPA 6010B	Cadmium	mg/L	1.01	<0.0020	1.00	101	75 - 125	W038027	17-Sep-10	
EPA 6010B	Chromium	mg/L	1.00	<0.0060	1.00	100	75 - 125	W038027	17-Sep-10	
EPA 6010B	Copper	mg/L	1.44	0.421	1.00	102	75 - 125	W038027	17-Sep-10	
EPA 6010B	Iron	mg/L	9.62	<0.060	10.0	96.2	75 - 125	W038027	17-Sep-10	
EPA 6010B	Lead	mg/L	0.975	<0.0075	1.00	96.9	75 - 125	W038027	17-Sep-10	
EPA 6010B	Manganese	mg/L	1.07	0.105	1.00	96.9	75 - 125	W038027	17-Sep-10	
EPA 6010B	Selenium	mg/L	1.18	0.061	1.00	112	75 - 125	W038027	17-Sep-10	
EPA 6010B	Silver	mg/L	0.0370	<0.0050	0.0500	73.9	75 - 125	W038027	17-Sep-10	M2
EPA 6010B	Zinc	mg/L	1.02	0.0287	1.00	99.3	75 - 125	W038027	17-Sep-10	
EPA 7470A	Mercury	mg/L	0.00095	<0.00020	0.00100	95.0	75 - 125	W038131	14-Sep-10	



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	mg/L	0.00095	0.00102	0.00100	7.1	20	W038132	14-Sep-10	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	mg/kg	54.5	47.3	100	14.2	20	W039156	22-Sep-10	
EPA 6010B	Arsenic	mg/kg	137	130	100	4.8	20	W039156	22-Sep-10	
EPA 6010B	Barium	mg/kg	441	397	100	10.5	20	W039156	22-Sep-10	
EPA 6010B	Cadmium	mg/kg	86.4	88.4	100	2.4	20	W039156	22-Sep-10	
EPA 6010B	Chromium	mg/kg	120	120	100	0.2	20	W039156	22-Sep-10	
EPA 6010B	Copper	mg/kg	8240	8090	100	1.9	20	W039156	23-Sep-10	D2
EPA 6010B	Iron	mg/kg	57000	53000	1000	7.3	20	W039156	22-Sep-10	
EPA 6010B	Lead	mg/kg	2930	113	100	185.0	20	W039156	22-Sep-10	R1
EPA 6010B	Manganese	mg/kg	1990	2000	100	0.4	20	W039156	22-Sep-10	
EPA 6010B	Selenium	mg/kg	97.4	95.0	100	2.6	20	W039156	22-Sep-10	
EPA 6010B	Silver	mg/kg	15.6	12.3	5.00	23.4	20	W039156	22-Sep-10	R1
EPA 6010B	Zinc	mg/kg	225	227	100	1.1	20	W039156	22-Sep-10	
EPA 7471A	Mercury	mg/kg	0.137	0.142	0.167	3.6	20	W037115	16-Sep-10	
Metals (Total Recoverable)										
EPA 6010B	Antimony	mg/L	1.01	1.02	1.00	0.8	20	W038031	20-Sep-10	
EPA 6010B	Arsenic	mg/L	0.982	0.986	1.00	0.4	20	W038031	20-Sep-10	
EPA 6010B	Barium	mg/L	1.15	1.17	1.00	2.0	20	W038031	20-Sep-10	
EPA 6010B	Cadmium	mg/L	1.02	1.03	1.00	1.4	20	W038031	20-Sep-10	
EPA 6010B	Chromium	mg/L	1.01	1.03	1.00	1.9	20	W038031	20-Sep-10	
EPA 6010B	Copper	mg/L	0.962	0.990	1.00	2.9	20	W038031	20-Sep-10	
EPA 6010B	Iron	mg/L	9.84	9.91	10.0	0.7	20	W038031	20-Sep-10	
EPA 6010B	Lead	mg/L	1.01	1.02	1.00	1.6	20	W038031	20-Sep-10	
EPA 6010B	Manganese	mg/L	1.03	1.03	1.00	0.5	20	W038031	20-Sep-10	
EPA 6010B	Selenium	mg/L	1.03	1.04	1.00	1.6	20	W038031	20-Sep-10	
EPA 6010B	Silver	mg/L	0.0530	0.0538	0.0500	1.6	20	W038031	20-Sep-10	
EPA 6010B	Zinc	mg/L	0.966	0.987	1.00	2.1	20	W038031	20-Sep-10	
Metals (Dissolved)										
EPA 6010B	Antimony	mg/L	1.10	1.14	1.00	3.1	20	W038027	17-Sep-10	
EPA 6010B	Arsenic	mg/L	1.02	1.05	1.00	3.3	20	W038027	17-Sep-10	
EPA 6010B	Barium	mg/L	1.07	1.10	1.00	2.3	20	W038027	17-Sep-10	
EPA 6010B	Cadmium	mg/L	0.972	1.01	1.00	3.5	20	W038027	17-Sep-10	
EPA 6010B	Chromium	mg/L	0.979	1.00	1.00	2.6	20	W038027	17-Sep-10	
EPA 6010B	Copper	mg/L	1.40	1.44	1.00	2.6	20	W038027	17-Sep-10	
EPA 6010B	Iron	mg/L	9.60	9.62	10.0	0.2	20	W038027	17-Sep-10	
EPA 6010B	Lead	mg/L	0.955	0.975	1.00	2.1	20	W038027	17-Sep-10	
EPA 6010B	Manganese	mg/L	1.07	1.07	1.00	0.4	20	W038027	17-Sep-10	
EPA 6010B	Selenium	mg/L	1.13	1.18	1.00	4.2	20	W038027	17-Sep-10	
EPA 6010B	Silver	mg/L	0.0354	0.0370	0.0500	4.2	20	W038027	17-Sep-10	
EPA 6010B	Zinc	mg/L	1.00	1.02	1.00	1.7	20	W038027	17-Sep-10	
EPA 7470A	Mercury	mg/L	0.00099	0.00095	0.00100	4.1	20	W038131	14-Sep-10	



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W010166**
Reported: 23-Sep-10 15:06

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	mg/kg	93.6	3.4	100	90.2	75 - 125	W039156	22-Sep-10	
EPA 6010B	Barium	mg/kg	404	324	100	79.8	75 - 125	W039156	22-Sep-10	
EPA 6010B	Lead	mg/kg	151	69.0	100	82.5	75 - 125	W039156	22-Sep-10	
EPA 6010B	Zinc	mg/kg	251	168	100	82.6	75 - 125	W039156	22-Sep-10	
Metals (Dissolved)										
EPA 6010B	Silver	mg/L	0.0262	<0.0050	0.0500	52.3	75 - 125	W038027	17-Sep-10	M2

Notes and Definitions

- D2 Sample required dilution due to high concentration of target analyte.
- M2 Matrix spike recovery was low, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- R1 RPD exceeded the method acceptance limit.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable