SWMU 1 - Tailing Basin & Water Recirculation System

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5.5.1 SWMU 1 - Tailing Basin & Water Recirculation System

The tailing basin was constructed to receive and manage the process waters, cooling water, and storm water from the Plant area. The tailing basin allowed suspended solids in the water to settle out, so the water could be re-circulated and re-used in Plant processes. The tailing basin was designed and operated as a "closed-loop" system, with no discharge to other surface waters.

The tailing basin is located in the center of the Silver Bow Plant. The location of Solid Waste Management Unit (SWMU) 1 is shown on Figure 5.5.1-1a and SWMU 1 monitoring stations and sample locations are provided on Figure 5.5.1-1b. The elemental phosphorus production area and the coarse slag pile are located to the east of the tailing basin. The Natural Area is located along the north, south and west sides of the tailing basin. The beaver ponds are also located north of the tailing basin.

The tailing basin covers approximately 119 acres and was created by constructing dikes in the original Sheep Gulch valley. Several photographs of the dike construction have been found (Appendix 5.5.1-A). These photographs are dated September and October 1954, and show the construction methods which included transporting borrow to the construction area (trucks and scrapers), placing the borrow soils with bulldozers, and appropriate soils compaction equipment for construction of a water containment dike. One photo also shows a water truck spraying water on the work area, which suppresses dust and adjusts moisture to optimize compaction and minimize permeability of the borrow soils. The photos also indicate that the borrow soils were obtained from an area within the current footprint of the tailing basin.

Tailing are the suspended solids that settled out in the tailing basin. Their primary source was initially the ore washing operations. This clayey material is believed to have formed a low permeability layer at the base of the tailing basin, particularly in the northern portions. Subsequently, the tailing was predominantly solids removed by the wet scrubber systems that provided air pollution control on the kilns and furnaces. The extent of tailing is known based on the design drawings of the tailing basin and location of the containment dikes. The tailing basin contains approximately 1.5 million cubic yards of tailing.

5.5.1.1 Discharges to the Tailing Basin

In the early years of the Plant, the Montana ore was washed to remove fine-grained materials. The wash water containing the entrained clays and silts was discharged to the tailing basin. These fine-grained materials would be found at the base of the tailing basin, predominantly in the northern

portion of the basin. When the Plant began using Idaho ore, the ore-washing plant was no longer needed.

In the 1970s, Plant air emissions control systems were expanded, and the water associated with those systems was recirculated through the tailing basin, as described in more detail under the Kiln #1 and #2 paragraph below. Rhodia believes the majority of the tailing in the basin is particulate matter (and dirt) removed by the Plant scrubbing systems and the old ore-washing plant.

There were three conveyance systems that delivered water to the tailing basin. The Plant water discharge trough carried the #3 Catch Basin stream, the 100 ft Clarifier overflow stream, and air scrubbing systems discharges. The #3 Catch Basin stream and the 100 ft Clarifier overflow stream discharged to the trough by way of underground pipes. The Plant water discharge trough (called "Launder") was an aboveground system located southwest of the kiln scrubbers, which delivered water to the north portion of the tailing basin. This trough was constructed of fiberglass and had a semi-circular cross section, which was approximately 4 feet in diameter. Individual sections, approximately 8 feet in length, were supported by a steel frame. These sections were bolted together and placed on the ground at the correct elevation to allow gravity flow to the tailing basin. The frame deteriorated in places allowing leakage into the surrounding soil.

The #3 Catch Basin stream contained recycled tailing basin water used for cooling the slag pits, recycled tailing basin water used in the Plant cooling water system, well water, and boiler blow-down water. The #3 Catch Basin was also the back-up system when the regular systems were not capable of handling process water from the roaster feed tank system, process water from the elemental phosphorus (P4) sump, recycled tailing basin water from the slag granulation system, and flow from the 100 foot (ft) clarifier. The #3 Catch Basin water was pumped to the Plant water discharge trough through an overhead pipe that has been removed, then an underground pipe that discharged to the tailing basin.

The 100 ft Clarifier was designed with an outlet weir (a section of wall that was lower than the rest of the wall) to allow water at the surface to discharge to a steel trough which fed into the clarifier sump. This type of outlet discharges by overflowing across the weir that sets the water level, and is good for maintaining a relatively quiescent pool where solids can settle out. During Plant operations, this stream was referred to as the clarifier overflow stream, and that language has been maintained here. From the clarifier sump, the 100 ft Clarifier overflow stream would be pumped to the Plant water discharge trough through an underground pipe leading to the tailing basin. The stream consisted of

process water from the P4 sump (which served the P4 Handling Area and Furnace Condenser Area) and process tanks. The streams from these areas were from P4 sump flows (which would be phossy water), from process tanks (including solids from the P4 filtering processes), water from the hot water tank, and non-contact water from the jacketed water line systems.

The Kiln Feed Building Moat stream was the water from a concrete moat located between the Kiln Building and the Kiln Feed Building. This stream consisted of recycled tailing basin water and fresh well water used in the Kiln Feed Building for washing down material transfer points and equipment. This stream contained kiln material handling water, and would not have contained phossy water. The solids in the Moat stream were mostly fine ore, coke, and silica dust. The stream was transferred to the tailing basin by pumping through overhead pipes to the Plant water discharge trough. On those occasions when the Moat Stream pumps were down, the flow from the Moat drained into the storm water drain system, which was pumped to the tailing basin by the Final Pump Station.

The #1 and #2 Kiln Scrubber streams were recycled tailing basin water used in the air pollution control scrubbers for the kiln emissions and other air scrubbing systems. The water used in the kiln scrubber systems carried away the dust and gaseous emissions scrubbed from the emissions from the kilns. The streams from the #1 and #2 Kiln scrubbers discharged directly to the Plant water discharge trough. The performance of the original kiln scrubbers was enhanced in 1971 when Rhodia increased the water flow through the scrubbers by using recycled tailing basin water rather than well water which was in limited supply. Secondary scrubbers were added in 1976, which removed additional particulates (dirt). A 1993 upgrade increased the particulate removal effectiveness and improved emissions opacity control. The scrubbers have always discharged to the tailing basin, though in the early years the water passed through a kiln scrubber clarifier en route to the tailing basin. The tailing basin was expanded in the 1970s for the purpose of accommodating the scrubber water and associated solids. Rhodia believes the majority of the tailing in the basin is particulate matter (dirt) removed by the Plant scrubbing systems and the old ore-washing plant.

The Lime Treatment stream was water from the tailing basin to which lime had been added. The system was used to regulate the pH levels in the tailing basin. The Lime Treatment stream water was added via an aboveground pipe into the Plant water discharge trough, which discharged to the tailing basin.

A second conveyance was the Hazelton Line, which carried the large flows from the slag granulation process. The Hazelton Line pumped tailing basin water used in the slag granulation system back to

the tailing basin through a large (24") underground pipe. The Hazelton Line water likely carried some granulated slag, but did not normally include phossy water. Some of the #3 Catch Basin streams, which did include phossy water, were pumped to the tailing basin through the Hazelton Line when the normal #3 Catch Basin discharge was not available.

The third conveyance was the Final Pump Station, which discharged to the tailing basin through a buried pipe. Before the facility was demolished, the normal stream consisted of storm water runoff, overflow water from the slag pits (recycled tailing basin water), and water from various drains and applications where well water could overflow. Other flows that were handled by the Final Pump Station when the normal systems were not available were overflow water from the Kiln Feed Building Moat, overflows from the kiln dust collector scrubbers (recycled tailing basin water) Plant cooling water system overflows, and overflows from the #3 Catch Basin. The Final Pump Station became operational in 1975, and was equipped with a portable generator so that it could be kept functional even when other systems had no power.

Currently, the Final Pump Station stream consists of storm water runoff, well water discharges from periodic flushing of facility fire hydrants, and a small well water discharge from the shop building.

5.5.1.2 Tailing Basin Water Quality

Rhodia prepared the Tailings Pond and Groundwater Review report and submitted the document to the Montana Department of Environmental Quality (MDEQ) on November 8, 1996 (*see* Appendix 5.5.1-B). The report provided a description and history of the Silver Bow Plant tailings basin and a summary of available groundwater data. The Silver Bow Plant recirculated approximately 10,000 gallons per minute (gpm) of water through the tailing basin. The water flow rate and water quality data from that report are summarized in Table 5.5.1-1. The tailing basin water contained elevated concentrations of arsenic, barium, cadmium, chromium, lead, and selenium. The #1 and #2 Kiln scrubber water stream contained elevated concentrations of fluoride.

During 1992 and 1993, nine samples of tailing basin water were analyzed for Toxicity Characterization Leaching Procedure (TCLP) metals by Method 1311. The analytical data are summarized in Table 5.5.1-2 (Barr, 2006).

The water quality in the tailing basin improved markedly after the cessation of the furnace operations in 1995 and the roaster operations in March 1997. Table 5.5.1-3 is a summary of tailing basin water quality over time for key parameters. The table shows a dramatic reduction for all the Table 5.5.1-3 parameters by October 1998. Arsenic, for instance, dropped from 0.5 mg/L during operations to

0.009 mg/L in October 1998. Cadmium dropped from 6.0 mg/L during operations to 0.004 mg/L in October 1998. After 1998, the tailing basin has been dewatering naturally due to evaporation and seepage. By fall 2003, there was no surface water remaining in the tailing basin, other than infrequent rainwater puddles. Thus, the end of Plant operations has removed the source of the highest concentrations available to migrate from the tailing basin to the groundwater. The remaining potential source to groundwater, leaching from tailing and soil to infiltrating water, is of much lower concentration and flow rate and therefore would not be expected to produce or sustain the groundwater concentrations reported near the tailing basin.

5.5.1.3 Investigation Activities

Prior to 2000, Rhodia had developed the following tailing analytical dataset.

- TCLP metals
- ASTM D3897 water leach
- Total metals and fluoride

The United States Environmental Protection Agency (EPA) collected five samples of the dry tailing from the upper two inches below the dust-suppressant-treated surface of the tailing basin in 2003. These samples were analyzed for general and site-specific parameters, metals, and radionuclides. The data for these samples are presented in Section 5.5.1.4.

The objectives of the Resource Conservation and Recovery Act (RCRA) Facility Investigation Report (RFI) for SWMU 1 were: 1) further characterize the tailing material in the tailing basin, 2) evaluate hazardous constituents in the soil beneath the tailing basin, and 3) investigate whether hazardous constituents have been deposited around the tailing basin.

Three rounds of investigation activities were conducted at the tailing basin and water recirculation system. The first round, in 2006, involved installation of monitoring wells and the collection of the 0-1 ft and 8-10 ft intervals of native soil where encountered. The second round, in 2008, included soil boring within the tailing basin to further characterize the tailing and native soil beneath the tailing basin. The third round, in 2009, included shallow soil samples to further characterize surface soil around the tailing basin.

2006 Investigation Activities

In 2006, three soil borings (MW-06-9, MW-06-21, and MW-06-22) were advanced through the tailing material to collect underlying native soil samples at the locations shown on Figure 5.5.1-1b.

Native soil samples were collected from the 0- to 1-ft and 8- to 10-ft interval at each location and were analyzed for fluoride, total phosphorus, elemental phosphorus, metals, SVOCs, VOCs, and radionuclides.

2008 Investigation Activities

Six borings were installed within the tailing basin at the locations shown on Figure 5.5.1-1b during December 2008. The borings (SB-08-1 through SB-08-6) are located on existing slag-covered portions of the tailing basin, which provided access for the drilling equipment. The boring logs are provided in Appendix 5.5.1-C.

Samples were collected continuously to ten feet into the underlying native soil. Standard penetration tests and split-barrel sampling of soils were performed according to ASTM D-1586 Standard Methods for Penetration Test and Split-Barrel Sampling of Soils. However, a 3-inch diameter split-barrel sampler was used at a few intervals in order to collect additional sample volume for laboratory analysis.

Analytical samples of tailing were collected from the split-barrel sampler to represent the upper, middle, and lower third of the tailing. Soil samples were also collected at two intervals beneath the tailing (i.e., 0 to 1-foot below native and 8 to 10 ft below native). Tailing and native soil samples were analyzed for elemental phosphorus, metals, and radionuclides. These samples were collected in accordance with the Standard Operating Procedures (SOPs) for Soil Sample Collection provided in the Field Sampling Plan of the Final Phase 1 RFI Work Plan (Barr 2009). As provided in the Quality Assurance Project Plan (QAPP), certain tailing samples were placed in decontaminated bowls and allowed to oxidize until the tailing no longer smoked. The tailing was stirred and allowed to sit for five minutes. When no smoke was observed over this time period, the tailing was placed in the appropriate sample containers for metals and radionuclide analysis. These samples were not analyzed for elemental phosphorus.

2009 Investigation Activities

Soil samples were collected at twenty-five stations (TBWRS-1 through TBWRS-25) located approximately 300 feet from the toe of the tailing basin dike and forming a halo around the tailing basin (*see* Figure 5.5.1-1b). Stations TBWRS-10, TBWRS-11, and TBWRS-16 were moved from the west side of Sheep Gulch to a location between the tailing basin dike and Sheep Gulch. In accordance with the approved Final Phase I Work Plan (Barr 2009), the soil samples were collected from areas that were not covered by slag. This was discussed during the August 2008 meeting with the EPA and Montana DEQ project managers. It was agreed that the purpose of the soil sampling was to evaluate

the impact of potential releases from the tailing basin to surface soil quality and not the impact of slag on soil quality.

Discrete soil samples from the 0- to 2-inch and 2- to 12-inch below ground surface (bgs) interval were collected from each sample location using techniques specified in the Field Sampling Plan of the RFI Work Plan. The 0- to 2-inch samples were collected using a 4-inch diameter stainless steel hand auger to obtain sufficient volume for sample analysis. The subsequent sample interval of 2- to 12-inches was collected by advancing a 3-inch diameter stainless steel hand auger from the bottom of the annular space created by the 4-inch diameter auger. The 2- to 12-inch sample was collected by advancing the 3-inch hand auger until it was full (generally to a depth of 8-inches), carefully removing the hand auger and placing the soil into a stainless steel sampling bowl, then carefully reinserting the hand auger and collecting soil to the bottom depth of 12-inches. For each interval, upon placement of this soil into the stainless steel sample bowl, rocks and detritus were removed and the soil homogenized prior to placing the soil into the sampling containers as specified in the Field Sampling Plan.

The soil samples were analyzed for x-ray fluorescence (XRF) metals according to the XRF screening and confirmatory analytical protocols. Of these samples, four samples (TBWRS-1, TBWRS-11, TBWRS-13, and TBWRS-16) were submitted for laboratory analysis of the site-specific parameters, metals, and radionuclides. Soil samples were recollected from twelve locations reported to have one or more XRF metal concentration above the respective threshold level established by the 2006 XRF Pilot Program. These samples were analyzed for the specific metal that exceeded the respective XRF threshold level.

5.5.1.4 Investigation Results

This section discusses the characterization of the tailing and soils at the Tailing basin.

5.5.1.4.1 Tailing Stratigraphy

Areas of the tailing basin have been covered by slag. Slag materials encountered near the surface of the tailing basin are generally gray to bluish gray, gravel to sand with silt and gravel. Gravel pieces consist of fused slag with a vitreous and/or vesicular appearance. Slag was used as road bed cover in the tailing basin, and was the uppermost material encountered at the soil boring locations. Slag thickness varies at different locations; from 2 feet at locations SB-08-3 and SB-08-4 to 10 feet at location SB-08-2 (*see* Figure 5.5.1b). An interbed of slag material was observed underlying tailing at a depth of 6-8 feet bgs at boring location SB-08-3.

Tailing material is generally of two types: 1) homogeneous, very dark gray to black silty tailing with 10-20% sand; and 2) laminated, very dark gray, and brown clayey tailing. The first type, homogeneous, silty tailing commonly has tiny (<1 mm diameter) white flecks or occasional whitish, irregular-shape blebs. This tailing has a pungent or acrid odor. The second type, clayey, laminated tailing is very sticky, and does not give off an incidental odor or produce smoke.

The homogeneous, silty tailing generally overlies the clayey, laminated tailing, and varies in thickness from 1 foot at SB-08-6 to 14 ft at SB-08-3. The clayey, laminated tailing was not encountered at locations SB-08-1 and SB-08-2, and was less than 1 foot thick at location SB-08-6. The clayey, laminated tailing was 10, 30, and 35 ft thick at locations SB-08-3, SB-08-4, and SB-08-5, respectively. These observations are consistent with the history of the tailing basin.

Figure 5.5.1-2 shows the location of two conceptual cross sections and Figures 5.5.1-3 and 5.5.1-4 are cross sections through the tailing basin. Cross section A-A' is an east-west section through the middle of the tailing basin. Cross section A-A' shows thicker tailing deposits in the middle of the basin with about 15 ft of silty tailing overlying 30 ft of clayey laminated tailing. Cross section B-B' is a north-south section through the middle of the tailing basin and shows thicker tailing deposits at the north end of the basin with both types of tailing present. The south end of the basin contains a relatively thin deposit of the silty tailing.

5.5.1.4.2 Tailing and Underlying Soil Quality Evaluation

Tailing and the underlying soil has been sampled and analyzed for various parameters. The analytical results are presented in this section and in Tables 5.5.1-4 through 5.5.1-14 and are depicted spatially on Figures 5.5.1-5 through 5.5.1-56.

Constituent concentrations are described in this report as above background/reference area concentrations if the mean and maximum concentrations of the SWMU data exceed both of the mean and maximum background/reference area values. All data will be retained for evaluation in the human health and ecological risk assessments. The definitive background comparison will be conducted in the risk assessment using a statistical approach consistent with EPA guidance (U.S. EPA 2002).

General Parameters

The general parameters for tailing and soil samples are summarized in Tables 5.5.1-4 and 5.5.1-5, respectively. Sample locations are shown on Figure 5.5.1-1b. General parameters for tailing samples include fluoride, orthophosphate as P, elemental phosphorus (white) and total phosphorus. The

distribution of these general parameter constituents and their respective sample intervals for the tailing and soil samples are shown on Figures 5.5.1-5 and 5.5.1-6, respectively.

Fluoride is present in the tailing at higher concentrations compared to the underlying native soils as shown in the analytical data for samples T-99-1, T-99-2 and T-99-3 (*see* Tables 5.5.1-4 and 5.5.1-5). The fluoride concentration in the tailing is between 460 and 1,000 mg/kg where the fluoride concentration in the underlying native soil is between 8 mg/kg and 48 mg/kg. This is the only dataset where a valid comparison between the tailing and native soil fluoride concentrations can be made. The other data sets were analyzed using similar analytical methods, but different laboratories used different extraction methods resulting in datasets that are not comparable.

Elemental phosphorus was found in tailing samples from each of the 2008 borings (*see* Table 5.5.1-4). Tailing samples were observed in the field for signs of smoke or flame as an indication of elemental phosphorus. Any soil/tailing discoloration and/or incidental odors were also recorded. Observations and specific descriptions of the materials encountered in each boring are noted on the soil boring logs presented in Appendix 5.5.1-C. A summary of the observations and intervals from which analytical samples of the tailing and native soils were collected are presented in the table below. **Bold** indicates the sample was smoking or steaming. [1] *Italic* indicates a duplicate sample was collected from the interval. The 17.5-18.5 ft sample was homogenized material from the tip of the sampler from the 16-18 ft and 18-20 ft samples. It is yellowish-brown clay soil, although the bulk of the sample in the 18-20 ft sample was very dark gray tailing.

2008 SWMU 1 Tailing Basin Borings

Soil Boring ID	Total Depth (ft bgs)	Depth to Tailing (ft bgs)	Depth to Native Soil (ft bgs)	Analytical Soil Sample Intervals (ft bgs)	
				Tailing	Native Soil
SB-08-1	22	7	11	8-11	11-12 19-21
SB-08-2	28	10	20	*10-14*	17.5-18.5 * *26-28*
SB-08-3	52	2	42	2-6 **13-20** 28-32	42-43 50-52

[1] The observation of smoke was complicated by extremely cold (< -18°) conditions on December 16, during the drilling of SB-08-5. During this period, soil moisture within the samples began condensing instantly upon opening the split spoon (e.g. like seeing your breath on a cold day). Under these conditions, it was difficult to determine if the sample was emitting smoke or steam due to the moisture in the cold.

2008 SWMU 1 Tailing Basin Borings					
Soil Boring ID	Total Depth (ft bgs)	Depth to Tailing (ft bgs)	Depth to Native Soil (ft bgs)	Analytical Soil Sample Intervals (ft bgs)	
				Tailing	Native Soil
				36-40	
SB-08-4	52	2	40.5	6-12 18-24 32-38	40.5-41.5 50-52
SB-08-5	56	3	46	**4-10** **16-22** **28-36** **42-44**	46-47 54-56
SB-08-6	22	9	12	9-12	12-13 20-22

Elemental phosphorus appears to be present to some degree horizontally and vertically throughout the tailing basin. The highest elemental phosphorus content was observed at SB-08-5 where the tailing may have been smoking so no analytical samples were collected. SB-08-5 is located near the end of the fiberglass launder that conveyed the process water into the tailing basin. This location would be expected to accumulate the most elemental phosphorus as the solids in the tailing began to settle from the process water stream. Elemental phosphorus was not detected in the native soil samples collected at SB-08-5.

Elemental phosphorus was detected in the native soil samples collected at MW-06-21 and SB-08-6. These borings are located in the same general area of the tailing basin as SB-08-5 and indicate the elemental phosphorus in the underlying soil is limited to the area near the fiberglass launder that conveyed the process water into the tailing basin.

The tailing contains about 5% total phosphorus and orthophosphate between 140 mg/kg and 1,900 mg/kg. Total phosphorus in the underlying native soil samples were consistent with phosphorus concentrations in typical Silver Bow County[2] soils with the exception of the top of native soil sample collected at MW-06-21, where total phosphorus was reported at 6,510 mg/kg. The concentration in the deeper sample from the same location was consistent with typical Silver Bow County soils.

[2] U.S. Department of the Interior, U.S. Geological Survey
This page is part of U.S. Geological Survey Open-File Report 2004-1001
URL: http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm
Maintained by Jeff Grossman

Tailing samples were analyzed by the ASTM D3987 Water Leach method. The analytical data is summarized in Table 5.5.1-15. The leachate contained fluoride concentrations above drinking water criteria.

Metals

Tailing sample analysis for metals parameters are summarized in Table 5.5.1-6. The metals data for soil samples are presented in Table 5.5.1-7.

Antimony is present in the tailing at concentrations above background soil concentrations. Antimony ranges from 6.5 mg/kg to 60.4 mg/kg with an average concentration of 20.5 mg/kg. Antimony concentrations in tailing and soil are shown on Figure 5.5.1-7 and 5.5.1-8, respectively. Antimony concentrations in soil are consistent with background concentrations.

Arsenic is present in the tailing at concentrations above background soil concentrations. Arsenic ranges from 27.6 mg/kg to 195 mg/kg with an average concentration of 85.3 mg/kg. Arsenic concentrations in tailing and soil are shown on Figure 5.5.1-9 and 5.5.1-10, respectively. Arsenic concentrations in soil are consistent with background concentrations. The arsenic distribution is shown in cross section on Figures 5.5.1-57 and 5.5.1-58. Arsenic is distributed throughout the tailing. The arsenic profile shows a much lower arsenic concentration in the native soil compared to the overlying tailing.

Barium is present in the tailing at concentrations above background soil concentrations. Barium ranges from 79.2 mg/kg to 383 mg/kg with an average concentration of 171.7 mg/kg. Barium concentrations in tailing and soil are shown on Figure 5.5.1-11 and 5.5.1-12, respectively. Barium concentrations in soil remain above background concentrations.

Beryllium is present in the tailing at concentrations above background soil concentrations. Beryllium ranges from 0.4 mg/kg to 2.6 mg/kg with an average concentration of 1.6 mg/kg. Beryllium concentrations in tailing and soil are shown on Figure 5.5.1-13 and 5.5.1-14, respectively. Beryllium concentrations in soil are consistent with background concentrations.

Cadmium is present in the tailing at concentrations above background soil concentrations. Cadmium ranges from 15.4 mg/kg to 1,470 mg/kg with an average concentration of 450 mg/kg. Cadmium concentrations in tailing and soil are shown on Figure 5.5.1-15 and 5.5.1-16, respectively. Cadmium concentrations in 0-1 foot native soil interval soil remain above background concentrations. However, cadmium concentrations are consistent with background in the 8-10 ft native soil interval.

The cadmium distribution is shown in cross section on Figures 5.5.1-59 and 5.5.1-60. Cadmium is distributed throughout the tailing. Higher concentrations are found in the silty tailing layer compared to the concentrations in the clayey laminated tailing layer. The cadmium profile shows a much lower cadmium concentration in the native soil compared to the overlying tailing.

Calcium is present in the tailing at concentrations above background soil concentrations. Calcium ranges from 5100 mg/kg to 246,000 mg/kg with an average concentration of 167,000 mg/kg. Calcium concentrations in tailing and soil are shown on Figure 5.5.1-17 and 5.5.1-18, respectively. Calcium concentrations in soil are two orders on magnitude lower than the tailing, but remain above background soil concentrations.

Chromium is present in the tailing at concentrations above background soil concentrations and the concentrations range from 10.3 mg/kg to 1360 mg/kg with an average concentration of 850 mg/kg. Chromium concentrations in tailing and soil are shown on Figure 5.5.1-19 and 5.5.1-20, respectively. Chromium concentrations in 0-1 foot native soil interval are higher than in the 8-10 ft interval, which are consistent with background concentrations.

Cobalt concentrations in tailing and soil are shown on Figure 5.5.1-21 and 5.5.1-22, respectively. Cobalt concentrations in the tailing and soil are consistent with background soil concentrations.

Copper concentrations in tailing and soil are shown on Figure 5.5.1-23 and 5.5.1-24, respectively. Copper concentrations in the tailing and soil are consistent with background soil concentrations.

Iron concentrations in tailing and soil are shown on Figure 5.5.1-25 and 5.5.1-26, respectively. Iron concentrations in the tailing and soil are consistent with background soil concentrations.

Lead is present in the tailing at concentrations above background soil concentrations. Lead ranges from 30.2 mg/kg to 451 mg/kg with an average concentration of 153 mg/kg. Lead concentrations in tailing and soil are shown on Figure 5.5.1-27 and 5.5.1-28, respectively. Lead concentrations in soil are consistent with background concentrations. The lead distribution is shown in cross section on Figures 5.5.1-61 and 5.5.1-62. Lead is distributed throughout the tailing. Higher concentrations are found in the silty tailing layer compared to the concentrations in the clayey laminated tailing layer. The lead profile shows a much lower lead concentration in the native soil compared to the overlying tailing.

Magnesium is present in the tailing at concentrations above background soil concentrations. Magnesium ranges from 2780 mg/kg to 14500 mg/kg with an average concentration of 6910 mg/kg.

Magnesium concentrations in tailing and soil are shown on Figure 5.5.1-29 and 5.5.1-30, respectively. Magnesium concentrations in soil remain above background soil concentrations. The magnesium distribution is shown in cross section on Figures 5.5.1-63 and 5.5.1-64. The magnesium profile shows increasing magnesium concentrations with depth in the tailing. The highest magnesium concentrations are found in the deepest tailing samples. As with the other metals, the magnesium concentration in the underlying native soil is considerably lower.

Manganese concentrations in tailing and soil are shown on Figure 5.5.1-31 and 5.5.1-32, respectively. Manganese concentrations in the tailing and soil are consistent with background soil concentrations.

Mercury is present in the tailing at concentrations above background soil concentrations. Mercury ranges from 0.3 mg/kg to 3.6 mg/kg with an average concentration of 1.4 mg/kg. Mercury concentrations in tailing and soil are shown on Figure 5.5.1-33 and 5.5.1-34, respectively. Mercury concentrations in soil are consistent with background concentrations.

Nickel is present in the tailing at concentrations above background soil concentrations. Nickel ranges from 5.3 mg/kg to 242 mg/kg with an average concentration of 130 mg/kg. Nickel concentrations in tailing and soil are shown on Figure 5.5.1-35 and 5.5.1-36, respectively. Nickel concentrations in soil are consistent with background concentrations.

Potassium is present in the tailing at concentrations above background soil concentrations. Potassium ranges from 2870 mg/kg to 11700 mg/kg with an average concentration of 7909 mg/kg. Potassium concentrations in tailing and soil are shown on Figure 5.5.1-37 and 5.5.1-38, respectively. Potassium concentrations in soil remain above background soil concentrations.

Selenium is present in the tailing at concentrations above background soil concentrations. Selenium ranges from 20.1mg/kg to 223 mg/kg with an average concentration of 77 mg/kg. Selenium concentrations in tailing and soil are shown on Figure 5.5.1-39 and 5.5.1-40, respectively. Selenium concentrations in soil remain above background concentrations. The higher concentrations are observed 0-1 ft native soil interval in the southern portion of the tailing basin. The concentrations for the 8-10 ft native soil intervals beneath these higher concentrations are lower and consistent with background soil concentrations. The selenium distribution is shown in cross section on Figures 5.5.1-65 and 5.5.1-66. Selenium is distributed throughout the tailing. The profile shows a much lower selenium concentration in the native soil compared to the overlying tailing.

Silver is present in the tailing at concentrations above background soil concentrations. Silver ranges from not detected at 0.8 mg/kg to 132 mg/kg with an average concentration of 31 mg/kg. Silver concentrations in tailing and soil are shown on Figure 5.5.1-41 and 5.5.1-42, respectively. Silver concentrations in soil are consistent with background soil concentrations.

Sodium is present in the tailing at concentrations above background soil concentrations. Sodium ranges from 130 mg/kg to 4760 mg/kg with an average concentration of 1780 mg/kg. Sodium concentrations in tailing and soil are shown on Figure 5.5.1-43 and 5.5.1-44, respectively. Sodium concentrations in soil are lower, but remain above background soil concentrations.

Thallium is present in the tailing at concentrations above background soil concentrations. Thallium ranges from 2.5 mg/kg to 33.1 mg/kg with an average concentration of 14.2 mg/kg. Thallium concentrations in tailing and soil are shown on Figure 5.5.1-45 and 5.5.1-46, respectively. Thallium concentrations in soil are lower, but remain above background soil concentrations. The thallium distribution is shown in cross section on Figures 5.5.1-67 and 5.5.1-68. Higher concentrations of thallium are found in the silty tailing layer.

Uranium is present in the tailing at concentrations above background soil concentrations. Uranium ranges from not detected at 27 mg/kg to 104 mg/kg with an average concentration of 57 mg/kg. Uranium concentrations in tailing and soil are shown on Figure 5.5.1-47 and 5.5.1-48, respectively. Uranium concentrations in soil are lower and generally consistent with background soil concentrations.

Vanadium is present in the tailing at concentrations above background soil concentrations. Vanadium ranges from not detected at 42.5 mg/kg to 1340 mg/kg with an average concentration of 804 mg/kg. Vanadium concentrations in tailing and soil are shown on Figure 5.5.1-49 and 5.5.1-50, respectively. Vanadium concentrations in soil are lower and generally consistent with background soil concentrations.

Zinc is present in the tailing at concentrations above background soil concentrations. Zinc ranges from not detected at 80.4 mg/kg to 6940 mg/kg with an average concentration of 2815 mg/kg. Zinc concentrations in tailing and soil are shown on Figures 5.5.1-51 and 5.5.1-52, respectively. Zinc concentrations in soil are lower and generally consistent with background soil concentrations.

Metals Delineation Summary

Tailing was derived from the initial ore washing operations or the particulate matter removed by the Plant air emission control (i.e., scrubbing) systems. As such, the tailing contains elevated concentrations of most metals. Cobalt, copper, iron, manganese concentrations were consistent with background concentrations. The metals concentrations in the tailing are generally higher than the concentrations reported for the soil samples from beneath the tailing basin. The metals concentrations in soils below the tailing basin may have been influenced by water infiltration. TCLP metals analysis of the tailing is summarized in Table 5.5.1-2. Tailing samples were also analyzed by the ASTM D3987 Water Leach method. The analytical data is summarized in Table 5.5.1-15 and indicates that antimony, arsenic, cadmium, manganese and nickel could leach from the tailing at concentrations above drinking water criteria.

SVOCs

Although SVOC compounds are ubiquitous in the environment (e.g. from forest fires), Montana has not published background concentrations. For the purposes of this SWMU evaluation, background is considered below detection limits. Accordingly, the SVOCs detected in the SWMU samples are considered above background. The SVOC constituents not detected in SWMU 1 samples are not discussed.

The SVOC data for soil are presented in Table 5.5.1-8. Tailing samples were not analyzed for SVOCs. One surface soil sample (SO-EPA-5) was collected by EPA in 1988 and submitted for SVOC analysis. No SVOC compounds were detected in this sample.

Seven soil samples from below the tailing (including one field duplicate sample) were collected from the 0-1 and 8-10 ft sample intervals of native soil from MW-06-9, MW-06-21, and MW-06-22 and submitted for laboratory analysis of SVOCs. Bis(2-ethylhexyl)phthalate is the only SVOC compound that was reported by the laboratory. This SVOC compound is a commonly found in plastics and is a common laboratory contaminant. The concentrations of bis(2-ethylhexyl)phthalate were from the 0-1 and 8-10 ft native soil sample intervals (MW-06-22, 5-6 ft and MW-06-22, 13-15 ft) collected from MW-06-22 and were reported as 0.51 mg/kg and 0.47 mg/kg respectively.

Bis(2-ethylhexyl)phthalate is a common lab contaminant and is not associated with the Silver Bow Plant.

VOCs

The VOC data for soil is presented in Table 5.5.1-9. Three soil samples from below the tailing basin were collected from the 8-10 ft interval from MW-06-9, MW-06-21, and MW-06-22 and submitted for VOC analysis. No VOC compounds were detected in these samples.

Radionuclides

Radionuclide data for the tailing and soil samples are summarized in Tables 5.5.1-10 and 5.5.1-11, respectively. The distribution of radionuclide constituents in the tailing are shown on Figures 5.5.1-53 and 5.5.1-55. Distribution of the radionuclide constituents in the soil samples are shown on Figures 5.5.1-54 and 5.5.1-56.

Tailing samples have radionuclide concentrations above background/reference area concentrations. The radionuclide constituents were reported in tailing samples at concentrations generally an order of magnitude above the underlying native soil concentrations. Tailing radionuclide concentrations of lead-210 ranged from 7.7 to 220 pCi/g. Radium-226 concentrations ranged from 8.7 to 27 pCi/g and thorium-230 ranged from 8.6 to 32 pCi/g. Uranium isotopes U-234, U-235 and U-238 ranged from 8.4 to 26 pCi/g; 0.49 to 3.1 pCi/g; and 7.93 to 31.9 pCi/g, respectively.

Soil from beneath the tailing basin typically has radionuclide concentrations an order of magnitude lower than the tailing radionuclide concentrations. Given the difference in concentrations between the tailing and the soil, it does not appear that the presence of the tailing has much of an effect on the soil concentrations of radionuclides such as Pb-210. The radionuclide concentrations in soils beneath the tailing basin are generally consistent with background.

Tailing samples analyzed using the ASTM water leach (ASTM D3987) procedure indicates that radionuclides do not leach at concentrations above drinking water criteria (*see* Table 5.5.1-15)

Radionuclides Delineation

Tailing contains elevated concentrations of radionuclides associated with U-238 and its decay chain products. Radionuclide concentrations in soil beneath the tailing are consistent with background concentrations except for the top of native soil sample at MW-06-21. U-238, U-234, and Th-230 concentrations exceeded the maximum background concentration; the radionuclide concentrations were consistent with background in the deep interval from this boring.

5.5.1.4.3 Surface Soil Quality Evaluation

Soil samples were collected at twenty five stations (TBWRS-1 through TBWRS-25) located approximately 300 ft from the toe of the tailing basin dike and forming a halo around the tailing

basin (*see* Figure 5.5.1-1b). The analytical laboratory and correlated XRF data for the soil samples were combined to assist the delineation of the hazardous constituents.

The general and site-specific parameters are summarized in Table 5.5.1-12. Fluoride concentrations are consistent with background concentrations. Elemental phosphorus was not detected in the surface soil samples. Total phosphorus concentrations were above typical concentrations in Silver Bow County soils.

The metals data for soil are presented in Tables 5.5.1-13. As detailed below, certain metals are present at concentrations above the background concentrations. A risk assessment will be necessary to evaluate which parameters, if any, are present at concentrations that warrant corrective measures. The dataset would be reviewed at that time and additional sampling may be necessary to inform the corrective measures study or later during the corrective measures design phase.

The metals have been segregated into groups to aid the discussion. The metals included in Group A are arsenic, cadmium, chromium, and copper. The spatial distributions of these metals are shown on Figures 5.5.1-10, 5.5.1-16, 5.5.1-20 and 5.5.1-24, respectively. The Group A metals are above background concentrations for arsenic, cadmium, chromium and copper. The 0-2 inch interval samples generally had higher concentrations compared to the 2-12 inch interval. The concentrations in the 2-12 inch intervals samples are consistent with background/reference area concentrations. The higher arsenic concentrations are found in samples collected south and west of the tailing basin, while higher cadmium and chromium concentrations were found in samples north and east of the tailing basin.

The metals included in Group B are iron, lead, manganese, and nickel. The spatial distributions of these metals are shown on Figures 5.5.1-26, 5.5.1-28, 5.5.1-32 and 5.5.1-36, respectively. Group B metals concentrations are consistent with background soil concentrations.

The metals included in Group C are selenium, silver, uranium, and vanadium. The spatial distributions of these metals are shown on Figures 5.5.1-40, 5.5.1-42, 5.5.1-48 and 5.5.1-50, respectively. Selenium was detected at one location (TBWRS-1). The concentration was above the maximum background concentration. Selenium was not detected in the other samples, but the detection limit was higher than the background concentration. Silver concentrations are consistent with background. Uranium and vanadium have concentrations above the maximum background concentrations. The 0-2 inch interval samples generally had higher concentrations compared to the 2-

12 inch interval. The concentrations in the 2-12 inch intervals samples consistent with background/reference area concentrations.

The metals included in Group D are barium, beryllium, cobalt, mercury, and thallium. The spatial distributions of these metals are shown on Figures 5.5.1-12, 5.5.1-14, 5.5.1-22, 5.5.1-34 and 5.5.1-46, respectively. Barium, beryllium, cobalt, and mercury concentrations are consistent with background concentrations. One sample (TBWRS-1) exceeded the maximum background concentration for thallium.

The metals included in Group E are calcium, magnesium, potassium, and sodium. The spatial distributions of these metals are shown on Figures 5.5.1-18, 5.5.1-30, 5.5.1-38 and 5.5.1-44, respectively. One sample (TBWRS-1) exceeded the maximum background concentration for calcium. Magnesium, potassium, and sodium are consistent with background concentrations.

Several metals were found at concentrations above background concentrations. Higher concentrations of arsenic were found in the 0-2 inch samples from west and south of the tailing basin. The arsenic concentrations were lower and consistent with background in the 2-12 inch samples from the same locations. Cadmium, chromium, selenium, and vanadium had a similar concentration trend (i.e., lower concentrations in the 2-12 inch samples). A risk assessment will be necessary to evaluate which parameters, if any, are present at concentrations that warrant corrective measures. The dataset would be reviewed at that time and additional sampling may be necessary to inform the corrective measures study or later during the corrective measures design phase.

The highest concentrations of Ra-226 and U-238 were reported from the soil samples collected from the 0-2 inch sample interval at location TBRWS-1 and TBRWS-11 (*see* Table 5.5.1-14). Based on the sample locations, the higher Ra-226 concentrations were most likely due to trace amounts of slag material since the slag aggregate was used to extend the dikes of the tailing basin and construct roads in and around the tailing basin. In addition, Pb-210 was not detected in the soil samples from around the tailing basin and water recirculation area, whereas Pb-210 was found in tailing samples. Consequently, deposition of wind-blown tailing is not a likely source of the radionuclide constituents reported in the TBWRS-1 and TBWRS-16. The spatial distributions of radionuclides are shown on Figures 5.5.1-54 and 5.5.1-56.

5.5.1.5 Groundwater Quality Evaluation

The tailing basin was constructed to receive and manage the process waters, cooling water, and storm water from the Plant area. The tailing basin allowed suspended solids in the water to settle out, so the

water could be re-circulated and re-used in Plant processes. Water streams discharged to the tailing basin contained elevated concentrations of arsenic, barium, cadmium, chromium, lead, and selenium (*see* Table 5.5.1-1). The #1 and #2 Kiln scrubber water stream contained elevated concentrations of fluoride. The water quality in the tailing basin improved markedly after the cessation of the furnace operations in 1995 and the roaster operations in March 1997. Table 5.5.1-3 is a summary of tailing basin water quality over time for key parameters. The table shows a dramatic reduction for all the Table 5.5.1-3 parameters by October 1998. Arsenic, for instance, dropped from 0.5 mg/L during operations to 0.009 mg/L in October 1998. Cadmium dropped from 6.0 mg/L during operations to 0.004 mg/L in October 1998. After 1998, the tailing basin has been dewatering naturally due to evaporation and seepage. By fall 2003, there was no surface water remaining in the tailing basin, other than infrequent rainwater puddles. Thus, the end of Plant operations has removed the source of the highest concentrations available to migrate from the tailing basin to the groundwater. The remaining potential source to groundwater, leaching from tailing and soil to infiltrating water, is of much lower concentration and flow rate, and would not be expected to produce or sustain the groundwater concentrations reported near the tailing basin.

The conceptual hydrological model presented in Section 3.2.4 describes how leakage from the tailing basin affected the surrounding groundwater. Figure 5.5.1-69 presents a conceptual cross-section for conditions during Plant operations. While the Plant was in operation, groundwater from upgradient of the Site would pass around or under the tailing basin or would be captured by the production wells. The tailing basin water level was maintained by the closed-loop water recycle system from Plant operations. Troughs and open ditches carried process water from the Plant to the tailing basin and from the tailing basin back to the Plant. Due to the low hydraulic conductivity of the tailing, the primary source of process water lost to seepage was likely through these ditches. Groundwater and any seepage from the tailing basin and process water ditches not captured by the production wells would flow generally northward, discharging to Silver Bow Creek directly or via Sheep Gulch. The groundwater discharge to the beaver pond area during Plant operations would likely be a combination of groundwater and infiltrated tailing basin water.

Figure 5.5.1-70 illustrates a cross-section of the conceptual model of the conditions after shutdown activities at the Silver Bow Plant. The basic Site groundwater flow system is unchanged from that during Plant operations with the following exceptions: there is no longer ponded water in the tailing basin and the Rhodia production wells are no longer operating. The seepage rate from the tailing basin is limited by the low hydraulic conductivity of the tailing, and the higher permeability deposits associated with the former Sheep Gulch channel form the likely primary pathway for seepage to

leave the basin. Without the downward vertical gradients induced by pumping at the deep production wells, there is no longer a mechanism for shallow groundwater in the area of the Plant and tailing basin to be pulled down into deeper strata. The regional groundwater discharge zone remains Silver Bow Creek, with the beaver pond and Sheep Gulch north of the beaver pond receiving some of the shallow groundwater as well. Some of the contribution from the tailing basin flows into gaining reaches of Sheep Gulch, while in losing reaches of Sheep Gulch surface water discharges to groundwater.

Groundwater quality investigations and results are presented in Section 5.3, which identifies the tailing basin as the source of the constituents in the groundwater downgradient of the tailing basin and water return channels. Conclusions developed in Section 5.3 are restated here for convenience.

Process water infiltrating from the TBWR (tailings basin and water recirculation) *areas is the predominant source of hazardous constituents to the groundwater at the Site, as illustrated by the geographic distribution of water quality shown on the isoconcentration contour maps (Figure 5.3-42a through 5.3-42w). …*

The following conclusions are supported by the existing groundwater quality data set regarding TBWR-sourced constituents:

- *Sulfate behaves as a mobile dissolved species, and has migrated toward the production wells and in the general direction of groundwater flow. This constituent is considered a good indicator of process water impacts, except near Silver Bow Creek where SSTOU* (Streamside Tailings Operable Unit) *influences must be accounted for, and has migrated as far as 1,500 feet from the TBWR areas or into deeper groundwater (i.e. at RP-W-6, and MW-06-12). Concentrations of this constituent are presently decreasing in groundwater.*
- *Arsenic, fluoride, cadmium, cobalt, and manganese are moderately mobile and have migrated to a limited extent (generally less than 1,000 feet). These constituents can be indicators of process water (though naturally occurring fluoride and arsenic can complicate interpretation) and concentrations are generally stable or decreasing, with the possible exception of fluoride downgradient of the TBWR areas. Oxygen-depleted groundwater exists under and adjacent to the tailing basin, and likely affects the solubility of redox-sensitive species such as manganese, and may control the solubility of cations in solution through co-precipitation.*

- *Nickel, antimony, thallium, and selenium do not appear to be good indicators of process water. If process water was a source for these constituents, they have migrated in groundwater from the Site to a limited extent. In general, concentrations of these constituents are decreasing; however, nickel concentrations, specifically at RP-W-6, and selenium concentrations on the east side of the Site are increasing.*
- *Total phosphorus is present locally in groundwater, but has demonstrated very little mobility, as it has not migrated from the immediate vicinity of the TBWR source.*
- *Gross beta radioactivity is present in groundwater associated with and downgradient from the TBWR areas, while groundwater in the vicinity of the TBWR areas is depleted in gross alpha radiation and uranium.*

5.5.1.6 Conclusions

The following conclusions were developed based on review of the information presented in this section:

- The sampling program implemented in SWMU 1 during RFI activities is consistent with the material characterization data acquired during previous sample events. The tailing and soil characteristics inside the boundary have been defined. Soil characteristics around the tailing basin and water recirculation area have also been defined.

- Slag is present at surface in and around the perimeter of the tailing basin. Slag was used to expand the tailing basin dikes and covers a large portion of the tailing basin surface.

- Fluoride concentrations in the tailing and soil from beneath and around the tailing basin and water recirculation system were above background when compared to the soil background/ reference area values. Elemental phosphorus was present in measurable concentrations in the tailing but was not detected in the soil from beneath or around the tailing basin and water recirculation area. Tailing at the process water outfall to the tailing basin likely contains the highest elemental phosphorus concentration in the tailing material.

- The tailing contains concentrations of metals at levels above background soil concentrations. Parts of the tailing basin have been covered with slag and the uncovered portions are subject to continued dust suppression activities, which reduce transport of tailing by wind. Soils from beneath the tailing basin and from around the tailing basin and water recirculation area generally have metals concentrations an order of magnitude lower than the tailing. The following metals are considered above background because the mean and maximum

concentrations of the soil samples collected from beneath the tailing basin are above the mean and maximum of the background/reference area concentrations: barium, cadmium, calcium, magnesium, selenium, sodium, and thallium.

- The following metals are considered above background for the surface soils because the mean and maximum concentrations are above the mean and maximum of the background/reference area concentrations: antimony, arsenic, cadmium, calcium, chromium, copper, thallium, selenium, uranium, vanadium, and zinc. The metals concentration for surface soil samples collected from around the tailing basin and water recirculation area tend to decrease with depth from the 0-2 inch sample interval to the deeper 2-12 inch sample interval, which is typically consistent with the background/reference area concentrations.

- Radionuclides are present in the tailing at concentrations that are above the background/reference area values. Soil from beneath the tailing basin typically has radionuclide concentrations an order of magnitude lower than the tailing radionuclide concentrations. The radionuclides reported for the soil samples are not significantly elevated compared to the background/reference area data set. The radionuclide profile for the surface soil samples is more indicative of slag, which was used to extend the dikes of the tailing basin and construct roads in and around the tailing basin. Pb-210 was not detected in the surface soil samples indicating the wind-blown tailing is not a likely source of radionuclides in the surface soil samples.

- The only SVOC compound reported for analyzed samples was bis(2-ethylhexyl)phthalate which is a common laboratory contaminant.

- No VOCs were detected in soil samples.

- Process water infiltrating from the TBWR areas is the predominant source of hazardous constituents to the groundwater at the Site.

SWMU 1 has been characterized for constituents related to the tailing basin (i.e., metals, radionuclides, and general parameters of fluoride, total phosphorus, and elemental phosphorus). As such, there is sufficient information to conduct the risk assessment for this SWMU. The risk assessment will identify which parameters, if any, are present at concentrations that may warrant corrective measures. The dataset would be reviewed at that time and additional sampling may be

necessary to inform the corrective measures study or later during the corrective measures design phase.

5.5.1.7 References

Barr Engineering Co. (Barr) 2006. Current Conditions/Release Assessment Report Corrective Action Order on Consent Docket No. RCRA-08-2004-0001, Rhodia Silver Bow Plant, Butte, Montana, February 2006.

Barr 2009. Final Phase 1 RCRA Facility Investigation Work Plan, Corrective Action Order on Consent, Docket No. RCRA-08-2004-0001 Rhodia Silver Bow Plant Butte, Montana March 25, 2009.

U.S. EPA. 2002. Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites. U.S. Environmental Protection Agency. EPA 540-R-01-003. OSWER 9285.7-41. September 2002.

Tables

Table 5.5.1-1

Process Water Flow Rate and Water Quality Summary[1]
Rhodia Silver Bow Plant

Source	Stream	Flow[1] [gpm]	As [mg/L]	Ba [mg/L]	Cd [mg/L]	Cr [mg/L]	Pb [mg/L]	Hg [mg/L]	Nitrate [mg/L]	Se [mg/L]	F [mg/L]	pH
#3 Catch Basin .	Process Water, Slag Cooling	350	0.339	0.092	0.085	0.246	0.519	0.001	NA	ND	NA	6
100' Clarifier	Process Water	300	0.339	0.092	0.085	0.246	0.519	0.001	NA	ND	NA	6
Kiln Feed Building Moat	Material Handling Water	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
#1 Kiln Scrubber	Emissions Control	1,200	1.81	0.087	18.7	0.201	0.517	0.007	ND	ND	122	2
#2 Kiln Scrubber	Emissions Control	1,800	1.81	0.087	18.7	0.201	0.517	0.007	ND	ND	122	2
Lime Treatment	pH Treatment	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hazelton Line	Slag Granulation	4,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Final Pump Station	Slag Cooling and Miscellaneous	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total		10,540										
Pond Return	From Tailing Basin	10,000	0.5	0.272	6	0.054	0.07	ND	NA	0.266	NA	5

Notes:

NA = Not available.

ND = Not detected.

[1]This table is adapted from Table 1 of the 1996 report Silver Bow Plant Tailings Pond and Groundwater Review, attached as Appendix I of the CCRA. The concentration, including those reported for Pond Return are analytical data, not mass balance calculated concentrations. Flows were estimated or measured by plant personnel.

Table 5.5.1-2

Process Water Data Summary
Rhodia Silver Bow Plant
[concentrations in mg/L]

Station ID: Tailing Water									
Dates	Sample ID	Arsenic, TCLP	Barium, TCLP	Cadmium, TCLP	Chromium, TCLP	Lead, TCLP	Mercury, TCLP	Selenium, TCLP	Silver, TCLP
12/15/1992	Pond Water	0.44	0.06 U	5.8	0.064	0.07	0.0003 U	0.55	0.003 U
1/22/1993	#3 Pond Water	0.53	0.233	6.45	0.083	0.08	0.0002	0.38	0.002 U
1/26/1993	Pond	0.358	0.272	6	0.054	0.07	0.0003 U	0.266	0.003 U
8/24/1993	#2-Pond Water Comp	0.8	0.4	6.6	0.32 U	0.1	0.0005 U	0.2	1.2 U
9/7/1993	Pond 1	1.46	0.069	8.6	0.101	0.084 U	0.0002 U	0.137 U	1 U
9/8/1993	Pond 2	1.1	0.129	10.1	0.073	0.098	0.0002 U	0.137 U	1 U
9/9/1993	Pond 3	1.18	0.131	7.99	0.032	0.084 U	0.0002 U	0.137 U	1 U
9/10/1993	Pond 4	1.08	0.08	6.63	0.05	0.084 U	0.001	0.137 U	1 U
9/10/1993	Pond., Comp	0.5	10 U	4.9	0.5 U	0.5 U	0.02 U	0.3	0.05 U

Table 5.5.1-3

Tailing Basin Water Quality Summary
Rhodia Silver Bow Plant

	During Plant Operations	October 1997	October 1998
Arsenic, mg/L	0.500	0.029	0.009
Barium, mg/L	0.272	<0.1	<0.1
Cadmium, mg/L	6.000	0.031	0.004
Chromium, mg/L	0.054	<0.01	<0.01
Lead, mg/L	0.070	<0.01	<0.01
Mercury, mg/L	ND[1]	<0.001	<0.001
Selenium, mg/L	0.266	0.044	0.013
Fluoride, mg/L	35-122[2]	5.71	2.43

[1] ND = Not detected
[2] Only the kiln input to the pond was analyzed for fluoride. The indicated range assumes the kiln water is the upper limit of the range, and assigns as the lower limit a computed value which assumes no fluoride input except the kiln water.

Table 5.5.1-4
Tailing Solids - General and Site Specific Parameters
SWMU 1
Rhodia Silver Bow Plant
[concentration in mg/kg]

Chemical Name				Fluoride	Orthophosphate as P	Phosphorus, elemental (white)	Phosphorus, total
Background Mean, Exceedances **Bold**				**4.1**			
Background Maximum, Exceedances Underline				37			
Background 95% UPL, Exceedances *Italic*				*7.6*			
Location ID	**Sample Date**	**Depth**	**Sample Type**				
ESI-TBS-1	07/21/2003	0 - 2 in	N	***710***	140	--	53000 J
ESI-TBS-2	07/21/2003	0 - 2 in	N	***2800***	740	--	56000 J
ESI-TBS-3	7/21/2003	0 - 2 in	N	***3800***	1900	--	49000 J
			FD	***840***	150	--	48000 J
ESI-TBS-4	07/21/2003	0 - 2 in	N	***6300***	410	--	42000 J
ESI-TBS-5	07/21/2003	0 - 2 in	N	***6100***	460	--	49000 J
SB-08-1	12/11/2008	8 - 11 ft	N	--	--	0.00164	--
SB-08-2	12/11/2008	10 - 14 ft	N	--	--	0.00407	--
			FD	--	--	0.00236	--
SB-08-3	12/11/2008	2 - 6 ft	N	--	--	< 0.000469	--
SB-08-3	12/12/2008	28 - 32 ft	N	--	--	0.000470 J	--
SB-08-3	12/12/2008	36 - 40 ft	N	--	--	< 0.000469	--
SB-08-4	12/17/2008	6 - 12 ft	N	--	--	0.0383	--
SB-08-4	12/17/2008	18 - 24 ft	N	--	--	0.000593 J	--
SB-08-4	12/18/2008	32 - 38 ft	N	--	--	< 0.000469	--
SB-08-6	12/13/2008	9 - 12 ft	N	--	--	< 0.000469	--
T-99-1	03/22/1999	30.5 - 33 ft	N	***460***	--	--	--
T-99-1	03/22/1999	43.5 - 46 ft	N	***920***	--	--	--
T-99-2	03/23/1999	42 - 44.5 ft	N	***670***	--	--	--
T-99-3	03/24/1999	39 - 41.5 ft	N	***540***	--	--	--
T-99-3	03/24/1999	41.5 - 44 ft	N	***610***	--	--	--

Table 5.5.1-5
Soil Data - General and Site Specific Parameters
SWMU 1
Rhodia Silver Bow Plant
[concentration in mg/kg]

Chemical Name				Fluoride	Phosphorus, elemental (white)	Phosphorus, total
Background Mean, Exceedances **Bold**				**4.1**		
Background Maximum, Exceedances Underline				37		
Background 95% UPL, Exceedances *Italic*				*7.6*		
Location ID	**Sample Date**	**Depth**	**Sample Type**			
MW-06-9	10/23/2006	45 - 46 ft	N	***690***	< 0.0000499 J	441 J
			FD	***750***	< 0.0000499 J	452 J
MW-06-9	10/23/2006	52 - 54 ft	N	***1400***	< 0.0000499 J	195 J
MW-06-21	10/11/2006	32 - 33 ft	N	***3500 J***	0.000184 J	6510 J
MW-06-21	10/11/2006	40 - 42 ft	N	***820 J***	0.000136 J	407 J
MW-06-22	10/04/2006	5 - 6 ft	N	***660 J***	< 0.0000499 J	635 J
MW-06-22	10/04/2006	13 - 15 ft	N	***1000 J***	< 0.0000499 J	453 J
SB-08-1	12/11/2008	11 - 12 ft	N	--	< 0.000469	
SB-08-1	12/11/2008	19 - 21 ft	N	--	< 0.000469	
SB-08-2	12/11/2008	17.5 - 18 ft	N	--	< 0.000469	
SB-08-2	12/11/2008	26 - 28 ft	N	--	< 0.000469	
			FD	--	< 0.000469	
SB-08-3	12/12/2008	42 - 43 ft	N	--	< 0.000469	
SB-08-3	12/12/2008	50 - 52 ft	N	--	< 0.000469 J	
SB-08-4	12/18/2008	40.5 - 41 ft	N	--	< 0.000469	
SB-08-4	12/18/2008	50 - 52 ft	N	--	< 0.000469	
SB-08-5	12/17/2008	46 - 47 ft	N	--	< 0.000469	
SB-08-5	12/17/2008	54 - 56 ft	N	--	< 0.000469	
SB-08-6	12/13/2008	12 - 13 ft	N	--	< 0.000469	
SB-08-6	12/13/2008	20 - 22 ft	N	--	0.003140	
T-99-1	03/22/1999	56.5 - 58.5 ft	N	< 5	--	
T-99-1	03/22/1999	64 - 64.5 ft	N	***8***	--	
T-99-2	03/23/1999	56 - 58 ft	N	***48***	--	
T-99-2	03/23/1999	63.5 - 65.5 ft	N	***9.5***	--	
T-99-3	03/24/1999	44.5 - 46.5 ft	N	***19***	--	
T-99-3	03/24/1999	53.5 - 55.5 ft	N	***21***	--	

Table 5.5.1-6
Tailing Solids - Metals
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name / Analysis Location				Aluminum Lab	Antimony Lab	Arsenic Lab	Barium Lab	Beryllium Lab	Cadmium Lab	Calcium Lab	Chromium Lab	Cobalt Lab	Copper Lab	Iron Lab	Lead Lab	Magnesium Lab	Manganese Lab	Mercury Lab	Nickel Lab	Potassium Lab	Selenium Lab	Silver Lab	Sodium Lab	Thallium Lab	Uranium Lab	Vanadium Lab	Zinc Lab
Background Mean, Exceedances **Bold**					**0.50**	**23**	**150**	**0.51**	**1.6**	**3900**	**11**	5.9	**35**	**19600**	**17**	**3500**	540	**0.021**	**5.3**	**3000**	**0.41**	**0.73 (1)**	**140**	**0.35**	**1.8**	**41**	**59**
Background Maximum, Exceedances Underline					3.9	120	290	1.3	8.9	14000	48	9.5	301	35300	190	5700	1100	0.20	21	5300	0.70	1.7 (1)	620	1.0	4.1	83	380
Background 95% UPL, Exceedances *Italic*					*1.0*	*40*	*170*	*0.55*	*1.1*	*4500*	*12*	6.1	*64*	*20600*	*35*	*3700*	570	*0.038*	*6.0*	*3200*	*0.47*	*0.35 (1)*	*220*	*0.46*	*2.0*	*43*	*98*
Location ID	**Sample Date**	**Depth**	**Sample Type**																								
ESI-TBS-1	7/18/2003	0 - 2 in	N	18200	***14.2 J***	***48.3***	***179***	***1.7***	***946***	***205000***	***422***	3.0 J	***70.4***	7930	***207***	**3570**	126	***0.38***	***49.1***	***6560***	***66.9***	***12.1 J***	***2690***	***23.3***	--	***451***	***2300***
ESI-TBS-2	7/18/2003	0 - 2 in	N	19800	***25.2 J***	***58.8***	***213***	***1.8***	***703***	***172000***	***724***	3.0 J	***104***	8320	***214***	3440	133	***0.58***	***73.6***	***7260***	***69.0***	***77.2 J***	***3390***	***17.6***	--	***776***	***4410***
ESI-TBS-3	7/18/2003	0 - 2 in	N	22900	***34.0 J***	***83.7***	***211***	***1.4***	***1030***	***176000***	***917***	4.0 J	***142***	6250	***388***	***12300***	74.4	***1.8***	***152***	***9520***	***107***	***81.9 J***	***4760***	***25.3***	--	***924***	***5430***
			FD	18000	***14.1 J***	***48.6***	***177***	***1.7***	***946***	***203000***	***429***	3.2 J	***69.3***	8150	***205***	**3550**	129	***0.30***	***50.0***	***6010***	***65.9***	***10.6 J***	***2570***	***23.0***	--	***452***	***2320***
ESI-TBS-4	7/18/2003	0 - 2 in	N	28500	***53.7 J***	***195***	***292***	***1.2***	***1470***	***226000***	***1060***	5.0 J	***233***	4780	***451***	***7450***	31.1	***3.6***	***139***	***10100***	***223***	***132 J***	***3300***	***21.5***	--	***1220***	***2430***
ESI-TBS-5	7/18/2003	0 - 2 in	N	32800	***60.4 J***	***77.5***	***383***	***1.5***	***737***	***171000***	***1270***	3.7 J	***210***	5870	***332***	3380	46.7	***2.9***	***113***	***10900***	***200.0***	***129 J***	***3570***	***33.1***	--	***1270***	***4020***
SB-08-1	12/11/2008	8 - 11 ft	N	--	***24.8***	***68.5***	111	***1.03***	***711***	***157000***	***495***	3.1	***67.3***	11100	***141***	3450	92.60	***1.040***	***76.9***	***5820***	***96.4***	***20.3***	***1850***	***18.0***	***72***	***668***	***4950***
SB-08-2	12/11/2008	10 - 14 ft	N	--	***35.0***	***112***	135	***1.28***	***1160***	***207000***	***910***	3.0	***97.4***	11300	***238***	***6370***	122	***2.230***	***131***	***9490***	***136***	***33.6***	***2010***	***31.9***	***63***	***1330***	***6890***
			FD	--	***34.5***	***115***	133	***1.24***	***1190***	***208000***	***910***	3.1	***96.8***	11400	***242***	***6280***	118	***2.250***	***132***	***9250***	***139***	***33.7***	***2010***	***30.1***	***74***	***1340***	***6940***
SB-08-3	12/11/2008	2 - 6 ft	N	--	***17.9***	**40.0**	109	***1.15 J***	***429***	***222000***	***790***	2.5	***88.6***	10700	***189***	***3840 J***	127	***0.634***	***97.7***	***5600***	***43.4***	***17.2***	***1620***	***11.0***	***87***	***904***	***2270***
SB-08-3	12/12/2008	13 - 20 ft	N	--	***15.6***	***85.3***	**154**	***1.71***	***363***	***171000***	***1050***	2.4	***108***	16300	***63.4***	***6430***	127	***1.360***	***157***	***7270***	***55.0***	***12.1***	***1280***	***8.91***	***60***	***997***	***2380***
SB-08-3	12/12/2008	28 - 32 ft	N	--	***7.220***	***108***	**196**	***2.23***	***99.6***	***116000***	***977***	2.5	***147***	***27200***	***38.0***	***10500***	149	***1.770***	***214***	***8580***	***37.8***	***4.3***	***260***	***2.57***	***27***	***538***	***1690***
SB-08-3	12/12/2008	36 - 40 ft	N	--	***7.480***	***95.0***	**153**	***2.56***	***121***	***124000***	***1260***	2.4	***159***	***26700***	***36.5***	***14500***	154	***1.050***	***242***	***11700***	***28.1***	***2.9***	***320***	***3.41***	***31***	***796***	***1630***
SB-08-4	12/17/2008	6 - 12 ft	N	--	***14.8***	***49.8***	106	***1.13***	***550***	***229000***	***650***	2.0 J	***75.8***	7970	***65.8***	***6260***	120	***0.670***	***92.7***	***4770***	***65.7***	***12.0***	***1700***	***11.1***	***87***	***903***	***2800***
SB-08-4	12/17/2008	18 - 24 ft	N	--	***8.180***	***110***	**187**	***2.44***	***123***	***108000***	***1360***	2.6	***153***	***27800***	**31.6**	***11500***	158	***1.940***	***234***	***11000***	***46.3***	***5.2***	***342***	***4.07***	***35***	***872***	***1410***
SB-08-4	12/18/2008	32 - 38 ft	N	--	***6.460***	***96.1***	**205**	***2.37***	***71.6***	***122000***	***1140***	2.4	***136***	***25900***	**30.2**	***10900***	139	***1.480***	***194***	***10500***	***28.3***	***1.8 J***	***266***	***2.45***	***27***	***660***	***1220***
SB-08-5	12/16/2008	4 - 10 ft	N	--	***13.6***	**27.6**	128	***1.10***	***275***	***246000***	***595***	1.7 J	***67.0***	7360	***90.4***	2780	75.50	***0.319***	***66.5***	***4690***	***20.1***	***12.8***	***2380***	***7.41***	***104***	***726***	***1880***
SB-08-5	12/16/2008	16 - 22 ft	N	--	***14.4***	***77.0***	79.2	0.43 J	***15.4***	**5100**	10.3	4.0	30.4	14800	6.2 J	3140	122	***0.911***	5.3	2870	***57.4***	< 0.8	130	***9.99***	***74***	**42.5**	**80.4**
SB-08-5	12/16/2008	28 - 36 ft	N	--	***8.050***	***94.3***	**155**	***2.00 J***	***93.8 J***	***127000***	***950***	2.1 J	***117***	***22700***	**31.1**	***9520 J***	132	***1.520***	***173 J***	***8660***	***33.7***	***4.1***	***341***	***2.74***	***28***	***561***	***1030 J***
SB-08-5	12/16/2008	42 - 44 ft	N		***7.200***	***95.2***	**189**	***2.41***	***93.4***	***121000***	***1240***	2.5	***145***	***26800***	**32.3**	***11300***	134	***1.600***	***219***	***10400***	***27.4***	***3.3***	***296***	***3.37***	***28***	***690***	***1380***
SB-08-6	12/13/2008	9 - 12 ft	N	--	***14.5***	***148***	**158**	***1.80***	***277***	***184000***	***1150***	2.6	***110***	17100	***43.1***	***8150***	118	***2.360***	***183***	***9320***	***70.6***	***7.2***	***1310***	***8.42***	***57.9***	***991***	***1660***
SO-EPA-5	8/5/1988		N	< 9830 J*	< 12.2	< 10.7 BQUJ*	124	***1.6***	< 199 J*	< 92400 J*	***430***	< 2.1	***73.2***	6200	< 65.4 R	3480	98.5	***0.30***	***60.5***	**3730**	< 4.2 C	< 9.6 R	***2790***	< 4.5 S	--	***577***	< 1270 J*
T-99-1	3/22/1999	30.5 - 33 ft	N	--	--	***83***	--	--	***69***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-1	3/22/1999	43.5 - 46 ft	N	--	--	***62***	--	--	***50***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-2	3/23/1999	42 - 44.5 ft	N	--	--	***79***	--	--	***31***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-3	3/24/1999	39 - 41.5 ft	N	--	--	***80***	--	--	***65***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-3	3/24/1999	41.5 - 44 ft	N	--	--	***81***	--	--	***57***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 5.5.1-7
Soil Data - Metals
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name / Analysis Location				Antimony Lab	Arsenic Lab	Barium Lab	Beryllium Lab	Cadmium Lab	Calcium Lab	Chromium Lab	Cobalt Lab	Copper Lab	Iron Lab	Lead Lab	Magnesium Lab	Manganese Lab	Mercury Lab	Nickel Lab	Potassium Lab	Selenium Lab	Silver Lab	Sodium Lab	Thallium Lab	Uranium Lab	Vanadium Lab	Zinc Lab
Background Mean, Exceedances **Bold**				**0.50**	**23**	**150**	**0.51**	**1.6**	**3900**	**11**	**5.9**	**35**	**19600**	**17**	**3500**	**540**	**0.021**	**5.3**	**3000**	**0.41**	**0.73 (1)**	**140**	**0.35**	**1.8**	**41**	**59**
Background Maximum, Exceedances Underline				3.9	120	290	1.3	8.9	14000	48	9.5	301	35300	190	5700	1100	0.20	21	5300	0.70	1.7 (1)	620	1.0	4.1	83	380
Background 95% UPL, Exceedances *Italic*				*1.0*	*40*	*170*	*0.55*	*1.1*	*4500*	*12*	*6.1*	*64*	*20600*	*35*	*3700*	*570*	*0.038*	*6.0*	*3200*	*0.47*	*0.35 (1)*	*220*	*0.46*	*2.0*	*43*	*98*
Location ID	**Sample Date**	**Depth**	**Sample Type**																							
MW-06-9	10/23/2006	45 - 46 ft	N	< 2 R	12 J	***198 J***	< 2 J	*1.4 J*	***4660 J***	10 J	***7 J***	27 J	17800 J	8 J	***4720 J***	387 J	< 0.1	***7 J***	***5530 J***	< 2 J	< 0.5 J	***261 J***	< 2 J	***3 J***	34 J	47 J
			FD	< 2 R	11 J	***201 J***	< 2 J	*1.4 J*	***4760 J***	11 J	***7 J***	27 J	18500 J	9 J	***4970 J***	392 J	< 0.1	***7 J***	***5720 J***	< 2 J	< 0.5 J	***289 J***	< 2 J	***3 J***	35 J	47 J
MW-06-9	10/23/2006	52 - 54 ft	N	< 2 R	3 J	***266 J***	< 2 J	1.1 J	***5010 J***	8 J	5 J	16 J	15900 J	7 J	***4510 J***	475 J	< 0.1	5 J	***4740 J***	< 2 J	< 0.5 J	***924 J***	< 2 J	**2 J**	***44 J***	34 J
MW-06-21	10/11/2006	32 - 33 ft	N	< 2 R	**24 J**	121 J	< 2 J	***10.1 J***	***29400 J***	***74 J***	4 J	**49 J**	15400 J	13 J	***3890 J***	138 J	***0.200***	***19 J***	***4930 J***	< 2 J	*0.7 J*	***415 J***	< 2 J	***6 J***	***67 J***	***130 J***
MW-06-21	10/11/2006	40 - 42 ft	N	< 2 R	3 J	117 J	< 2 J	< 0.5 J	**4020 J**	4 J	5 J	16 J	14000 J	12 J	***4040 J***	238 J	< 0.1	4 J	***3870 J***	< 2 J	< 0.5 J	***383 J***	< 2 J	1 J	21 J	50 J
MW-06-22	10/04/2006	5 - 6 ft	N	< 2 R	6 J	***178 J***	< 2 J	0.9 J	***7530 J***	5 J	5 J	22 J	13300 J	5 J	3030 J	298 J	< 0.1	5 J	***3960 R***	< 2 J	< 0.5 J	***477 J***	***2 J***	**2 J**	25 J	36 J
MW-06-22	10/4/2006	13 - 15 ft	N	< 2 R	7 J	134 J	< 2 J	1.0 J	**3930 J**	8 J	**6 J**	23 J	16500 J	7 J	***4120 J***	295 J	< 0.1	**6 J**	***5450 R***	< 2 J	< 0.5 J	***455 J***	***2 J***	**2 J**	27 J	50 J
SB-08-1	12/11/2008	11 - 12 ft	N	**1**	6	***206***	***0.98 J***	*1.6000*	***7780***	6	6	18	19200	9.6 J	***4970***	122	***0.0***	3.4 J	**3050**	***9***	< 1.1	***407***	0.323	2	***44***	**70**
SB-08-1	12/11/2008	19 - 21 ft	N	0.34	1.96	***316***	***0.73 J***	0.5 J	***6460***	3.9	5.1	10.9	14600	< 3.1	3390	**560**	0.021	2.1 J	**3040**	***0.7 J***	< 0.8	***429***	0.316	1.100	21.1	35.4
SB-08-2	12/11/2008	17.5 - 18 ft	N	***1.850***	8.42	***186***	***0.75 J***	***26.0***	***10900***	***26.0***	**6.1**	**37.8**	***21500***	16.1 J	***5210***	206	***0.171***	***13.5***	***4590***	***5.1***	***1.3 J***	***301***	***2.00***	***3.400***	***68.0***	***186***
SB-08-2	12/11/2008	26 - 28 ft	N	0.27	5.77	***721 J***	***0.75 J***	*1.3 J*	***5110***	***13.1 J***	5.2	12.7	17100	5.5 J	***4290***	255	0.008 J	***7.3 J***	***5730 J***	< 0.5	< 0.9	***449 J***	***0.655***	1.300	36.9	***262 J***
			FD	0.25	4.82	***172 J***	**0.52 J**	0.4 J	3830	8.1 J	4.7	11.1	15300	< 3.5	**3560**	217	0.007 J	3.7 J	***3260 J***	***0.5 J***	< 0.9	**213 J**	***0.626***	1.100	32.2	30.2 J
SB-08-3	12/12/2008	42 - 43 ft	N	**0.60**	6.98	103	***0.65 J***	***2.6***	***8890***	***15.3***	2.0 J	16.5	8530	< 3.3	2720	214	**0.033**	***7.3***	2590	***1.3***	< 0.9	***558***	***0.790***	***3.97***	31.4	56.7
SB-08-3	12/12/2008	50 - 52 ft	N	***1.780 J***	18.9	***1810 J***	***0.79 J***	0.066 J	***6060 J***	3.2	3.48	10.5 J	10900	6.6 J	2550 J	***8900 J***	0.018 J	2.6 J	2220	***1.1***	< 0.3	***864 J***	***3.86 J***	***3.12***	***95.8 J***	16.50 J
SB-08-4	12/18/2008	40.5 - 41 ft	N	0.28	2.49	**159**	0.32 J	0.7 J	***6540***	**11.4**	4.1	9.7	15500	< 3.4	3070	278	**0.030**	4.1 J	2640	< 0.5	< 0.9	**145**	0.296	1.600	***52.1***	29.6
SB-08-4	12/18/2008	50 - 52 ft	N	0.28	0.95	113	0.48 J	< 0.2	***6180***	3.3	2.8	10.2	12300	< 3.3	2600	65.70	0.007 J	1.7 J	2890	***0.7 J***	< 0.9	***849***	0.127	0.69	16.3	26.9
SB-08-5	12/17/2008	46 - 47 ft	N	0.29	8.94	***175***	***0.83 J***	*1.2*	***14800***	8.9	5.5	17.0	19600	5.2 J	***6780***	361	0.016 J	4.6	***4110***	***0.6 J***	< 0.8	***327***	**0.389**	***3.000***	37.7	55.6
SB-08-5	12/17/2008	54 - 56 ft	N	0.17	2.49	***271***	***0.75 J***	0.6 J	**4040**	5.8	***6.2***	15.1	16700	< 3.4	***4820***	488	0.015 J	3.4 J	***3950***	***0.6 J***	< 0.9	***1870***	***0.432***	1.600	25.3	41.1
SB-08-6	12/13/2008	12 - 13 ft	N	**0.58**	12.3	83.4	0.43 J	***16.3***	***5390***	**11.1**	4.0	32.4	15500	5.2 J	3310	128	***0.041***	**5.8**	**3050**	***1.3***	< 0.9	137	***1.68***	***2.01***	***44.7***	**83**
SB-08-6	12/13/2008	20 - 22 ft	N	**0.63**	7.50	145	***1.04 J***	***6.4***	***9520***	***17.3***	***8.0***	32.5	***26300***	12.3 J	***6560***	409	***0.055***	***9.3***	***6240***	***1.4***	< 0.9	***482***	***0.611***	***2.68***	***47.5***	***101***
T-99-1	3/22/1999	56.5 - 58.5 ft	N	--	< 5	--	--	< 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-1	3/22/1999	64 - 64.5 ft	N	--	< 5	--	--	< 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-2	3/23/1999	56 - 58 ft	N	--	< 5	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-2	3/23/1999	63.5 - 65.5 ft	N	--	5	--	--	***2***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-3	3/24/1999	44.5 - 46.5 ft	N	--	5	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-99-3	3/24/1999	53.5 - 55.5 ft	N	--	6	--	--	< 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 5.5.1-8
Soil Data - SVOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

			Chemical Name	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1-Methylnaphthalene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Chloronaphthalene
Location ID	Sample Date	Depth	Sample Type													
MW-06-9	10/23/2006	45 - 46 ft	N	< 0.44 J	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 2.2	< 0.44	< 0.44	< 0.44
			FD	< 0.44 J	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 2.2	< 0.44	< 0.44	< 0.44
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.45 J	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 2.3	< 0.45	< 0.45	< 0.45
MW-06-21	10/11/2006	32 - 33 ft	N	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 2.2	< 0.44	< 0.44	< 0.44
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 2.1	< 0.41	< 0.41	< 0.41
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 2.1	< 0.42	< 0.42	< 0.42
MW-06-22	10/04/2006	5 - 6 ft	N	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 2.0	< 0.39	< 0.39	< 0.39
SO-EPA-5	08/05/1988		N	< 0.34	< 0.34	< 0.34	< 0.34	--	< 1.7	< 0.34	< 0.34	< 0.34	< 1.7	< 0.34	< 0.34	< 0.34

Table 5.5.1-8
Soil Data - SVOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name				2-Chlorophenol	2-Methyl-4,6-dinitrophenol	2-Methylnaphthalene	2-Nitroaniline	2-Nitrophenol	3,3`-Dichlorobenzidine	3-Nitroaniline	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol	4-Chlorophenol	4-Chlorophenyl phenyl ether	4-Nitroaniline	4-Nitrophenol	Acenaphthene	Acenaphthylene
Location ID	Sample Date	Depth	Sample Type															
MW-06-9	10/23/2006	45 - 46 ft	N	< 0.44	< 2.2	< 0.44	--	< 0.44	< 0.88	--	< 0.44	< 0.44	< 0.44	< 0.44	--	< 2.2	< 0.44	< 0.44
			FD	< 0.44	< 2.2	< 0.44	--	< 0.44	< 0.89	--	< 0.44	< 0.44	< 0.44	< 0.44	--	< 2.2	< 0.44	< 0.44
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.45	< 2.3	< 0.45	--	< 0.45	< 0.90	--	< 0.45	< 0.45	< 0.45	< 0.45	--	< 2.3	< 0.45	< 0.45
MW-06-21	10/11/2006	32 - 33 ft	N	< 0.44	< 2.2	< 0.44	--	< 0.44	< 0.88	--	< 0.44	< 0.44	< 0.44	< 0.44	--	< 2.2	< 0.44	< 0.44
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.41	< 2.1	< 0.41	--	< 0.41	< 0.82	--	< 0.41	< 0.41	< 0.41	< 0.41	--	< 2.1	< 0.41	< 0.41
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.42	< 2.1	< 0.42	--	< 0.42	< 0.84	--	< 0.42	< 0.42	< 0.42	< 0.42	--	< 2.1	< 0.42	< 0.42
MW-06-22	10/04/2006	5 - 6 ft	N	< 0.39	< 2.0	< 0.39	--	< 0.39	< 0.79	--	< 0.39	< 0.39	< 0.39	< 0.39	--	< 2.0	< 0.39	< 0.39
SO-EPA-5	08/05/1988		N	< 0.34	< 1.7	< 0.34	< 1.7	< 0.34	< 0.69	< 1.7	< 0.34	< 0.34	< 0.34	< 0.34	< 1.7	< 1.7	< 0.34	< 0.34

Table 5.5.1-8
Soil Data - SVOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name				Anthracene	Azobenzene	Benzidine	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Benzoic acid	Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl) ether	chloroisopropyl) ether	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Chrysene	Dibenz(a,h) anthracene
Location ID	Sample Date	Depth	Sample Type																	
MW-06-9	10/23/2006	45 - 46 ft	N	< 0.44	< 0.44	< 0.88	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--	--	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
			FD	< 0.44	< 0.44	< 0.89	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--	--	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.45	< 0.45	< 0.90	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	--	--	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
MW-06-21	10/11/2006	32 - 33 ft	N	< 0.44	< 0.44	< 0.88	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--	--	< 0.44	< 0.44	< 0.44	< 0.77	< 0.44	< 0.44	< 0.44
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.41	< 0.41	< 0.82	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	--	--	< 0.41	< 0.41	< 0.41	< 0.69	< 0.41	< 0.41	< 0.41
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.42	< 0.42	< 0.84	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	--	--	< 0.42	< 0.42	< 0.42	0.51	< 0.42	< 0.42	< 0.42
MW-06-22	10/04/2006	5 - 6 ft	N	< 0.39	< 0.39	< 0.79	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	--	--	< 0.39	< 0.39	< 0.39	**0.47**	< 0.39	< 0.39	< 0.39
SO-EPA-5	08/05/1988		N	< 0.041	--	--	< 0.11	< 0.16	< 0.16	< 0.14	< 0.10	< 1.7	< 0.34	< 0.34	< 0.34	< 0.34	< 0.087	< 0.34	< 0.15	< 0.34

Table 5.5.1-8
Soil Data - SVOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name				Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate	Fluoranthene	Fluorene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd) pyrene	Isophorone	m,p-cresols	Naphthalene
Location ID	Sample Date	Depth	Sample Type															
MW-06-9	10/23/2006	45 - 46 ft	N	--	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.88	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
			FD	--	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.89	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
MW-06-9	10/23/2006	52 - 54 ft	N	--	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.90	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
MW-06-21	10/11/2006	32 - 33 ft	N	--	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.89	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
MW-06-21	10/11/2006	40 - 42 ft	N	--	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.83	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
MW-06-22	10/04/2006	13 - 15 ft	N	--	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.85	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
MW-06-22	10/04/2006	5 - 6 ft	N	--	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.79	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
SO-EPA-5	08/05/1988		N	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.29	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.10	< 0.34	--	< 0.34

Table 5.5.1-8
Soil Data - SVOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

			Chemical Name	Nitrobenzene	N-Nitrosodimethylamine	N-Nitrosodi-n-propylamine	N-Nitrosodiphenylamine	o-cresol	p-cresol	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Pyridine
Location ID	Sample Date	Depth	Sample Type											
MW-06-9	10/23/2006	45 - 46 ft	N	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--	< 2.2	< 0.44	< 0.44	< 0.44	< 0.44
			FD	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--	< 2.2	< 0.44	< 0.44	< 0.44	< 0.44
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	--	< 2.3	< 0.45	< 0.45	< 0.45	< 0.45
MW-06-21	10/11/2006	32 - 33 ft	N	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--	< 2.2	< 0.44	< 0.44	< 0.44	< 0.44
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	--	< 2.1	< 0.41	< 0.41	< 0.41	< 0.41
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	--	< 2.1	< 0.42	< 0.42	< 0.42	< 0.42
MW-06-22	10/04/2006	5 - 6 ft	N	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	--	< 2.0	< 0.39	< 0.39	< 0.39	< 0.39
SO-EPA-5	08/05/1988		N	< 0.34	--	< 0.34	< 0.34	< 0.34	< 0.34	< 1.7	< 0.24	< 0.34	< 0.21	--

Table 5.5.1-9
Soil Data - VOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

			Chemical Name	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloro-1-propene	1,1-Dichloroethane	1,1-Dichloroethylene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane
Location ID	Sample Date	Depth	Sample Type													
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J

Table 5.5.1-9
Soil Data - VOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

			Chemical Name	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloroethylene, cis	Dichloroethylene, trans	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichloro-1-propene, cis	1,3-Dichloro-1-propene, trans	1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane	2-Chloroethyl vinyl ether
Location ID	Sample Date	Depth	Sample Type													
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J

Table 5.5.1-9
Soil Data - VOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name				2-Hexanone	Acetone	Acrolein	Acrylonitrile	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Butyl benzene	Butylbenzene, sec	Butylbenzene, tert	Carbon disulfide	Carbon tetrachloride	Chlorobenzene
Location ID	Sample Date	Depth	Sample Type																
MW-06-9	10/23/2006	52 - 54 ft	N	< 4.4	< 4.4	< 4.4 R	< 4.4 R	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
MW-06-21	10/11/2006	40 - 42 ft	N	< 7.7	< 7.7	< 7.7 R	< 7.7 R	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
MW-06-22	10/04/2006	13 - 15 ft	N	< 4.8 J	< 4.8 J	< 4.8 R	< 4.8 R	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J

Table 5.5.1-9
Soil Data - VOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name				Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	Chlorotoluene o-	Chlorotoluene p-	Cumene (isopropyl benzene)	Cymene p- (Toluene isopropyl p-)	Dibromomethane (methylene bromide)	Dichlorodifluoromethane (CFC-12)	Ethyl benzene	Hexachlorobutadiene
Location ID	Sample Date	Depth	Sample Type												
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J

Table 5.5.1-9
Soil Data - VOCs
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name				Iodomethane	Methyl ethyl ketone	Methyl isobutyl ketone	Methyl tertiary butyl ether (MTBE)	Methylene chloride	Naphthalene	Propylbenzene	Styrene	Tetrachloroethylene	Toluene	Trichloroethylene	Trichlorofluoromethane	Vinyl acetate	Vinyl chloride	Xylene, m & p	Xylene, o	Xylene, total
Location ID	Sample Date	Depth	Sample Type																	
MW-06-9	10/23/2006	52 - 54 ft	N	< 0.22	< 4.4	< 4.4	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
MW-06-21	10/11/2006	40 - 42 ft	N	< 0.38	< 7.7	< 7.7	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
MW-06-22	10/04/2006	13 - 15 ft	N	< 0.24 J	< 4.8 J	< 4.8 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J	< 0.24 J

Table 5.5.1-10
Tailing Solids - Radionuclides
SWMU 1
Rhodia Silver Bow Plant
[concentration in pCi/g]

Chemical Name				Bismuth 214	Cesium 137	Gross Alpha (radiation)	Gross Beta (radiation)	Lead 210	Lead 212	Lead 214	Potassium 40	Protactinium-234	Radium 223	Radium 226	Thallium 208	Thorium 227	Thorium 230	Thorium 232	Thorium 234
Background Mean, Exceedances **Bold**														**3.6**			**0.96**		
Background Maximum, Exceedances Underline														12			3.4		
Background 95% UCL, Exceedances *Italic*														*5.0*			*1.7*		
Location ID	**Sample Date**	**Depth**	**Sample Type**																
ESI-TBS-1	07/18/2003	0 - 2 in	N	24.4 +/- 2.13	< 0.173	197 +/- 13.1 J	161 +/- 11.7 J	110 +/- 17.2	0.605 +/- 0.187	27.7 +/- 2.78	6.11 +/- 1.35	--	7.26 +/- 2.32	***24.9 +/- 1.60***	--	3.43 +/- 1.39	--	--	30.0 +/- 3.75
ESI-TBS-2	07/18/2003	0 - 2 in	N	20.3 +/- 1.86	< 0.169	220 +/- 13.1 J	154 +/- 10.5 J	122 +/- 19.1	0.586 +/- 0.187	23.1 +/- 2.35	9.05 +/- 1.55	--	--	***18.9 +/- 1.29 J***	0.226 +/- 0.111	3.98 +/- 1.56	--	--	26.7 +/- 3.67
ESI-TBS-3	7/18/2003	0 - 2 in	N	12.8 +/- 1.22	< 0.124	376 +/- 21.3 J	275 +/- 16.2 J	181 +/- 28.0	--	13.9 +/- 1.44	7.87 +/- 1.30	--	--	***18.3 +/- 1.20 J***	--	--	--	--	16.0 +/- 2.43
			FD	26.2 +/- 2.25	< 0.158	209 +/- 13.7 J	174 +/- 12.3 J	92.7 +/- 14.7	0.508 +/- 0.174	28.2 +/- 2.82	6.35 +/- 1.32	31.7 +/- 11.8	7.41 +/- 2.62	***25.5 +/- 1.45***	--	4.14 +/- 1.64	--	--	29.9 +/- 3.76
ESI-TBS-4	07/18/2003	0 - 2 in	N	20.4 +/- 1.86	< 0.164	353 +/- 17.6 J	269 +/- 16.4 J	334 +/- 51.2	--	23.0 +/- 2.35	10.8 +/- 1.72	--	--	***19.6 +/- 1.34 J***	--	--	--	--	22.8 +/- 3.25
ESI-TBS-5	07/18/2003	0 - 2 in	N	23.4 +/- 2.09	< 0.180	453 +/- 23.2 J	384 +/- 20.7 J	316 +/- 48.4	--	25.4 +/- 2.58	13.5 +/- 1.92	--	--	***23.6 +/- 1.02***	0.206 +/- 0.100	--	--	--	24.6 +/- 3.51
ET1	01/01/1999		N	--	--	--	--	--	--	--	--	--	--	***32 +/- 1.10***	--	--	--	0.94 +/- 1.20	--
ET2	01/01/1999		N	--	--	--	--	--	--	--	--	--	--	***32 +/- 0.99***	--	--	--	0.43 +/- 0.98	--
SB-08-1	12/11/2008	8 - 11 ft	N	--	--	--	--	160 +/- 4	--	--	--	--	--	***20 +/- 2***	--	--	***20 +/- 1.7***	--	--
SB-08-2	12/11/2008	10 - 14 ft	N	--	--	--	--	200 +/- 4.5	--	--	--	--	--	***20 +/- 1.9***	--	--	***20 +/- 1.6***	--	--
			FD	--	--	--	--	220 +/- 4.6	--	--	--	--	--	***22 +/- 2***	--	--	***18 +/- 1.5***	--	--
SB-08-3	12/11/2008	2 - 6 ft	N	--	--	--	--	92 +/- 3.1	--	--	--	--	--	***23 +/- 2***	--	--	***27 +/- 1.8***	--	--
SB-08-3	12/12/2008	13 - 20 ft	N	--	--	--	--	65 +/- 2.8	--	--	--	--	--	***17 +/- 1.6***	--	--	***18 +/- 1.5***	--	--
SB-08-3	12/12/2008	28 - 32 ft	N	--	--	--	--	12 +/- 1.7	--	--	--	--	--	***8.7 +/- 1.1***	--	--	***8.6 +/- 1***	--	--
SB-08-3	12/12/2008	36 - 40 ft	N	--	--	--	--	18 +/- 2	--	--	--	--	--	***11 +/- 1.3***	--	--	***11 +/- 1.2***	--	--
SB-08-4	12/17/2008	6 - 12 ft	N	--	--	--	--	78 +/- 3.1	--	--	--	--	--	***27 +/- 1.7***	--	--	***26 +/- 1.7***	--	--
SB-08-4	12/17/2008	18 - 24 ft	N	--	--	--	--	17 +/- 2	--	--	--	--	--	***13 +/- 1.2***	--	--	***11 +/- 1.4***	--	--
SB-08-4	12/18/2008	32 - 38 ft	N	--	--	--	--	18 +/- 1.9	--	--	--	--	--	***11 +/- 1.4***	--	--	***9.5 +/- 1.2***	--	--
SB-08-5	12/16/2008	4 - 10 ft	N	--	--	--	--	90 +/- 3.2	--	--	--	--	--	***26 +/- 1.7***	--	--	***32 +/- 2***	--	--
SB-08-5	12/16/2008	16 - 22 ft	N	--	--	--	--	44 +/- 2.5	--	--	--	--	--	***20 +/- 1.6***	--	--	***19 +/- 1.6***	--	--
SB-08-5	12/16/2008	28 - 36 ft	N	--	--	--	--	14 +/- 1.8	--	--	--	--	--	***10 +/- 1.3***	--	--	***9.2 +/- 1.3***	--	--
SB-08-5	12/16/2008	42 - 44 ft	N	--	--	--	--	7.7 +/- 1.7	--	--	--	--	--	***11 +/- 1.3***	--	--	***10 +/- 1.3***	--	--
SB-08-6	12/13/2008	9 - 12 ft	N	--	--	--	--	35 +/- 2.3	--	--	--	--	--	***15 +/- 1.8***	--	--	***18 +/- 1.5***	--	--
WT1	01/01/1999		N	--	--	--	--	--	--	--	--	--	--	***22 +/- 0.80***	--	--	--	0.67 +/- 0.79	--
WT2	01/01/1999		N	--	--	--	--	--	--	--	--	--	--	***23 +/- 0.86***	--	--	--	0.73 +/- 0.86	--

Table 5.5.1-10
Tailing Solids - Radionuclides
SWMU 1
Rhodia Silver Bow Plant
[concentration in pCi/g]

			Chemical Name	Uranium 234	Uranium 235	Uranium 238
			Background Mean, Exceedances **Bold**	**0.73**		**0.78**
			Background Maximum, Exceedances Underline	2.8		2.7
			Background 95% UCL, Exceedances *Italic*	*1.6*		*1.6*
Location ID	**Sample Date**	**Depth**	**Sample Type**			
ESI-TBS-1	07/18/2003	0 - 2 in	N	--	--	--
ESI-TBS-2	07/18/2003	0 - 2 in	N	--	2.17 +/- 0.839	--
ESI-TBS-3	7/18/2003	0 - 2 in	N	--	--	--
			FD	--	--	--
ESI-TBS-4	07/18/2003	0 - 2 in	N	--	1.75 +/- 0.893	--
ESI-TBS-5	07/18/2003	0 - 2 in	N	--	--	--
ET1	01/01/1999		N	--	--	***35 +/- 38.00***
ET2	01/01/1999		N	--	--	< 15
SB-08-1	12/11/2008	8 - 11 ft	N	***20 +/- 1.5***	0.72 +/- 0.37	***19.4 +/- 1.5***
SB-08-2	12/11/2008	10 - 14 ft	N	***19 +/- 1.4***	0.94 +/- 0.38	***18.2 +/- 1.4***
			FD	***20 +/- 1.4***	0.73 +/- 0.34	***18.8 +/- 1.4***
SB-08-3	12/11/2008	2 - 6 ft	N	***26 +/- 1.9***	1.4 +/- 0.52	***26.7 +/- 1.9***
SB-08-3	12/12/2008	13 - 20 ft	N	***22 +/- 1.6***	1.1 +/- 0.37	***19.8 +/- 1.5***
SB-08-3	12/12/2008	28 - 32 ft	N	***9.6 +/- 1.1***	0.53 +/- 0.34	***7.93 +/- 0.95***
SB-08-3	12/12/2008	36 - 40 ft	N	***11 +/- 1.1***	0.57 +/- 0.34	***10.4 +/- 1.1***
SB-08-4	12/17/2008	6 - 12 ft	N	***20 +/- 1.5***	1.3 +/- 0.4	***20.6 +/- 1.5***
SB-08-4	12/17/2008	18 - 24 ft	N	***11 +/- 0.97***	0.66 +/- 0.3	***10.1 +/- 0.94***
SB-08-4	12/18/2008	32 - 38 ft	N	***8.6 +/- 0.99***	0.27 +/- 0.3	***9 +/- 1***
SB-08-5	12/16/2008	4 - 10 ft	N	***31 +/- 2.3***	3.1 +/- 0.78	***31.9 +/- 2.3***
SB-08-5	12/16/2008	16 - 22 ft	N	***18 +/- 1.5***	0.86 +/- 0.4	***19.1 +/- 1.5***
SB-08-5	12/16/2008	28 - 36 ft	N	***9.7 +/- 0.96***	0.6 +/- 0.31	***9.29 +/- 0.94***
SB-08-5	12/16/2008	42 - 44 ft	N	***8.4 +/- 0.93***	0.49 +/- 0.31	***8.84 +/- 0.95***
SB-08-6	12/13/2008	9 - 12 ft	N	***21 +/- 1.5***	0.93 +/- 0.4	***22.3 +/- 1.6***
WT1	01/01/1999		N	--	--	< 18
WT2	01/01/1999		N	--	--	***40 +/- 40.00***

Table 5.5.1-11
Soil Data - Radionuclides
SWMU 1
Rhodia Silver Bow Plant
[concentration in pCi/g]

			Chemical Name	Lead 210	Radium 226	Thorium 230	Uranium 234	Uranium 235	Uranium 238
Background Mean, Exceedances **Bold**					**3.6**	**0.96**	**0.73**		**0.78**
Background Maximum, Exceedances Underline					12	3.4	2.8		2.7
Background 95% UPL, Exceedances *Italic*					*5.0*	*1.7*	*1.6*		*1.6*
Location ID	**Sample Date**	**Depth**	**Sample Type**						
MW-06-9	10/23/2006	45 - 46 ft	N	0.8 +/- 0.1	1.3 +/- 0.2	***2.1 +/- 0.9***	***2.3 +/- 1.3***	--	**1.3 +/- 1**
			FD	0.7 +/- 0.1	1.4 +/- 0.5	**1.1 +/- 0.5**	**1.3 +/- 0.9**	--	***1.7 +/- 1***
MW-06-9	10/23/2006	52 - 54 ft	N	0.9 +/- 0.1	2.0 +/- 0.5	**1.1 +/- 0.6**	**1 +/- 0.8**	--	< 0.2
MW-06-21	10/11/2006	32 - 33 ft	N	3.5 +/- 0.2	**4.3 +/- 0.3**	***3.7 +/- 0.9***	***5.3 +/- 1.9***	--	***3.5 +/- 1.5***
MW-06-21	10/11/2006	40 - 42 ft	N	0.2 +/- 0.09	1.7 +/- 0.5	0.4 +/- 0.3	< 0.2	--	< 0.2
MW-06-22	10/04/2006	5 - 6 ft	N	0.3 +/- 0.1	2.3 +/- 0.5	< 0.2	< 0.2	--	**1 +/- 0.8**
MW-06-22	10/04/2006	13 - 15 ft	N	1.4 +/- 0.2	1.4 +/- 0.1	< 0.2	< 0.2	--	< 0.2
SB-08-1	12/11/2008	11 - 12 ft	N	< 3.4	2.6 +/- 0.62	< 0.65	**0.79 +/- 0.32**	< 0.19	0.74 +/- 0.28
SB-08-1	12/11/2008	19 - 21 ft	N	< 3.4	< 1.3	< 0.59	0.64 +/- 0.34	< 0.21	0.6 +/- 0.27
SB-08-2	12/11/2008	17.5 - 18 ft	N	8.6 +/- 1.5	2.9 +/- 0.93	**1.1 +/- 0.46**	**1.5 +/- 0.52**	< 0.21	***1.68 +/- 0.45***
SB-08-2	12/11/2008	26 - 28 ft	N	< 3.5	3.3 +/- 0.81	< 0.62	0.6 +/- 0.35	< 0.22	0.38 +/- 0.32
			FD	< 3.8	2.1 +/- 0.6	< 0.92	0.46 +/- 0.28	< 0.18	0.71 +/- 0.27
SB-08-3	12/12/2008	42 - 43 ft	N	< 3.6	< 1.4	0.85 +/- 0.43	0.67 +/- 0.34	< 0.2	**0.99 +/- 0.39**
SB-08-3	12/12/2008	50 - 52 ft	N	< 3.9	< 1.6	**1.1 +/- 0.48**	0.34 +/- 0.38	< 0.2	**1.36 +/- 0.41**
SB-08-4	12/18/2008	40.5 - 41 ft	N	6.3 +/- 1.5	1.8 +/- 0.61	0.71 +/- 0.38	**1 +/- 0.36**	< 0.2	**0.8 +/- 0.3**
SB-08-4	12/18/2008	50 - 52 ft	N	5.3 +/- 1.6	< 1.5	< 0.58	0.26 +/- 0.29	< 0.22	0.39 +/- 0.23
SB-08-5	12/17/2008	46 - 47 ft	N	< 3.3	2 +/- 0.52	< 0.55	**0.86 +/- 0.35**	< 0.19	**1.36 +/- 0.37**
SB-08-5	12/17/2008	54 - 56 ft	N	< 3.5	1.9 +/- 0.59 J	< 0.68	0.5 +/- 0.26	< 0.19	0.61 +/- 0.25
SB-08-6	12/13/2008	12 - 13 ft	N	< 3.7	1.6 +/- 0.65	< 0.5	**0.94 +/- 0.35**	< 0.21	**0.93 +/- 0.32**
SB-08-6	12/13/2008	20 - 22 ft	N	< 3.3	2.4 +/- 0.88	0.53 +/- 0.37	**1 +/- 0.4**	< 0.21	**1.15 +/- 0.36**

Table 5.5.1-12
Surface Soil Data - General and Site Specific Parameters
SWMU 1
Rhodia Silver Bow Plant
[concentration in mg/kg]

Chemical Name				Fluoride	Phosphorus, elemental (white)	Phosphorus, total
Background Mean, Exceedances **Bold**				**4.1**		
Background Maximum, Exceedances Underline				37		
Background 95% UPL, Exceedances *Italic*				*7.6*		
Location ID	**Sample Date**	**Depth**	**Sample Type**			
TBWRS-1	06/03/2009	0 - 2 in	N	***29.5***	< 0.00047	6340
TBWRS-11	06/03/2009	0 - 2 in	N	4.0	< 0.00047	1420
TBWRS-13	06/03/2009	0 - 2 in	N	2.5 R	< 0.00047 J	2390
TBWRS-16	6/3/2009	0 - 2 in	N	3.3 J	< 0.00047	1250
			FD	***7.7***	< 0.00047	1210

Table 5.5.1-13
Surface Soil Data - Metals
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

Chemical Name / Analysis Location				Antimony Lab	Arsenic Lab	Arsenic Field	Barium Lab	Beryllium Lab	Cadmium Lab	Cadmium Field	Calcium Lab	Chromium Lab	Chromium Field	Cobalt Lab	Copper Lab	Iron Lab	Lead Lab	Lead Field	Magnesium Lab	Manganese Lab	Manganese Field	Mercury Lab	Nickel Lab	Potassium Lab
Background Mean, Exceedances **Bold**				**0.50**	**23**	**23**	**150**	**0.51**	**1.6**	**1.6**	**3900**	**11**	**11**	5.9	**35**	19600	**17**	**17**	**3500**	**540**	**540**	**0.021**	**5.3**	**3000**
Background Maximum, Exceedances Underline				3.9	120	120	290	1.3	8.9	8.9	14000	48	48	9.5	301	35300	190	190	5700	1100	1100	0.20	21	5300
Background 95% UPL, Exceedances *Italic*				*1.0*	*40*	*40*	*170*	*0.55*	*1.1*	*1.1*	*4500*	*12*	*12*	6.1	*64*	20600	*35*	*35*	*3700*	*570*	*570*	*0.038*	*6.0*	*3200*
Location ID	**Sample Date**	**Depth**	**Sample Type**																					
TBWRS-1	5/15/2009	0 - 2 in	N	--	--	***59***	--	--	--	***54***	--	--	***122***	--	--	--	--	***60***	--	--	458	--	--	--
TBWRS-1	5/15/2009	2 - 12 in	N	--	--	**34**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**19 J**	--	--	488	--	--	--
TBWRS-1	6/3/2009	0 - 2 in	N	***2.490***	***67.5***	--	**157**	***0.60 J***	***42.1***	--	***18400***	***36.1***	--	4.5	***100***	17800	***38.7***	--	3380	455	--	***0.190***	***10.3***	2770
TBWRS-2	5/15/2009	0 - 2 in	N	--	--	***43***	--	--	--	***3 J***	--	--	***31***	--	--	--	--	***37***	--	--	***593***	--	--	--
TBWRS-2	5/15/2009	2 - 12 in	N	--	--	**35**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**20 J**	--	--	503	--	--	--
TBWRS-3	5/15/2009	0 - 2 in	N	--	--	***49***	--	--	--	***18***	--	--	***98***	--	--	--	--	***57***	--	--	443	--	--	--
TBWRS-3	5/15/2009	2 - 12 in	N	--	--	**33**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	17 J	--	--	**548**	--	--	--
TBWRS-4	5/15/2009	0 - 2 in	N	--	--	***57***	--	--	--	***17***	--	--	***57***	--	***171***	--	--	***72***	--	--	533	--	--	--
TBWRS-4	5/15/2009	2 - 12 in	N	--	--	***55***	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**23**	--	--	465	--	--	--
TBWRS-5	5/15/2009	0 - 2 in	N	--	--	***41***	--	--	--	***11 J***	--	--	***40***	--	--	--	--	***56***	--	--	420	--	--	--
TBWRS-5	5/15/2009	2 - 12 in	N	--	--	**40**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**25**	--	--	420	--	--	--
TBWRS-6	5/16/2009	0 - 2 in	N	--	--	**37**	--	--	--	***15 J***	--	--	***89***	--	***130***	--	--	***72***	--	--	345	--	--	--
TBWRS-6	5/16/2009	2 - 12 in	N	--	--	**35**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	17 J	--	--	308	--	--	--
TBWRS-7	5/16/2009	0 - 2 in	N	--	--	***44***	--	--	--	***17 J***	--	--	***65***	--	***101***	--	--	***63***	--	--	488	--	--	--
TBWRS-7	5/16/2009	2 - 12 in	N	--	--	**35**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	11 J	--	--	360	--	--	--
TBWRS-8	5/16/2009	0 - 2 in	N	--	--	16 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	17 J	--	--	165 J	--	--	--
TBWRS-8	5/16/2009	2 - 12 in	N	--	--	< 11	--	--	--	< 0.2	--	--	< 2	--	--	--	--	12 J	--	--	165 J	--	--	--
TBWRS-9	5/16/2009	0 - 2 in	N	--	--	14 J	--	--	--	***7 J***	--	--	< 2	--	--	--	--	17 J	--	--	**548**	--	--	--
TBWRS-9	5/16/2009	2 - 12 in	N	--	--	22 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	15 J	--	--	510	--	--	--
TBWRS-10	5/16/2009	0 - 2 in	N	--	--	***55***	--	--	--	< 0.2	--	--	***25 J***	--	***116***	--	--	***65***	--	--	315	--	--	--
TBWRS-10	5/16/2009	2 - 12 in	N	--	--	17 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	10 J	--	--	330	--	--	--
TBWRS-11	5/17/2009	0 - 2 in	N	--	--	**36**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	***59***	--	--	338	--	--	--
TBWRS-11	5/17/2009	2 - 12 in	N	--	--	**26**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	11 J	--	--	315	--	--	--
TBWRS-11	6/3/2009	0 - 2 in	N	***1.830***	**23.5**	--	**157**	**0.54 J**	***3.5***	--	***6100***	***12.1***	--	4.8	***134***	17800	***41.4***	--	***3740***	356	--	***0.051***	4.5	***3470***
TBWRS-12	5/17/2009	0 - 2 in	N	--	***72.3***	***75***	--	--	--	< 0.2	--	--	**12 J**	--	***130***	--	--	***49***	--	--	465	--	--	--
TBWRS-12	5/17/2009	2 - 12 in	N	--	--	17 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	8 J	--	--	368	--	--	--
TBWRS-13	5/17/2009	0 - 2 in	N	--	--	***101***	--	--	--	< 0.2	--	--	< 2	--	--	--	--	***72***	--	--	***668***	--	--	--
TBWRS-13	5/17/2009	2 - 12 in	N	--	--	***41***	--	--	--	< 0.2	--	--	< 2	--	--	--	--	9 J	--	--	***593***	--	--	--
TBWRS-13	6/3/2009	0 - 2 in	N	***4.390 J***	***129***	--	***285***	***0.61 J***	***8.8***	--	***5050***	***16.2***	--	5.6	***355***	17200	***118***	--	3370 J	***943***	--	***0.170***	***6.5***	***5130***
TBWRS-14	5/16/2009	0 - 2 in	N	--	***88.7***	***95***	--	--	--	< 0.2	--	--	9 J	--	--	--	--	***42***	--	--	473	--	--	--
TBWRS-14	5/16/2009	2 - 12 in	N	--	--	23 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	11 J	--	--	375	--	--	--
TBWRS-15	5/16/2009	0 - 2 in	N	--	--	**31 J**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	***47***	--	--	533	--	--	--
TBWRS-15	5/16/2009	2 - 12 in	N	--	--	**26**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	5 J	--	--	330	--	--	--
TBWRS-16	5/16/2009	0 - 2 in	N	--	--	***57***	--	--	--	< 0.2	--	--	< 2	--	--	--	--	***87***	--	--	443	--	--	--
TBWRS-16	5/16/2009	2 - 12 in	N	--	--	**33**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**19 J**	--	--	480	--	--	--
TBWRS-16	6/3/2009	0 - 2 in	N	***2.500***	***55.7***	--	127	0.44 J	***2.8***	--	3730	**11.9**	--	4.6	***125***	16200	***47.5***	--	1680	397	--	***0.049***	2.8 J	2350
			FD	***2.540***	***63.0***	--	127	0.47	***2.4***	--	3630	***12.9***	--	4.1	***125***	18500	***44.8***	--	1770	385	--	***0.047***	2.6	2480
TBWRS-17	5/17/2009	0 - 2 in	N	--	--	< 12	--	--	--	< 0.2	--	--	< 2	--	--	--	--	10 J	--	--	398	--	--	--
TBWRS-17	5/17/2009	2 - 12 in	N	--	--	**33**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**19 J**	--	--	443	--	--	--
TBWRS-18	5/17/2009	0 - 2 in	N	--	***86.7***	***101***	--	--	--	< 0.2	--	--	< 2	--	***148***	--	--	***59***	--	--	***608***	--	--	--
TBWRS-18	5/17/2009	2 - 12 in	N	--	--	**28**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	12 J	--	--	473	--	--	--
TBWRS-19	5/17/2009	0 - 2 in	N	--	***105***	***95***	--	--	--	< 0.2	--	--	< 2	--	***142***	--	--	***67***	--	--	***645***	--	--	--
TBWRS-19	5/17/2009	2 - 12 in	N	--	--	**25 J**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	12 J	--	--	480	--	--	--
TBWRS-20	5/17/2009	0 - 2 in	N	--	***57.0***	***69***	--	--	--	< 0.2	--	--	< 2	--	***103***	--	--	***55***	--	--	**563**	--	--	--
TBWRS-20	5/17/2009	2 - 12 in	N	--	--	**25**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	5 J	--	--	465	--	--	--
TBWRS-21	5/17/2009	0 - 2 in	N	--	***82.2***	***82***	--	--	--	< 0.2	--	--	3 J	--	--	--	--	**28**	--	--	495	--	--	--
TBWRS-21	5/17/2009	2 - 12 in	N	--	--	11 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	13 J	--	--	405	--	--	--
TBWRS-22	5/17/2009	0 - 2 in	N	--	***70.6***	***82***	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**31**	--	--	**563**	--	--	--
TBWRS-22	5/17/2009	2 - 12 in	N	--	--	**26**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	10 J	--	--	488	--	--	--
TBWRS-23	5/18/2009	0 - 2 in	N	--	--	**26 J**	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**29**	--	--	323	--	--	--
TBWRS-23	5/18/2009	2 - 12 in	N	--	--	20 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	**23**	--	--	255	--	--	--
TBWRS-24	5/18/2009	0 - 2 in	N	--	***84.0***	***88***	--	--	--	< 0.2	--	--	< 2	--	--	--	--	***65***	--	--	480	--	--	--
TBWRS-24	5/18/2009	2 - 12 in	N	--	--	18 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	8 J	--	--	405	--	--	--
TBWRS-25	5/17/2009	0 - 2 in	N	--	***97.8***	***114***	--	--	--	< 0.2	--	--	< 2	--	***133***	--	--	***40***	--	--	***593***	--	--	--
TBWRS-25	5/17/2009	2 - 12 in	N	--	--	15 J	--	--	--	< 0.2	--	--	< 2	--	--	--	--	9 J	--	--	473	--	--	--

Table 5.5.1-13
Surface Soil Data - Metals
SWMU 1
Rhodia Silver Bow Plant
[concentrations in mg/kg]

			Chemical Name	Selenium	Selenium	Silver	Silver	Sodium	Thallium	Uranium	Uranium	Vanadium	Vanadium	Zinc	Zinc
			Analysis Location	Lab	Field	Lab	Field	Lab	Lab	Lab	Field	Lab	Field	Lab	Field
Background Mean, Exceedances **Bold**				**0.41**	**0.41**	**0.73 (1)**	**0.73 (1)**	**140**	**0.35**	**1.8**	**1.8**	**41**	**41**	**59**	**59**
Background Maximum, Exceedances Underline				0.70	0.70	1.7 (1)	1.7 (1)	620	1.0	4.1	4.1	83	83	380	380
Background 95% UPL, Exceedances *Italic*				*0.47*	*0.47*	*0.35 (1)*	*0.35 (1)*	220	*0.46*	*2.0*	*2.0*	*43*	*43*	*98*	*98*
Location ID	**Sample Date**	**Depth**	**Sample Type**												
TBWRS-1	5/15/2009	0 - 2 in	N	--	***4 J***	--	< 0.4	--	--	--	***6 J***	--	***150***	--	***472***
TBWRS-1	5/15/2009	2 - 12 in	N	--	< 0.7	--	< 0.4	--	--	--	< 6	--	20 J	--	**82**
TBWRS-1	6/3/2009	0 - 2 in	N	***3.3***	--	***1.4 J***	--	**182**	***1.200***	***5.440***	--	***73.2***	--	***306***	--
TBWRS-2	5/15/2009	0 - 2 in	N	--	< 0.7	--	< 0.4	--	--	--	< 6	--	14 J	--	***207***
TBWRS-2	5/15/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 6	--	< 2	--	43
TBWRS-3	5/15/2009	0 - 2 in	N	--	< 1	--	< 0.4	--	--	--	***4 J***	--	***120 J***	--	***352***
TBWRS-3	5/15/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 7	--	< 2	--	56
TBWRS-4	5/15/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	***5 J***	--	***60 J***	--	***323***
TBWRS-4	5/15/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 7	--	< 2	--	**62**
TBWRS-5	5/15/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 6	--	***60 J***	--	***272***
TBWRS-5	5/15/2009	2 - 12 in	N	--	< 1	--	< 0.4	--	--	--	< 7	--	< 2	--	**68**
TBWRS-6	5/16/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	***3 J***	--	***120 J***	--	***397***
TBWRS-6	5/16/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 5	--	< 2	--	**62**
TBWRS-7	5/16/2009	0 - 2 in	N	--	< 1	--	< 0.4	--	--	--	**2 J**	--	***135 J***	--	***294***
TBWRS-7	5/16/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 7	--	***75 J***	--	46
TBWRS-8	5/16/2009	0 - 2 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 2	--	**88**
TBWRS-8	5/16/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 7	--	< 2	--	51
TBWRS-9	5/16/2009	0 - 2 in	N	--	< 1	--	< 0.4	--	--	--	< 6	--	< 2	--	**95**
TBWRS-9	5/16/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 8	--	< 2	--	**75**
TBWRS-10	5/16/2009	0 - 2 in	N	--	< 3	--	< 0.4	--	--	--	***3 J***	--	30 J	--	***157***
TBWRS-10	5/16/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 8	--	< 2	--	36
TBWRS-11	5/17/2009	0 - 2 in	N	--	< 3	--	< 1	--	--	--	***3 J***	--	14 J	--	***136***
TBWRS-11	5/17/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 7	--	< 2	--	41
TBWRS-11	6/3/2009	0 - 2 in	N	< 0.8	--	< 0.4	--	**188**	**0.405**	**1.820**	--	***43.1***	--	***123***	--
TBWRS-12	5/17/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 6	--	26 J	--	***102***
TBWRS-12	5/17/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 2	--	34 J
TBWRS-13	5/17/2009	0 - 2 in	N	--	< 0.7	--	< 1	--	--	--	< 5	--	6 J	--	***193***
TBWRS-13	5/17/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 5	--	< 2	--	**62**
TBWRS-13	6/3/2009	0 - 2 in	N	< 0.8	--	***1.2 J***	--	84.2	***0.556***	***2.290***	--	35.3	--	***235***	--
TBWRS-14	5/16/2009	0 - 2 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	***45 J***	--	***129***
TBWRS-14	5/16/2009	2 - 12 in	N	--	< 1	--	< 0.4	--	--	--	< 7	--	< 2	--	33 J
TBWRS-15	5/16/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 7	--	21 J	--	***102***
TBWRS-15	5/16/2009	2 - 12 in	N	--	< 1	--	***1 J***	--	--	--	< 6	--	3 J	--	28 J
TBWRS-16	5/16/2009	0 - 2 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	12 J	--	***143***
TBWRS-16	5/16/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 2	--	49
TBWRS-16	6/3/2009	0 - 2 in	N	< 0.7	--	***0.9 J***	--	82.7	0.324	1.550	--	***45.3***	--	***109***	--
			FD	< 0.7	--	< 0.4	--	105	0.334	1.760	--	***52.9***	--	***106***	--
TBWRS-17	5/17/2009	0 - 2 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 2	--	54
TBWRS-17	5/17/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 2	--	54
TBWRS-18	5/17/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 7	--	< 2	--	***150***
TBWRS-18	5/17/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 8	--	< 2	--	57
TBWRS-19	5/17/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 6	--	29 J	--	***143***
TBWRS-19	5/17/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 7	--	< 2	--	50
TBWRS-20	5/17/2009	0 - 2 in	N	--	< 0.7	--	< 1	--	--	--	< 4	--	< 2	--	***136***
TBWRS-20	5/17/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 2	--	35
TBWRS-21	5/17/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 7	--	< 2	--	**82**
TBWRS-21	5/17/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 7	--	20 J	--	38 J
TBWRS-22	5/17/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 7	--	< 2	--	**88**
TBWRS-22	5/17/2009	2 - 12 in	N	--	< 1	--	< 1	--	--	--	< 6	--	< 11	--	43
TBWRS-23	5/18/2009	0 - 2 in	N	--	< 1	--	< 1	--	--	--	< 6	--	< 2	--	***123***
TBWRS-23	5/18/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 7	--	< 2	--	58
TBWRS-24	5/18/2009	0 - 2 in	N	--	< 0.7	--	< 0.4	--	--	--	< 6	--	< 2	--	***123***
TBWRS-24	5/18/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 9	--	41
TBWRS-25	5/17/2009	0 - 2 in	N	--	< 1	--	< 0.4	--	--	--	< 6	--	< 2	--	**88**
TBWRS-25	5/17/2009	2 - 12 in	N	--	< 0.7	--	< 1	--	--	--	< 6	--	< 12	--	49

Table 5.5.1-14
Surface Soil Data - Radionuclides
SWMU 1
Rhodia Silver Bow Plant
[concentration in pCi/g]

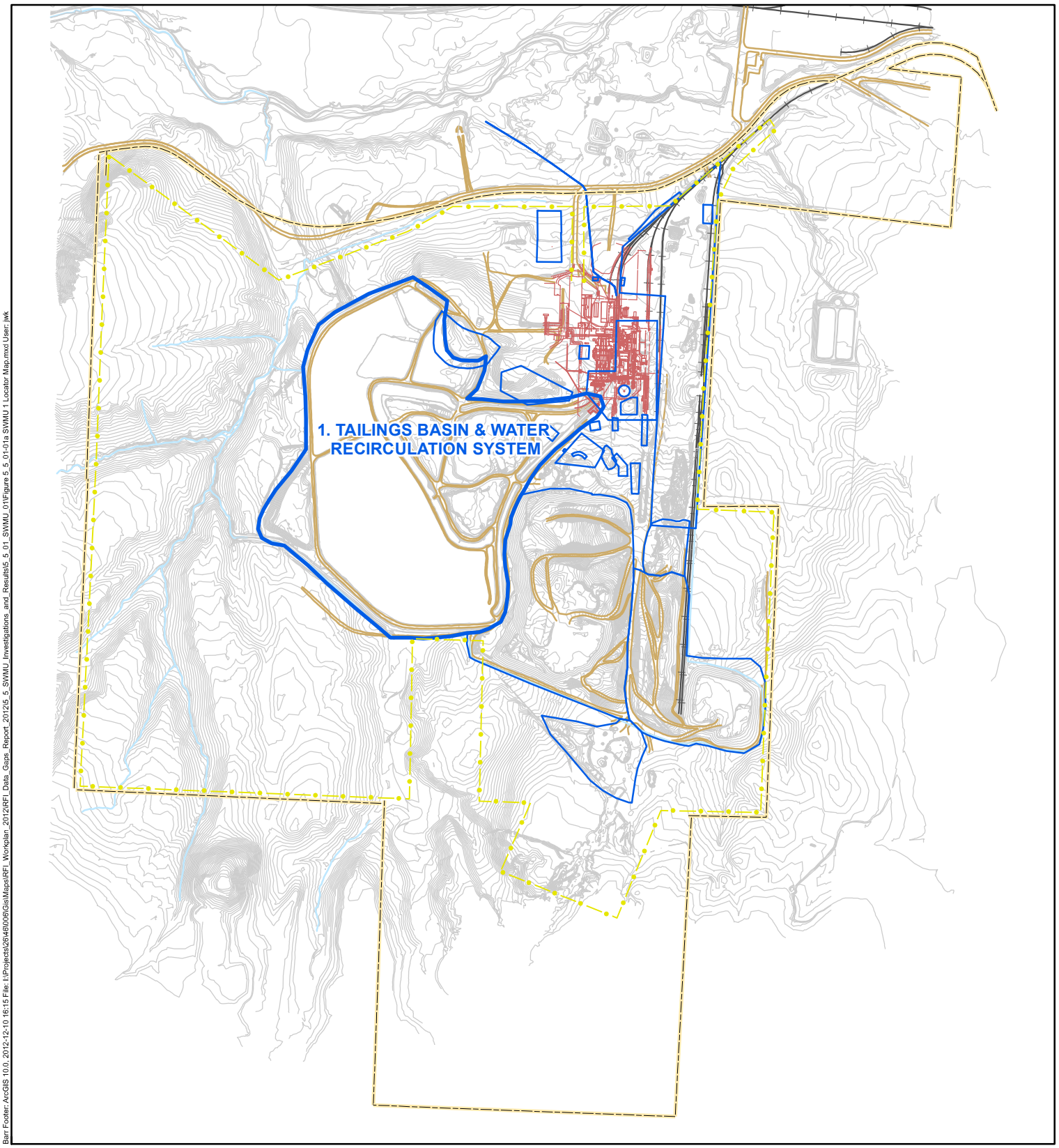
			Chemical Name	Lead 210	Radium 226	Thorium 230	Uranium 234	Uranium 235	Uranium 238
Background Mean, Exceedances **Bold**					**3.6**	**0.96**	**0.73**		**0.78**
Background Maximum, Exceedances Underline					12	3.4	2.8		2.7
Background 95% UPL, Exceedances *Italic*					*5.0*	*1.7*	*1.6*		*1.6*
Location ID	**Sample Date**	**Depth**	**Sample Type**						
TBWRS-1	06/03/2009	0 - 2 in	N	< 5.7	***14 +/- 1.8***	***1.8 +/- 0.49***	***2.3 +/- 0.48***	< 0.18	***2.15 +/- 0.44***
TBWRS-11	06/03/2009	0 - 2 in	N	< 5.3	***8.3 +/- 1.4***	< 0.62	0.47 +/- 0.27	< 0.23	0.76 +/- 0.31
TBWRS-13	06/03/2009	0 - 2 in	N	< 5.5	3.5 +/- 0.85	< 0.63	0.73 +/- 0.39	< 0.22	**0.86 +/- 0.33**
TBWRS-16	6/3/2009	0 - 2 in	N	< 6.6	***25 +/- 2.3***	0.77 +/- 0.4	**0.97 +/- 0.33**	< 0.2	**0.97 +/- 0.34**
			FD	< 5.8	**4.9 +/- 1.1**	0.7 +/- 0.37	**0.85 +/- 0.33**	< 0.2	0.78 +/- 0.32

Table 5.5.1-15

Tailing Leach Sample Data
ASTM Water Leach (ASTM D3987)
Rhodia Silver Bow Plant

Parameter	TS-1 10/30/97	TS-2 10/30/97	TS-3 10/29/97	TS-4 10/29/97	TS-5 11/02/97	TS-6 11/03/97	DT-1 10/14/97	DT-2 10/14/97
Metals - Dissolved (mg/L)								
Aluminum	<0.1	<0.1	1.4	2.3	<0.1	<0.1	<0.1	<0.1
Antimony	0.06	0.06	0.19	0.13	<0.05	0.05	<0.05	<0.05
Arsenic	0.116	0.117	0.234	0.261	0.075	0.076	<0.005	0.014
Barium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.001	0.002	0.003	<0.001	<0.001	<0.001	0.007	0.154
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	0.15	0.32	5.27	<0.03	0.04	0.11	<0.03	<0.03
Lead	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	0.03	0.03	0.16	0.06	<0.001	0.02	<0.01	<0.01
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	0.02	0.02	0.12	0.16	<0.01	0.01	<0.01	<0.01
Selenium	0.018	0.007	<0.005	0.012	<0.01	<0.005	0.015	0.02
Silver	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005
Thallium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1	0.2
Zinc	<0.01	0.03	0.12	0.32	<0.01	<0.01	<0.01	0.09
Major Constituents - Dissolved (mg/L)								
Calcium	59	28	43	45	45	61	196	238
Magnesium	8	2	8	3	11	7	2	15
Sodium	5	4	6	7	4	5	5	8
Potassium	8	5	11	8	7	9	10	12
Site-Specific Analytes (mg/L)								
Chloride	6	3	7	9	4	4	6	13
Fluoride	10.4	9.6	20.8	29.6	10.4	10.4	12	5.9
Phosphorus	15.1	15.2	21.5	2.58	15.4	24.5	9.46	1.55
Sulfate	116	29	69	61	77	100	383	534
Radionuclides (pCi/L)								
Gross Alpha	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Radium 226	<0.2	<0.2	<0.2	<0.2	0.9+/-0.2	1.2+/-0.2	1.1+/-0.1	1.4+/-0.2
Radium 228	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Total Uranium (mg/l)	0.0025	0.0012	0.0009	0.0006	0.0006	0.0005	<0.0003	0.0006
Strontium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2	<2
General Analytes (mg/L)								
Alkalinity, Total	30	13	10	8	45	30	18	31
Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.74	1.15
Nitrite	N/A	N/A	N/A	N/A	N/A	N/A	<0.05	<0.05
Total Dissolved Solids	232	121	220	179	215	279	676	931

Figures



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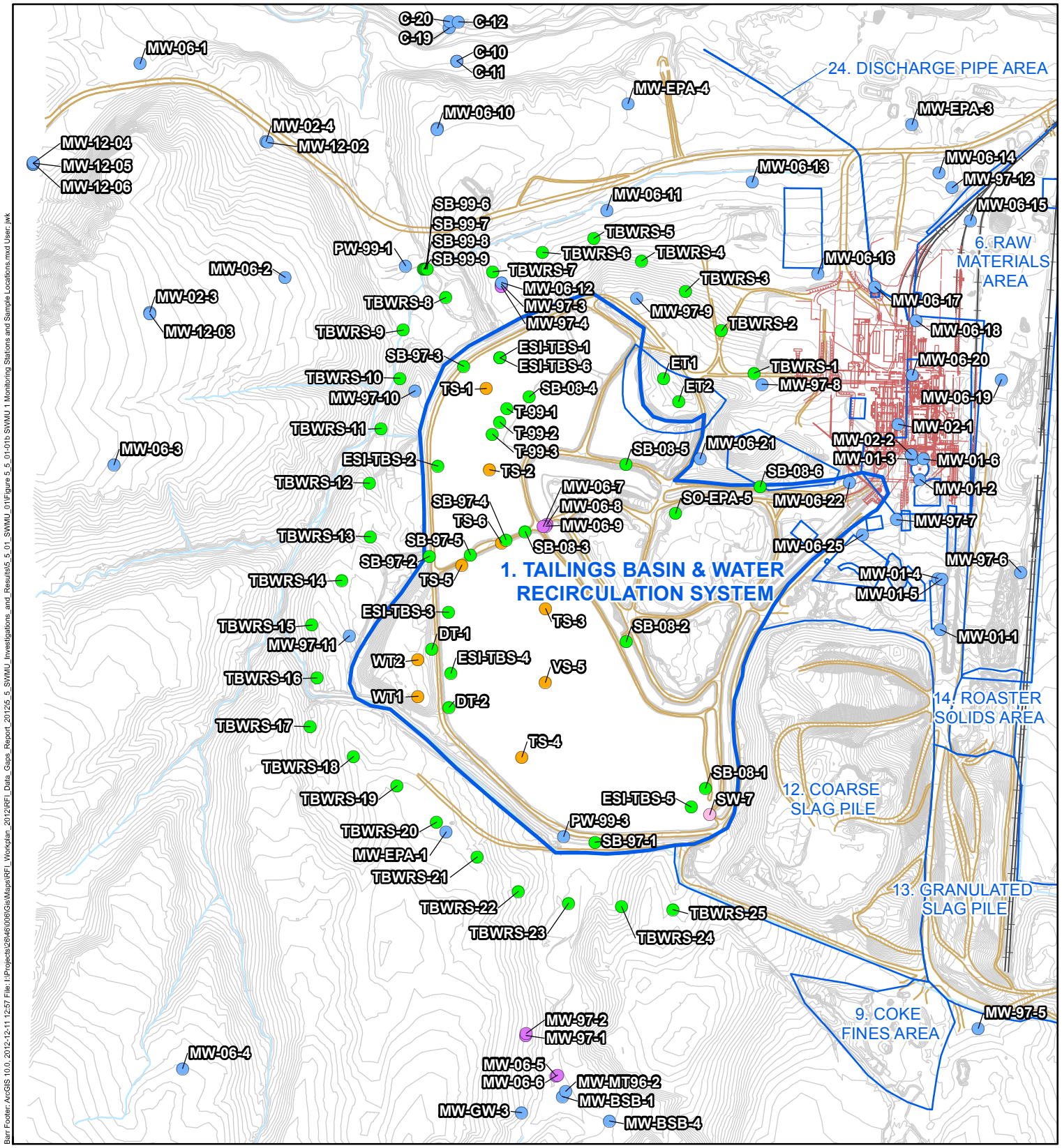
SWMU 1
Other SWMUs
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures
Property Boundary
Fence Line

N

Feet
1,000 0 1,000

Figure 5.5.1-1a

SWMU 1 LOCATION
Rhodia Silver Bow Plant
Montana



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Monitoring Well
Well Nest
Soil Sample
Tailings Sample
Process Water Sample
SWMU 1
Other SWMUs

Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

N

Feet
750 0 750

Figure 5.5.1-1b

SWMU 1
MONITORING STATIONS
AND SAMPLE LOCATIONS
Rhodia Silver Bow Plant
Montana

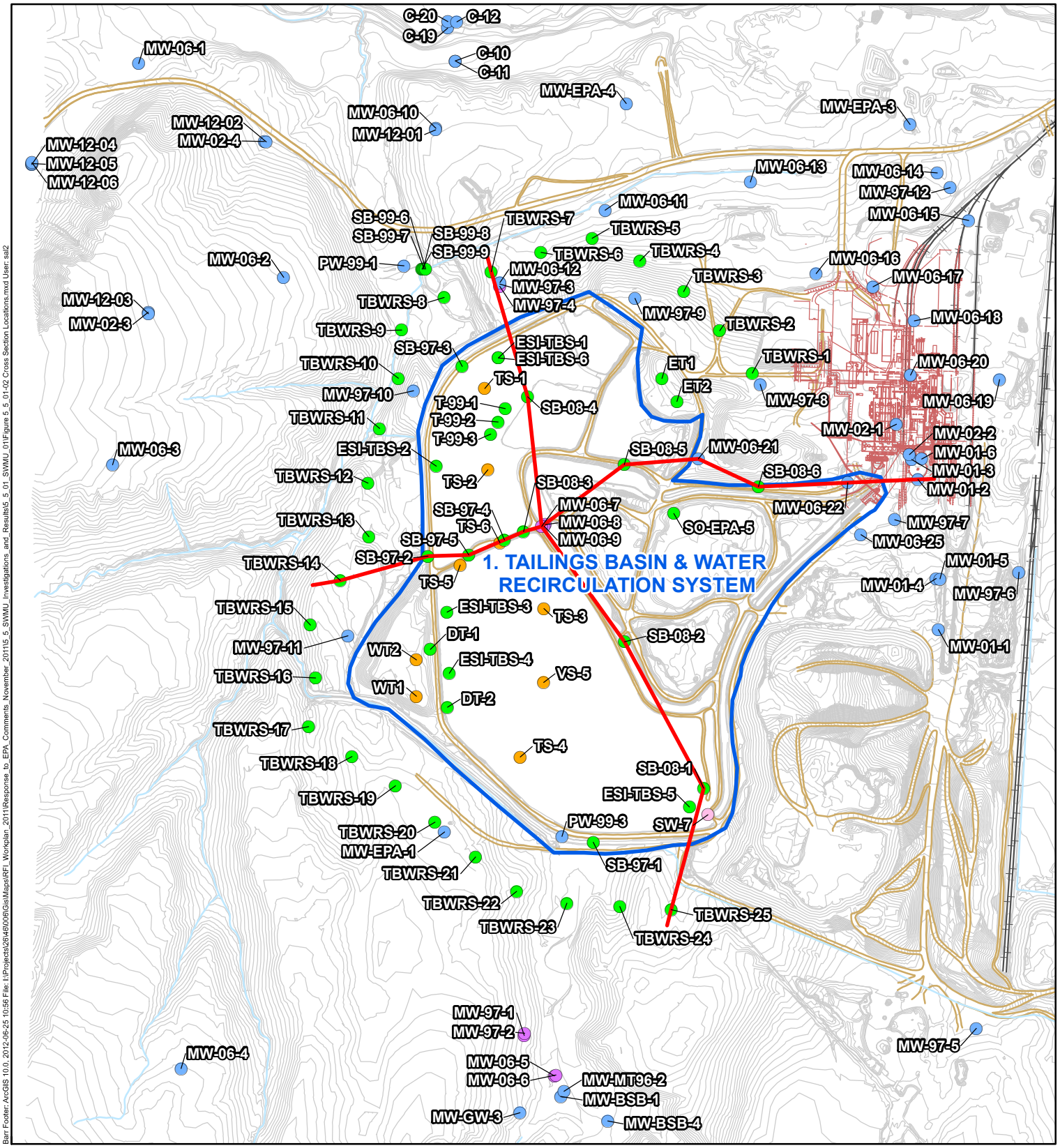

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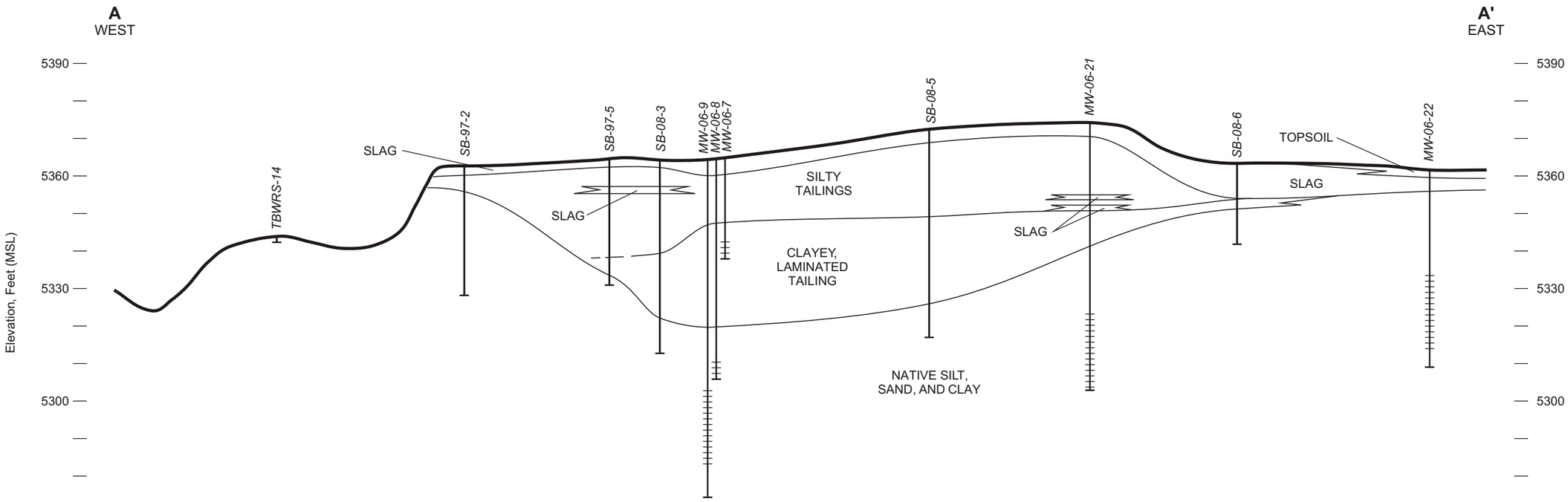
Figure 5.5.1-2

SWMU 1
CROSS SECTION LOCATIONS
Rhodia Silver Bow Plant
Montana



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-3

CONCEPTUAL CROSS SECTION A-A'
THROUGH SWMU 1
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\26246006\WorkFiles\Figures_Graphics\2012Cross Sections\Conceptual Cross SectionA-A' Thru SWMU 1.CDR RLG 12-28-12

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILT
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY
?
?
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SLAG

0 300

Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-4

CONCEPTUAL CROSS SECTION B-B'
THROUGH SWMU 1
Rhodia Silver Bow Plant
Montana

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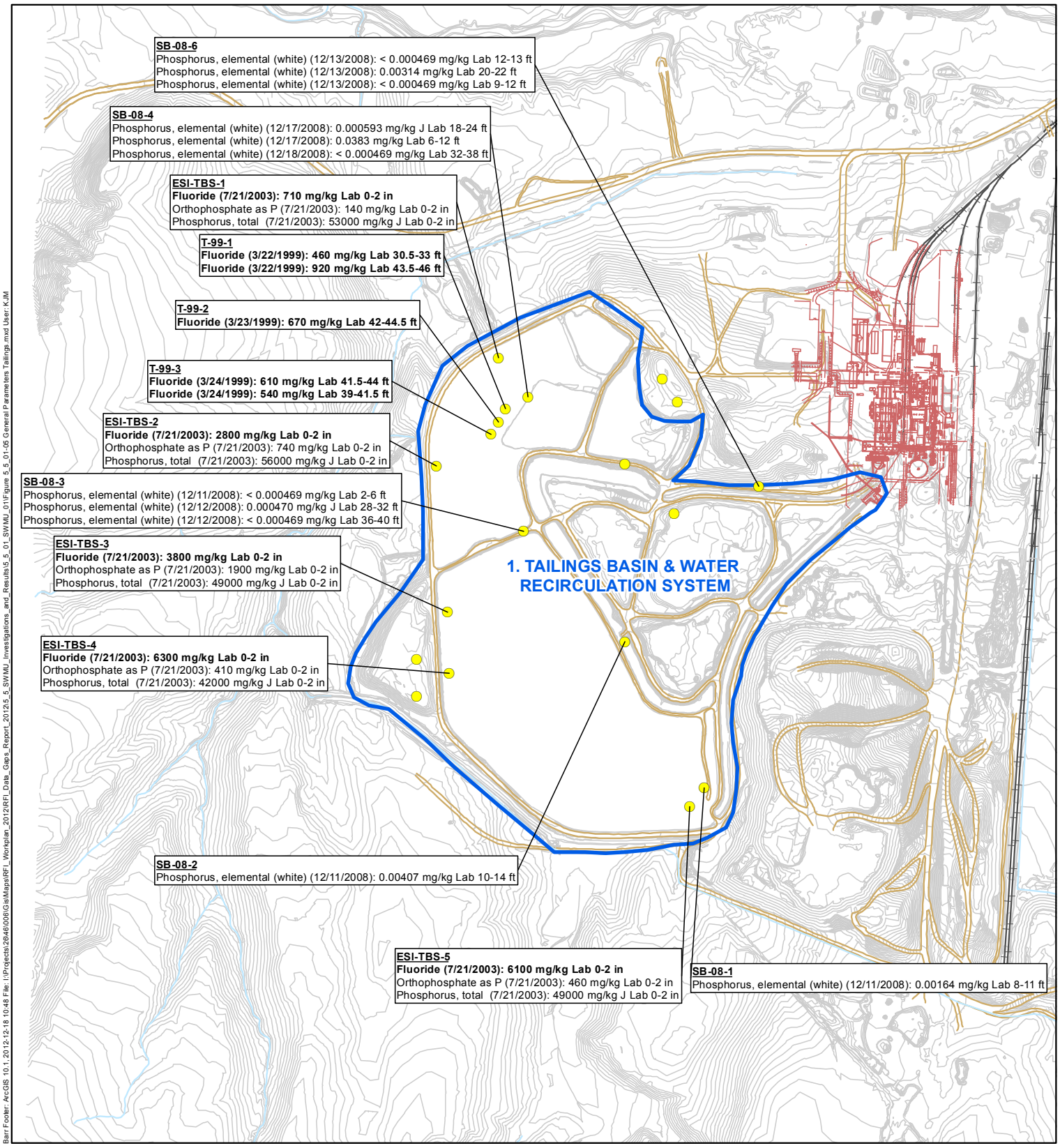

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Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

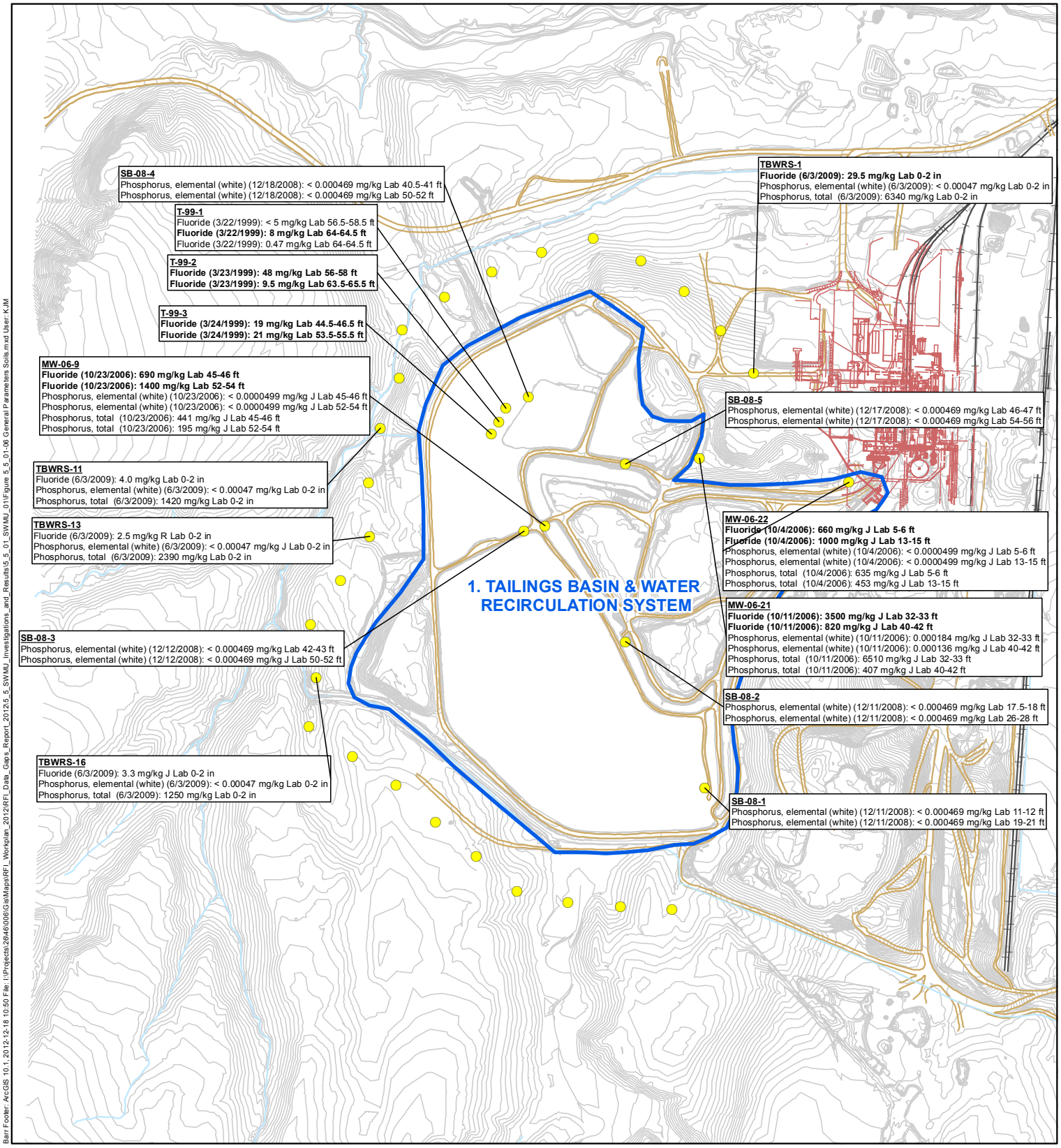
N

Feet

750 0 750

Figure 5.5.1-5

SWMU 1
TAILINGS RESULTS:
GENERAL PARAMETERS
Rhodia Silver Bow Plant
Montana



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Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

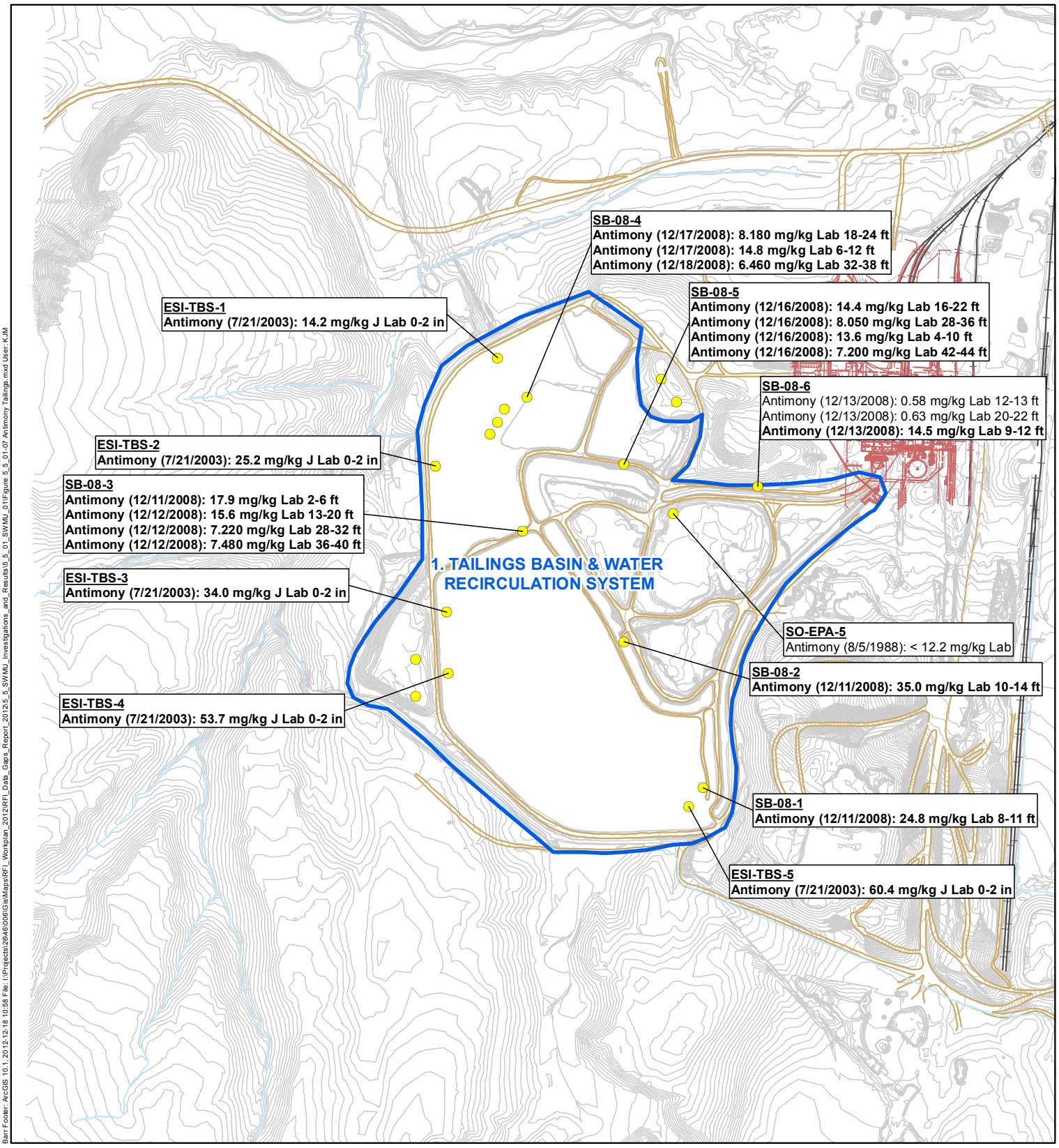
N

Feet

750 0 750

Figure 5.5.1-6

SWMU 1
SOILS RESULTS:
GENERAL PARAMETERS
Rhodia Silver Bow Plant
Montana



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- Sample Location
- SWMU 1
- Elevation Contour
- Drainage
- Railroad
- Road
- Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

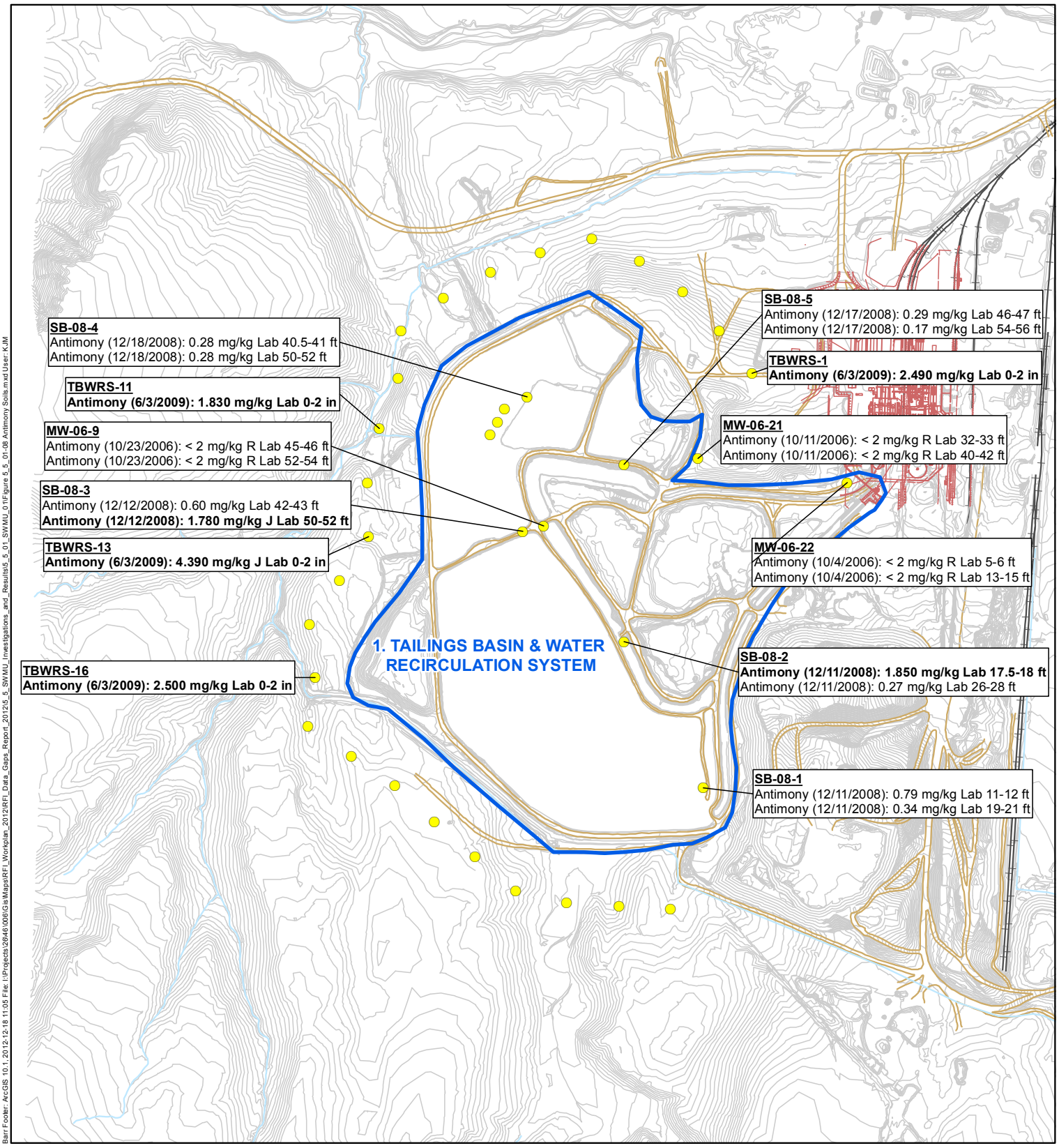
N

Feet

750 0 750

Figure 5.5.1-7

SWMU 1
TAILINGS RESULTS:
ANTIMONY
Rhodia Silver Bow Plant
Montana



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Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

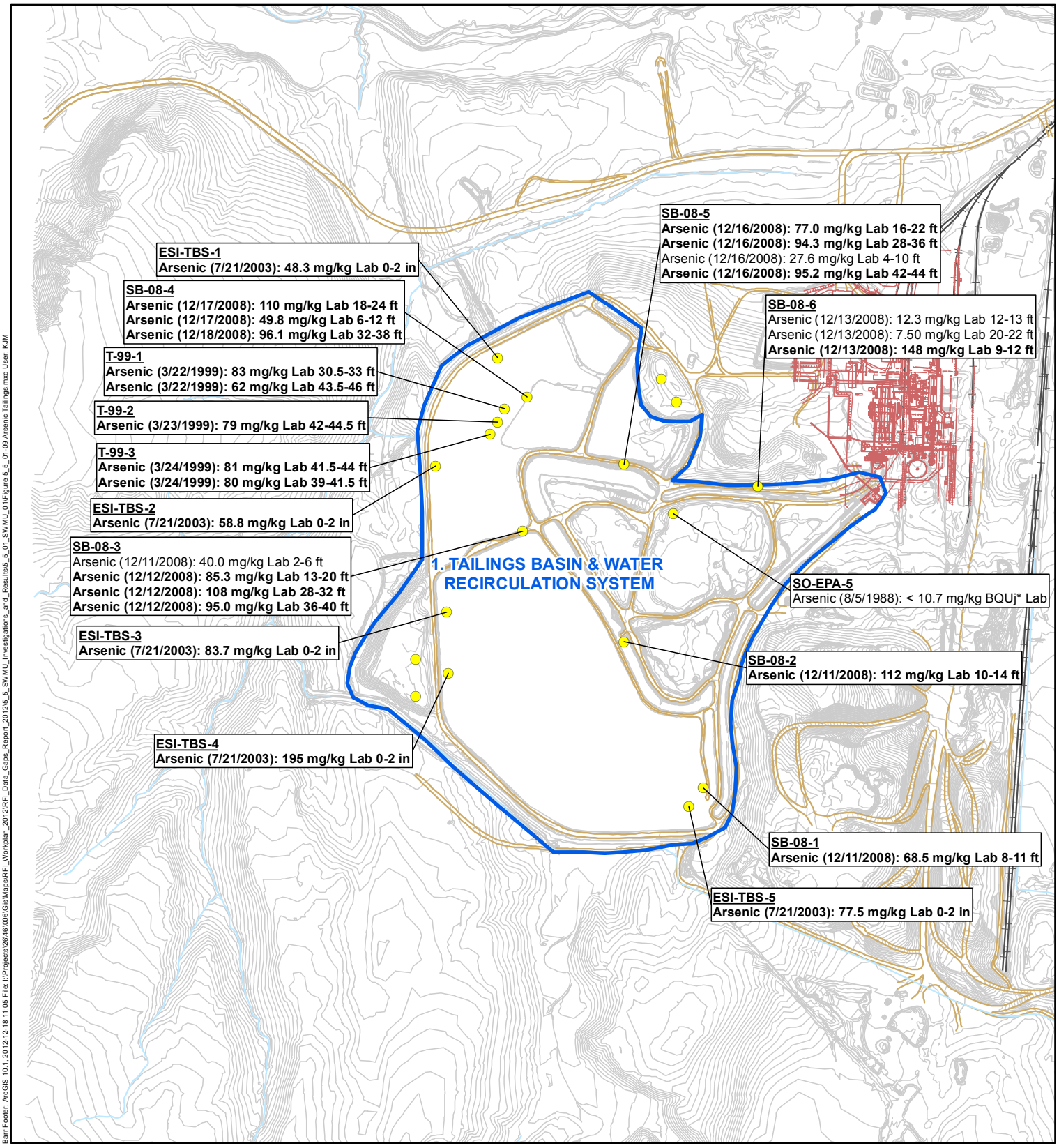
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-8

SWMU 1
SOILS RESULTS:
ANTIMONY
Rhodia Silver Bow Plant
Montana



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Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

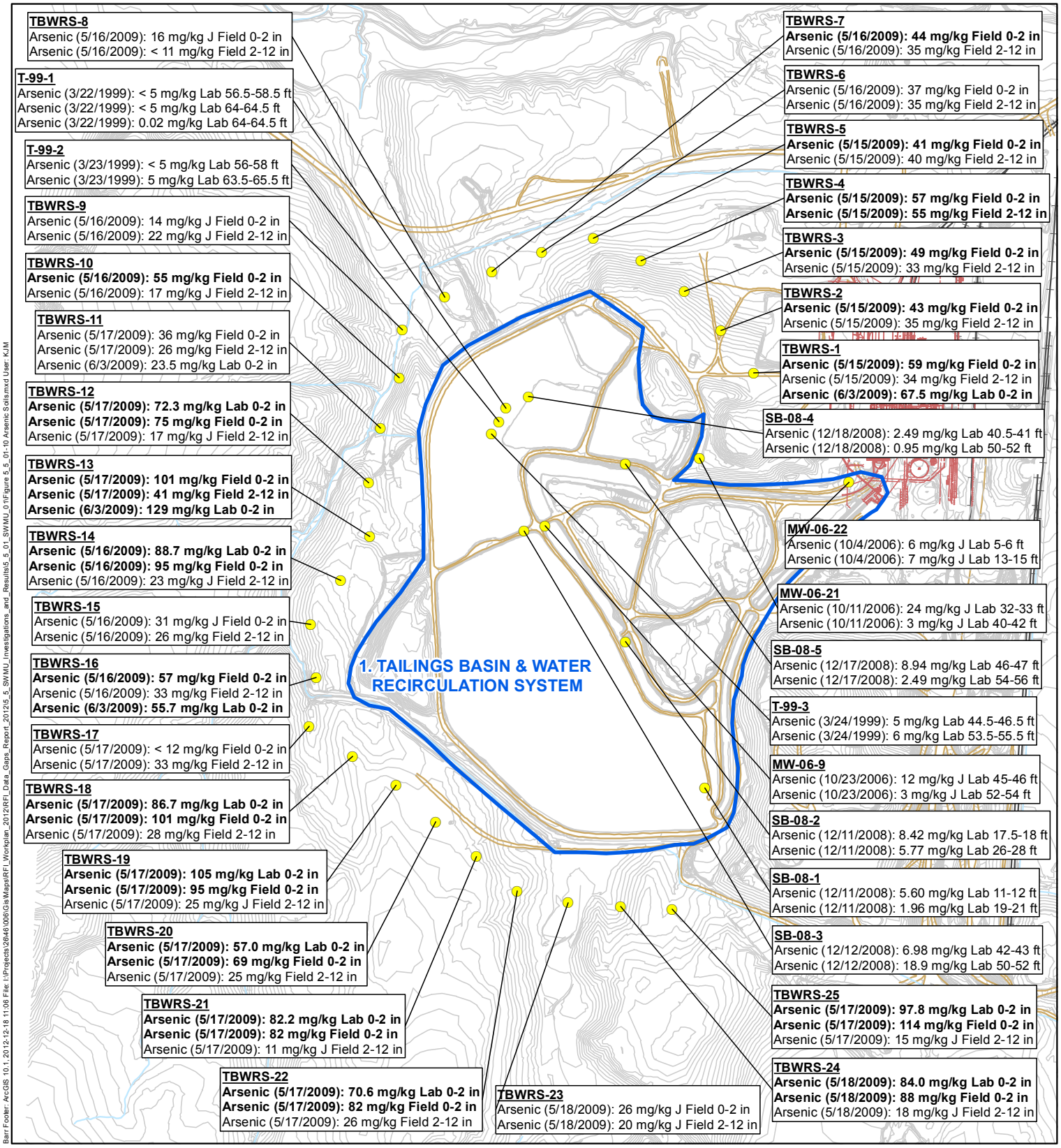
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-9

SWMU 1
TAILINGS RESULTS:
ARSENIC
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:06 File: I:\Projects\2646\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-10 Arsenic Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

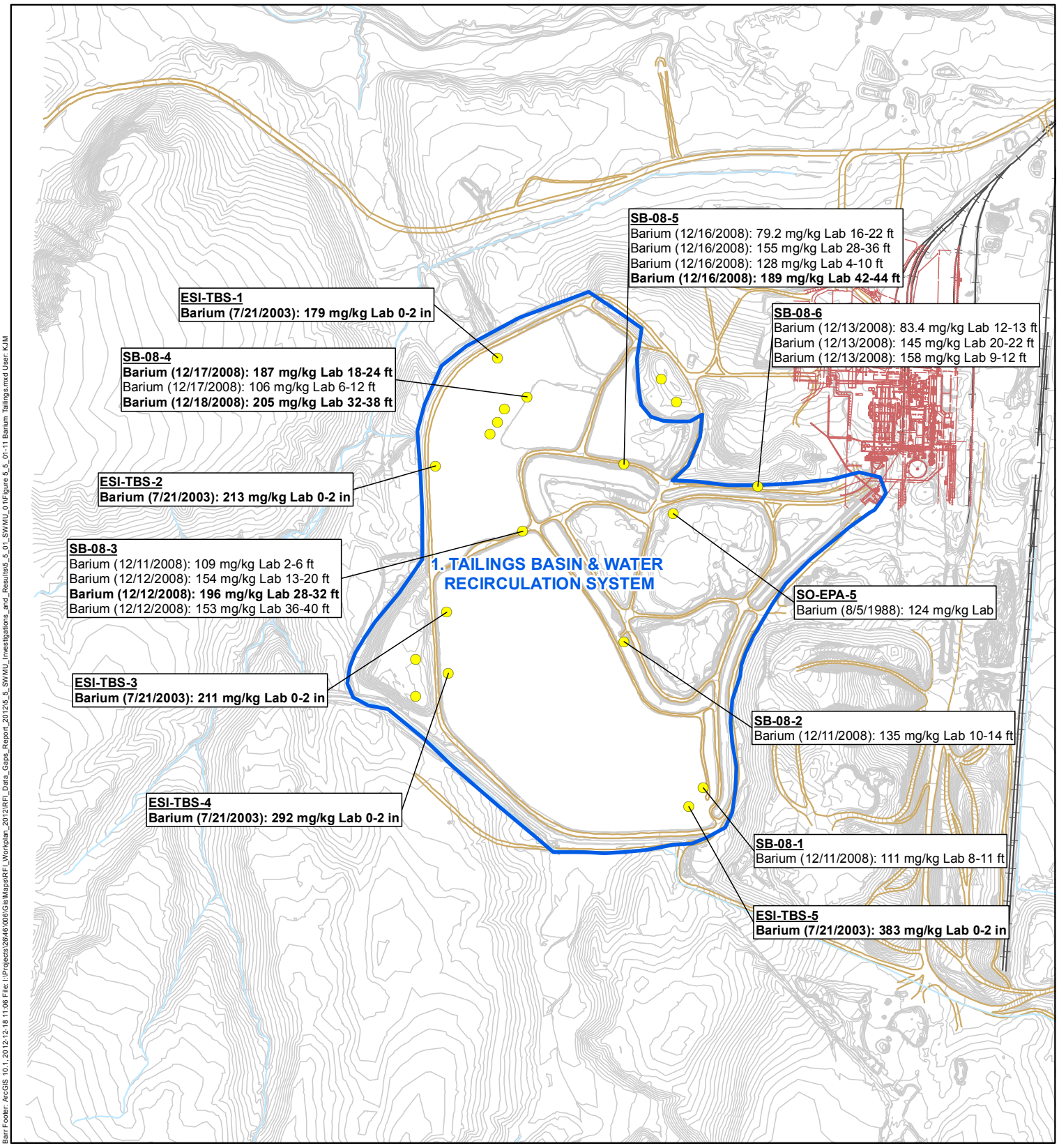
N

Feet

750 0 750

Figure 5.5.1-10

SWMU 1
SOILS RESULTS:
ARSENIC
Rhodia Silver Bow Plant
Montana



Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

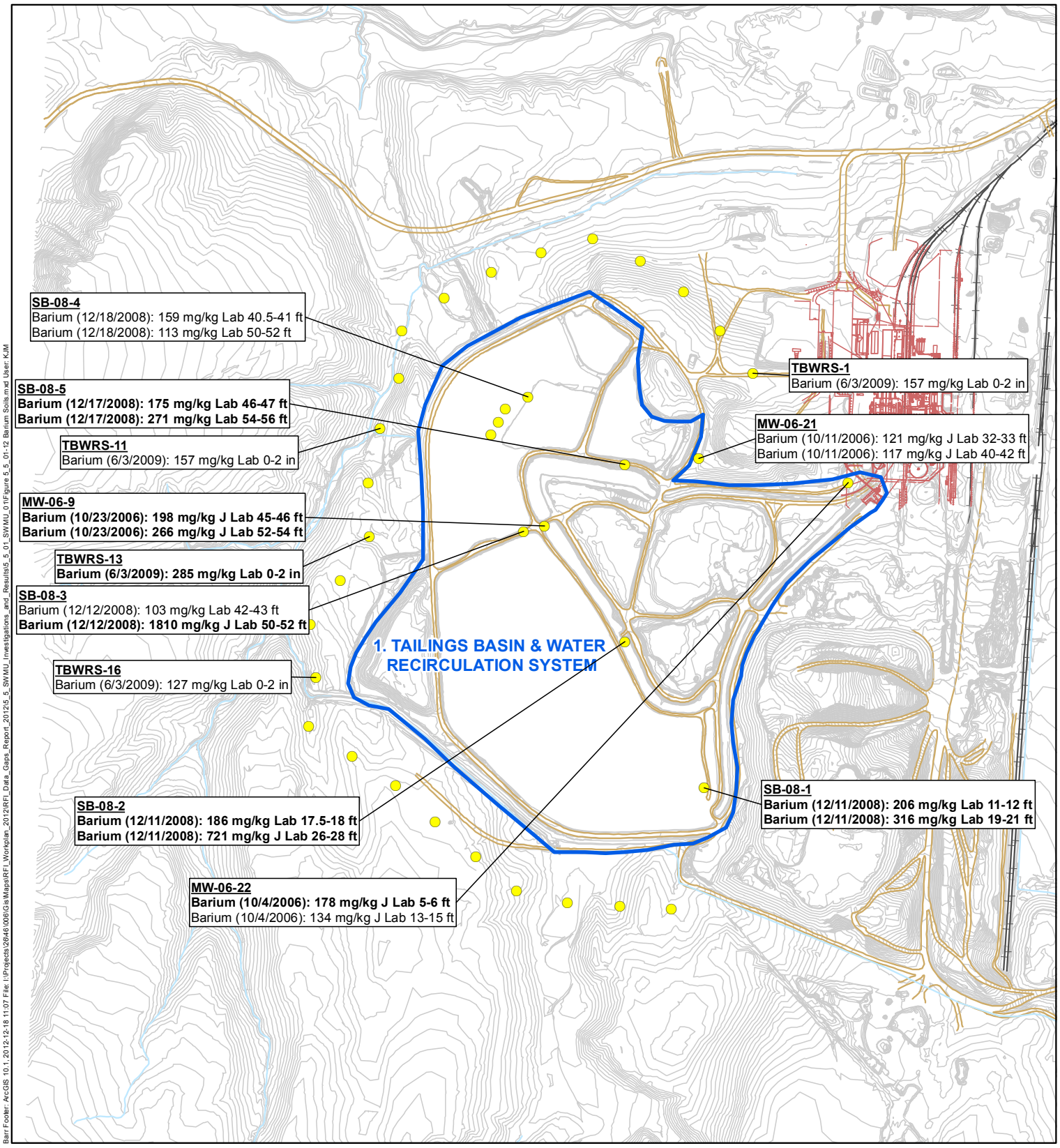
N

Feet

750 0 750

Figure 5.5.1-11

SWMU 1
TAILINGS RESULTS:
BARIUM
Rhodia Silver Bow Plant
Montana



Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

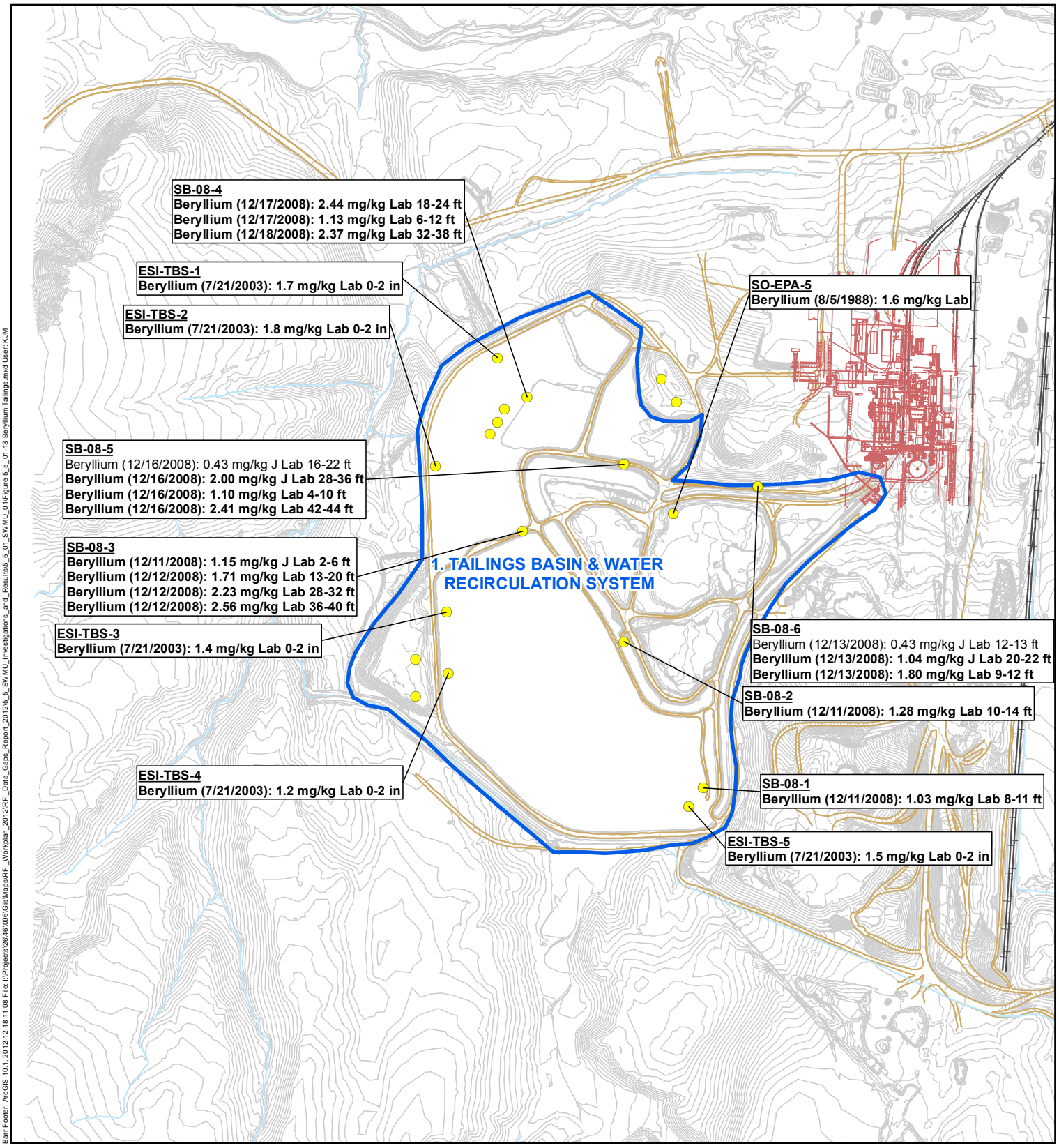
N

Feet

750 0 750

Figure 5.5.1-12

SWMU 1
SOILS RESULTS:
BARIUM
Rhodia Silver Bow Plant
Montana



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Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

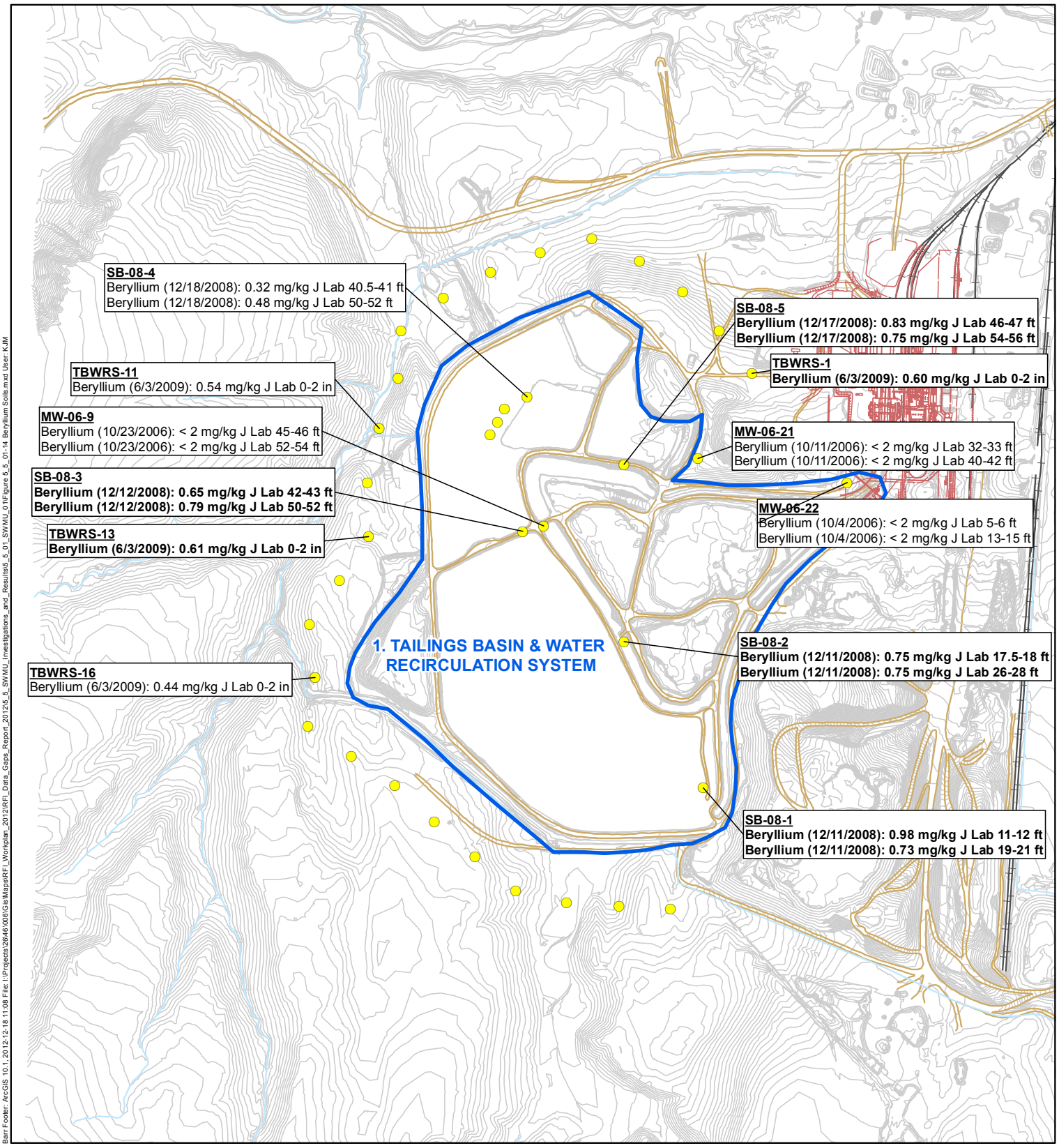
N

Feet

750 0 750

Figure 5.5.1-13

SWMU 1
TAILINGS RESULTS:
BERYLLIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:08 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-14 Beryllium Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

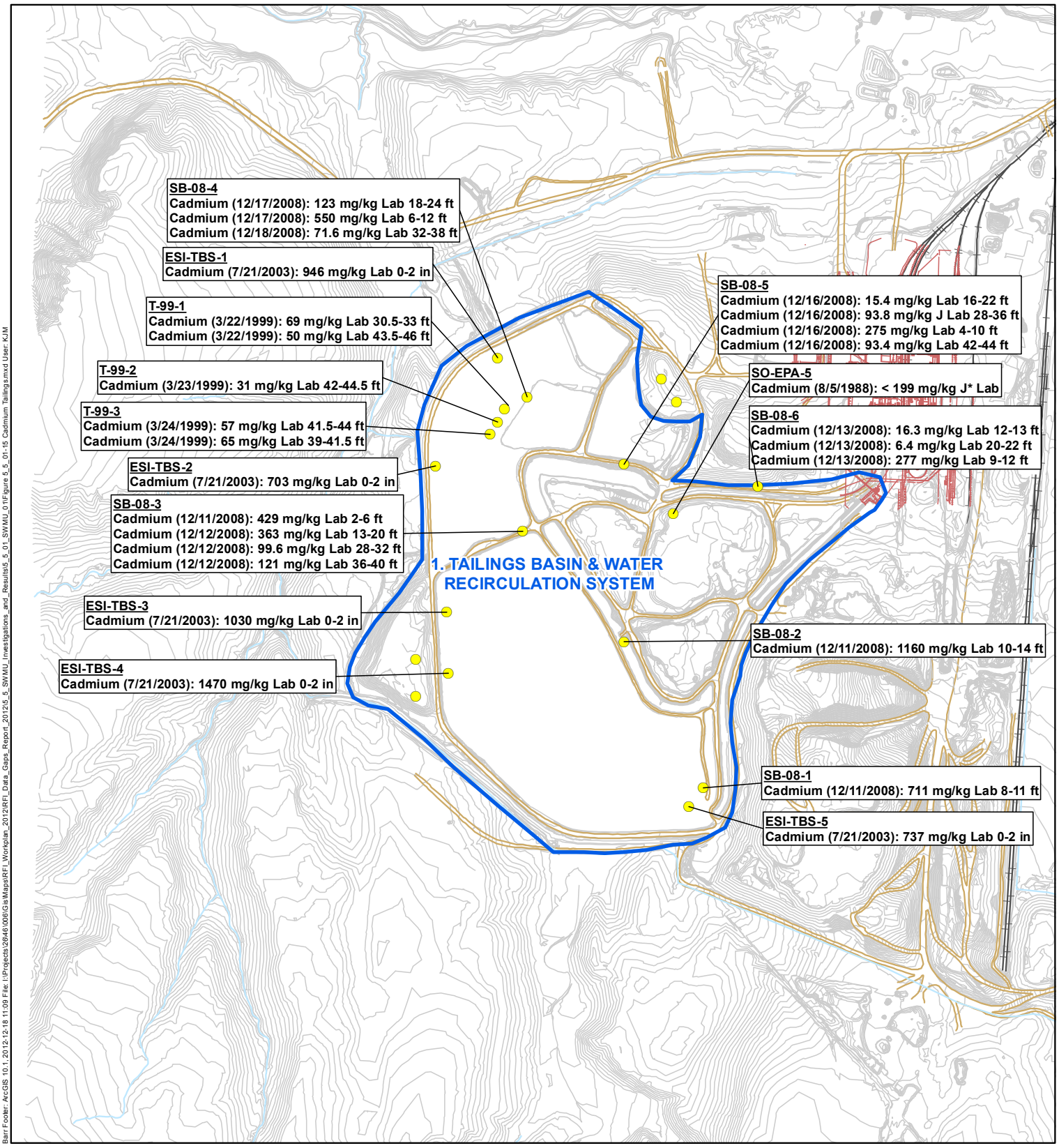
N

Feet

750 0 750

Figure 5.5.1-14

SWMU 1
SOILS RESULTS:
BERYLLIUM
Rhodia Silver Bow Plant
Montana



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Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

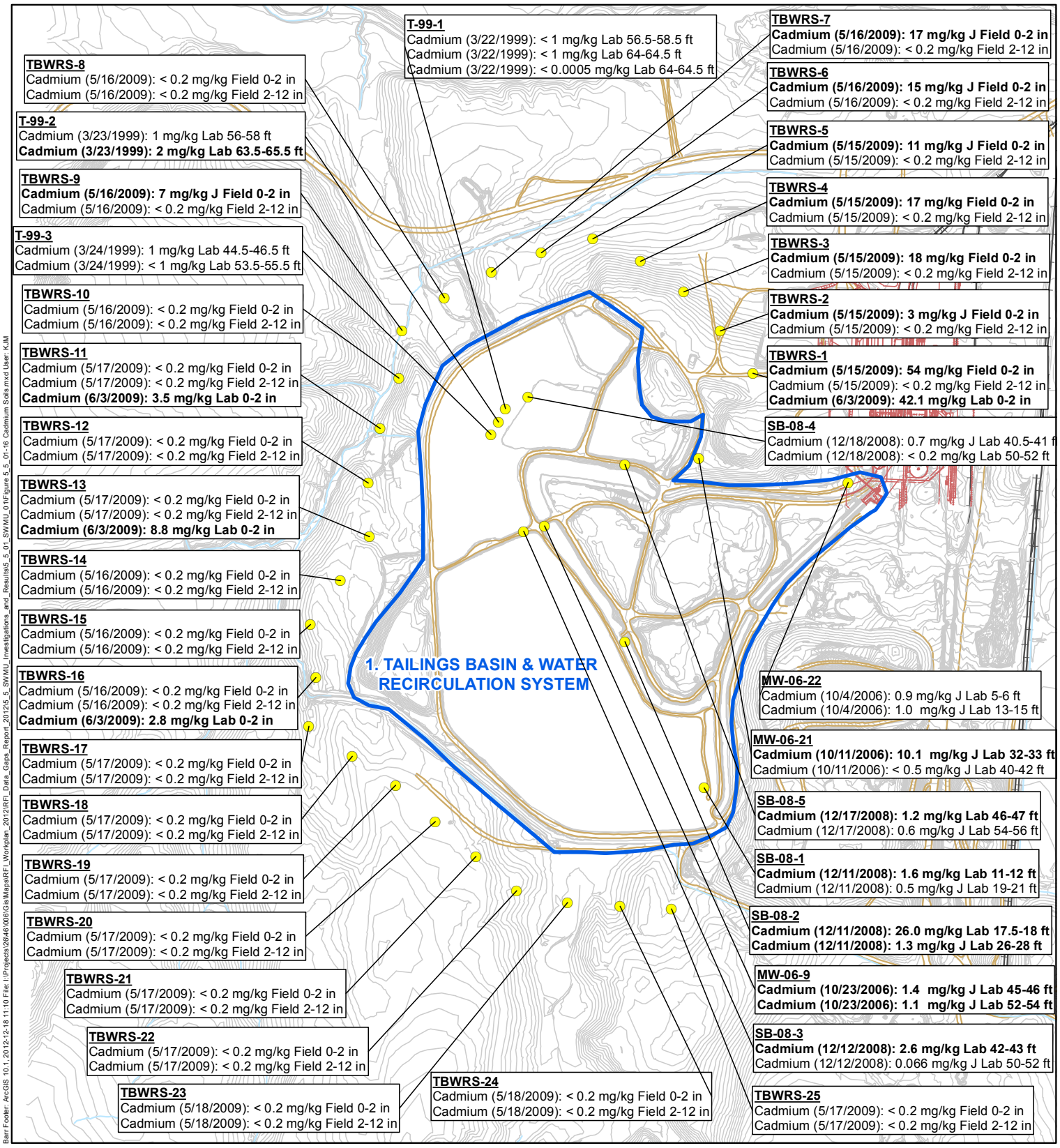
N

Feet

750 0 750

Figure 5.5.1-15

SWMU 1
TAILINGS RESULTS:
CADMIUM
Rhodia Silver Bow Plant
Montana



Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

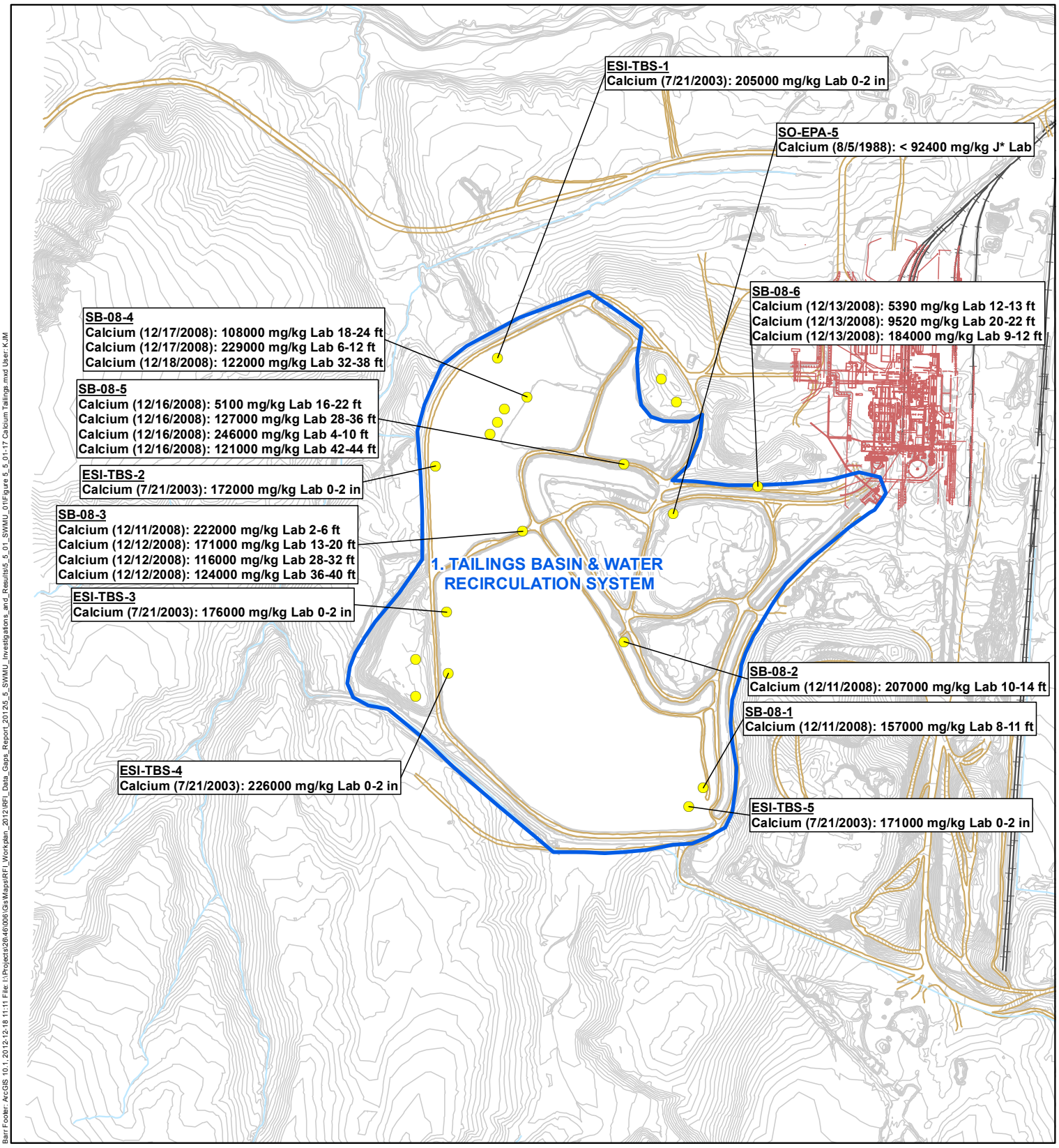
N

Feet

750 0 750

Figure 5.5.1-16

SWMU 1
SOILS RESULTS:
CADMIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:11 File: \\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_20125_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-17 Calcium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

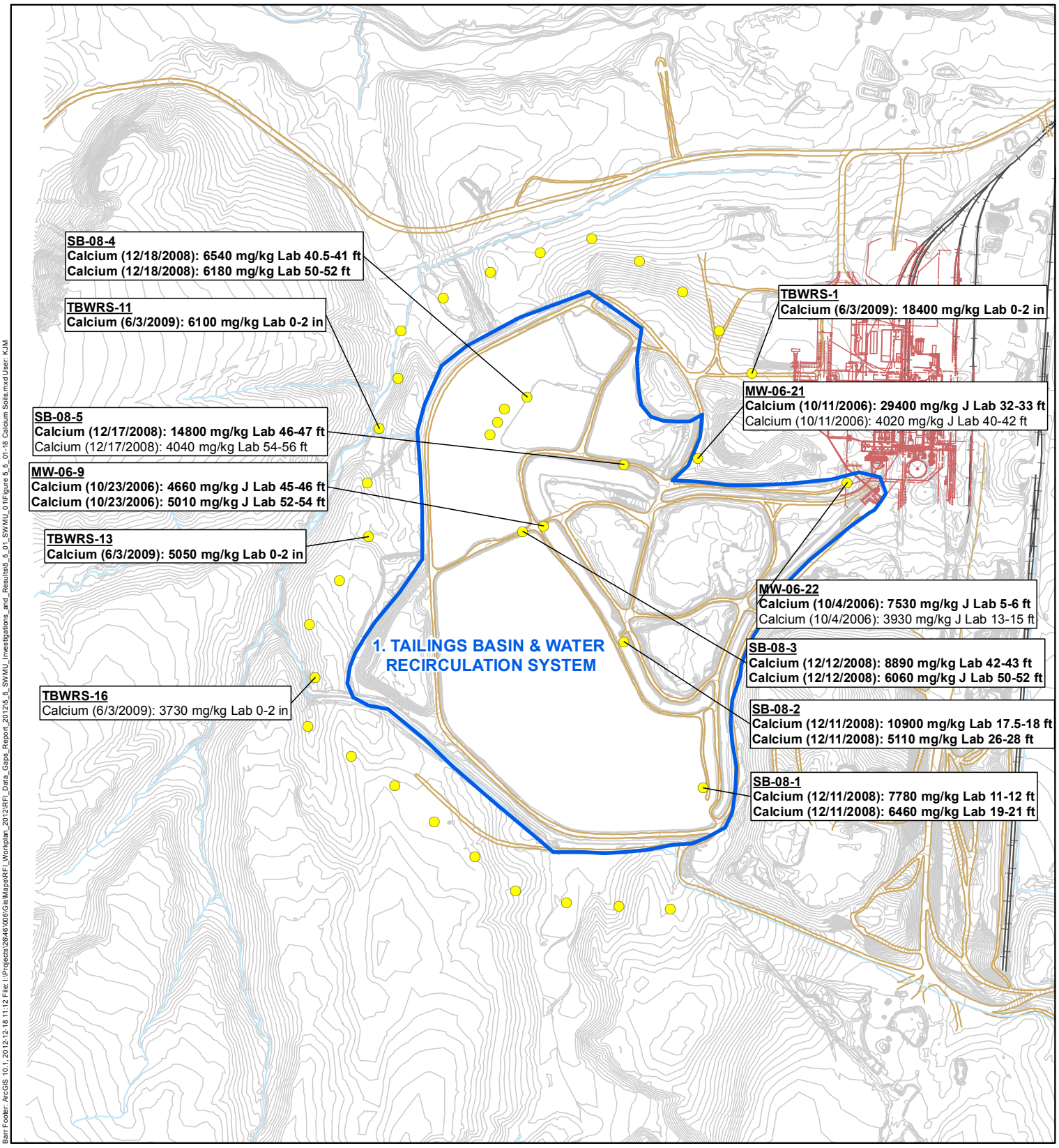
N

Feet

750 0 750

Figure 5.5.1-17

SWMU 1
TAILINGS RESULTS:
CALCIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1, 2012-12-18 11:12 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-18_Calcium Soils.mxd User: KJM

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

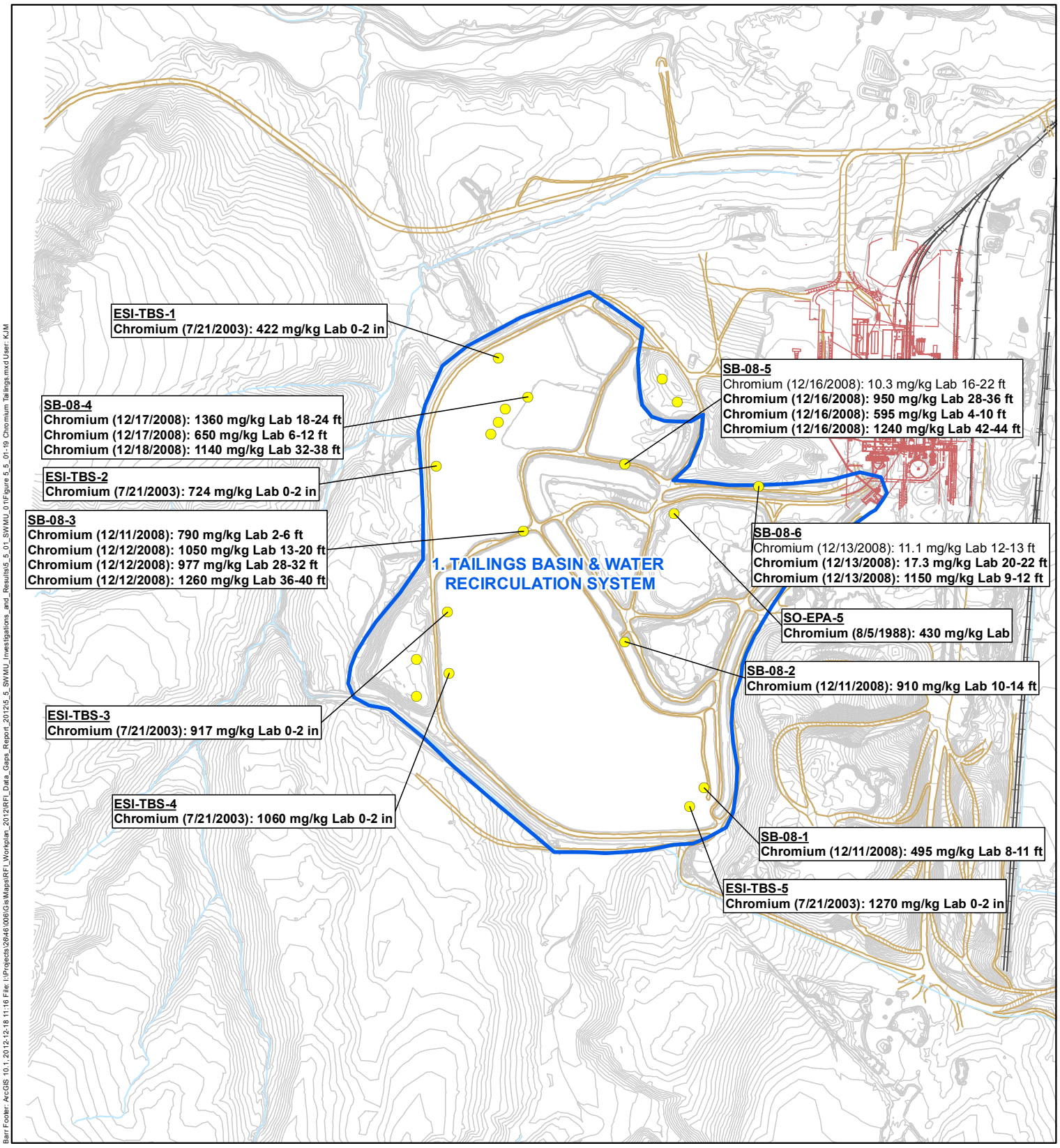
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-18

SWMU 1
SOILS RESULTS:
CALCIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:16 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-19 Chromium Tailings.mxd User: KJM

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-19

SWMU 1
TAILINGS RESULTS:
CHROMIUM
Rhodia Silver Bow Plant
Montana

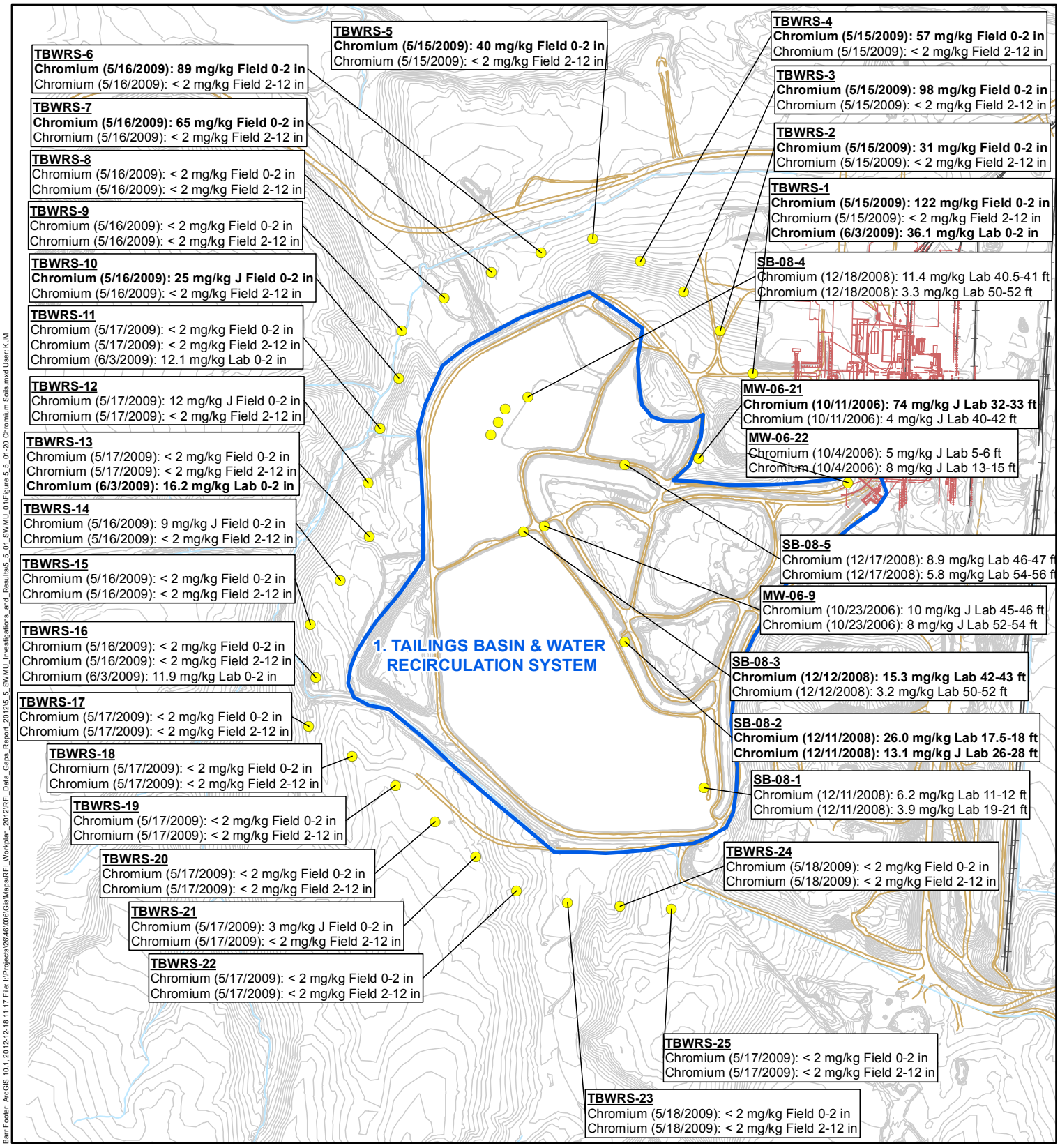
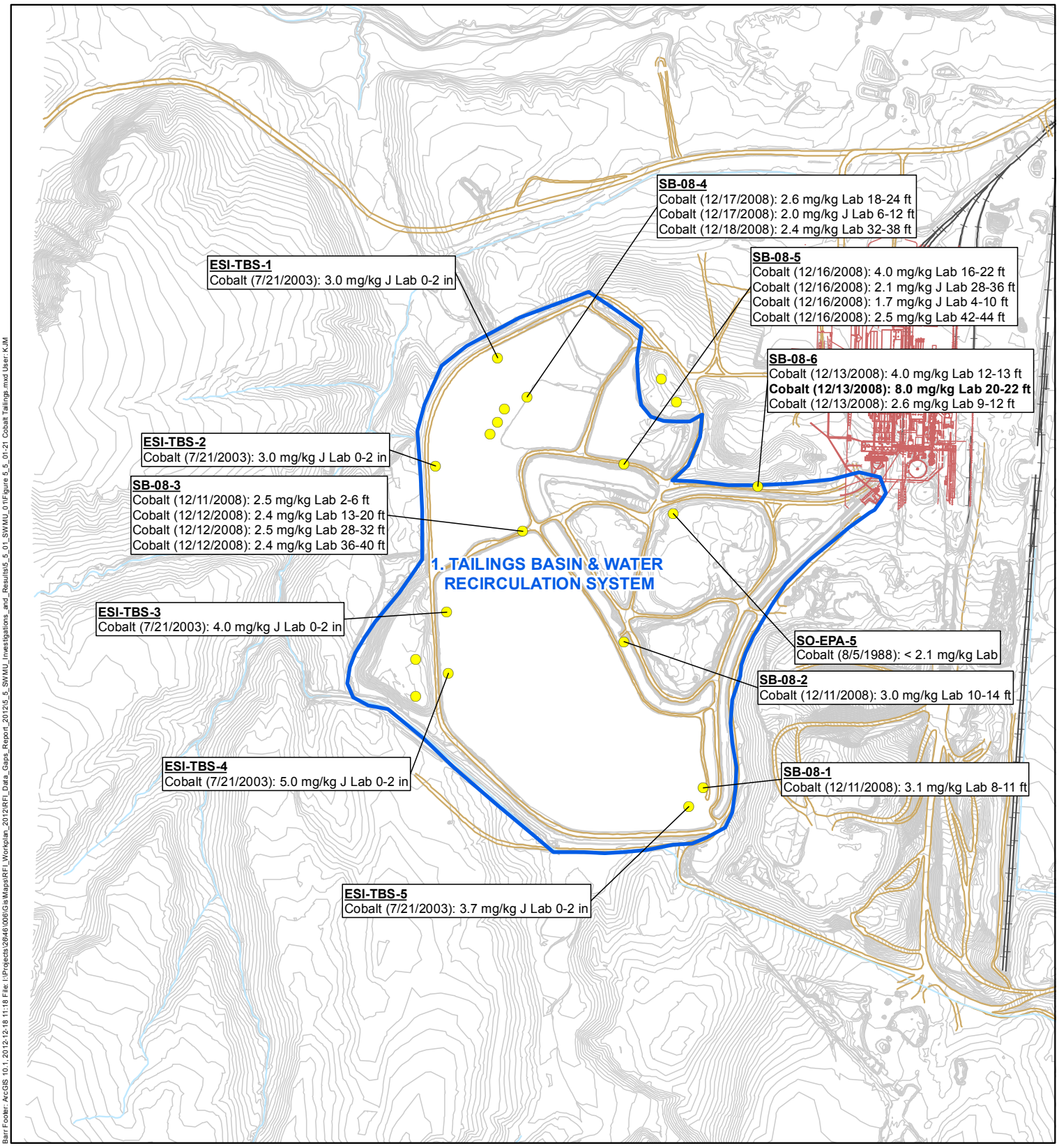


Figure 5.5.1-20

SWMU 1
SOILS RESULTS:
CHROMIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:18 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-21 Cobalt Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

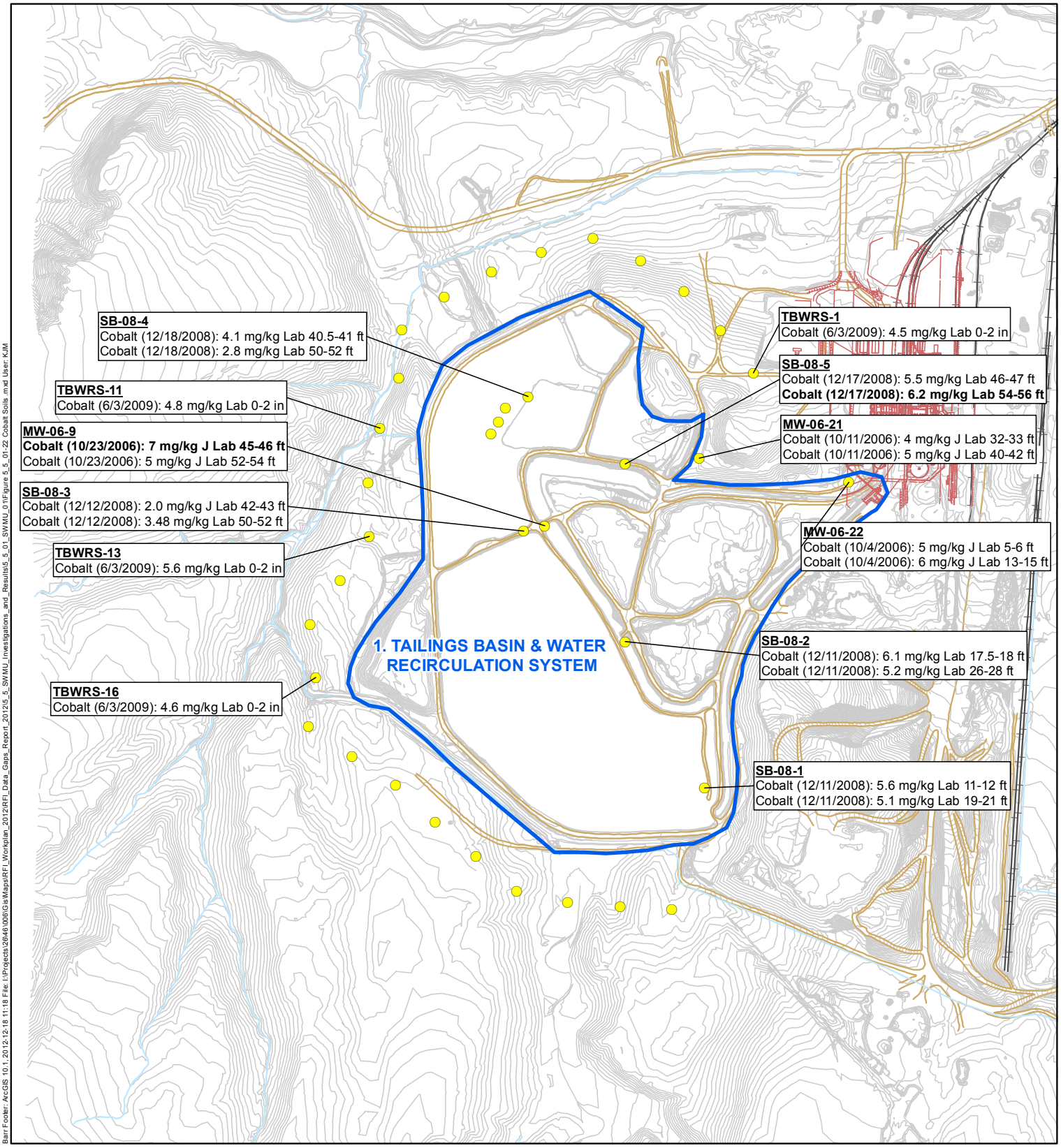
N

Feet

750 0 750

Figure 5.5.1-21

SWMU 1
TAILINGS RESULTS:
COBALT
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:18 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-22 Cobalt Soils .mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

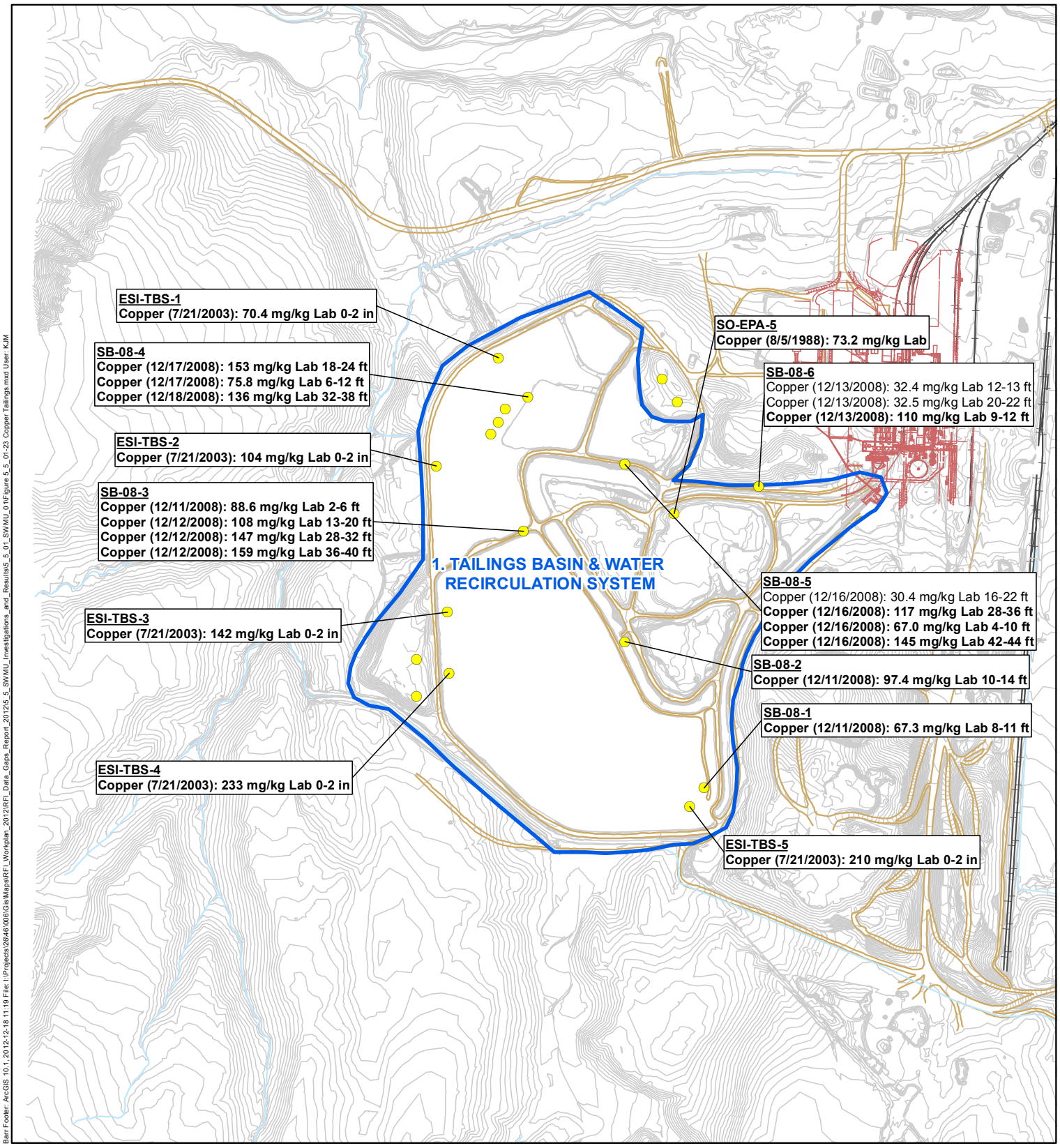
N

Feet

750 0 750

Figure 5.5.1-22

SWMU 1
SOILS RESULTS:
COBALT
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:19 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-23 Copper Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

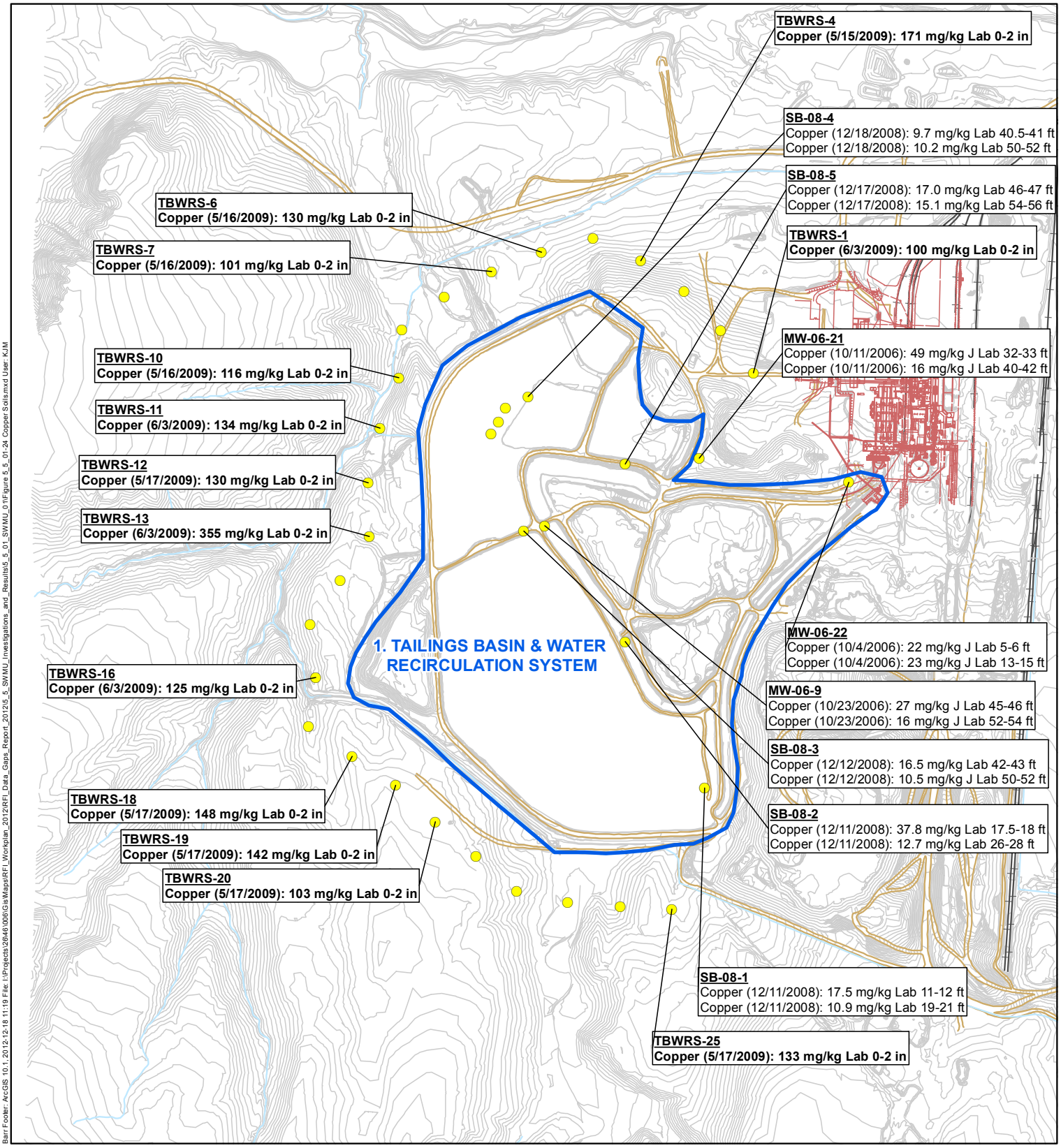
N

Feet

750 0 750

Figure 5.5.1-23

SWMU 1
TAILINGS RESULTS:
COPPER
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:19 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-24 Copper Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

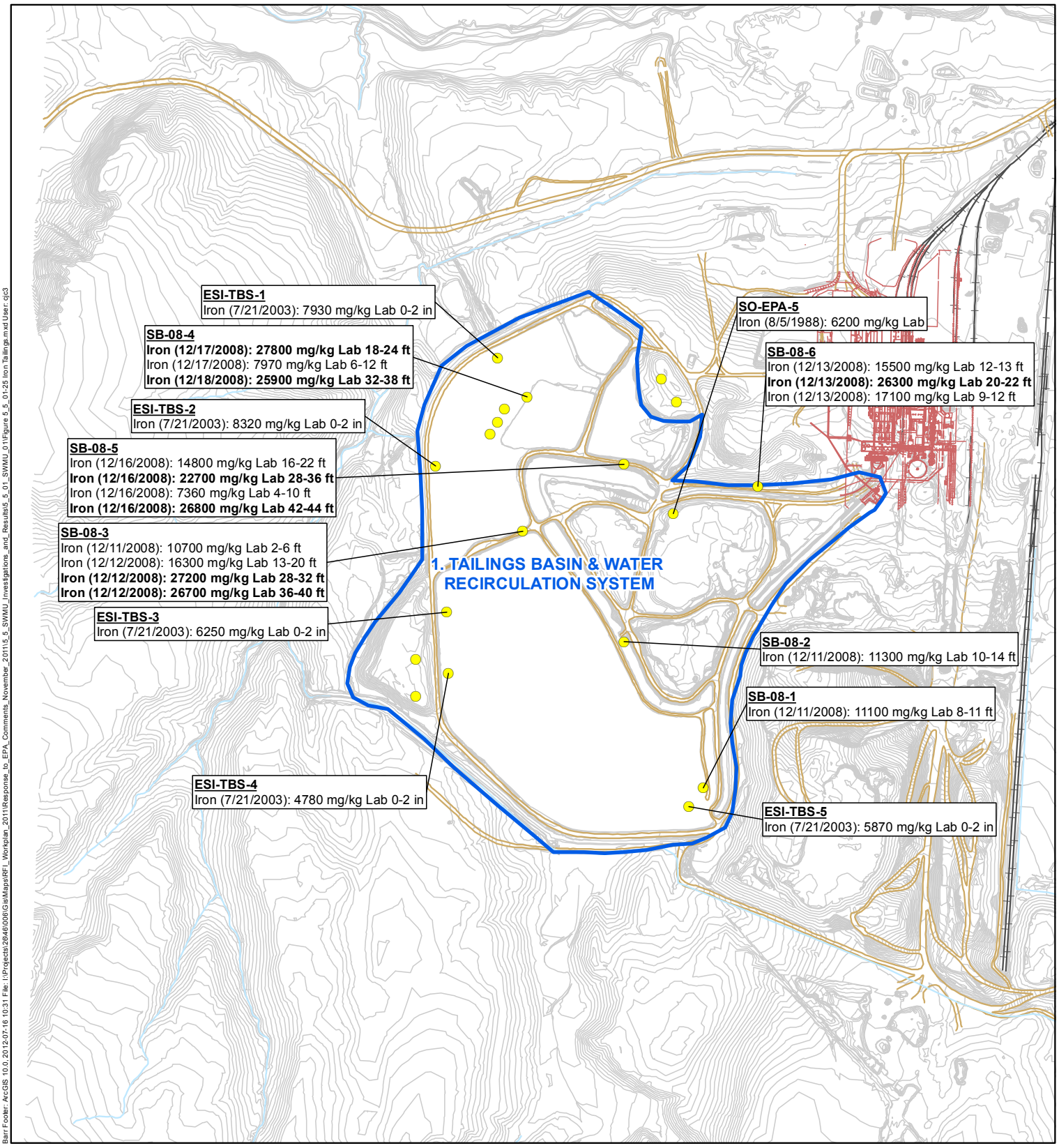
N

Feet

750 0 750

Figure 5.5.1-24

SWMU 1
SOILS RESULTS:
COPPER
Rhodia Silver Bow Plant
Montana



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Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

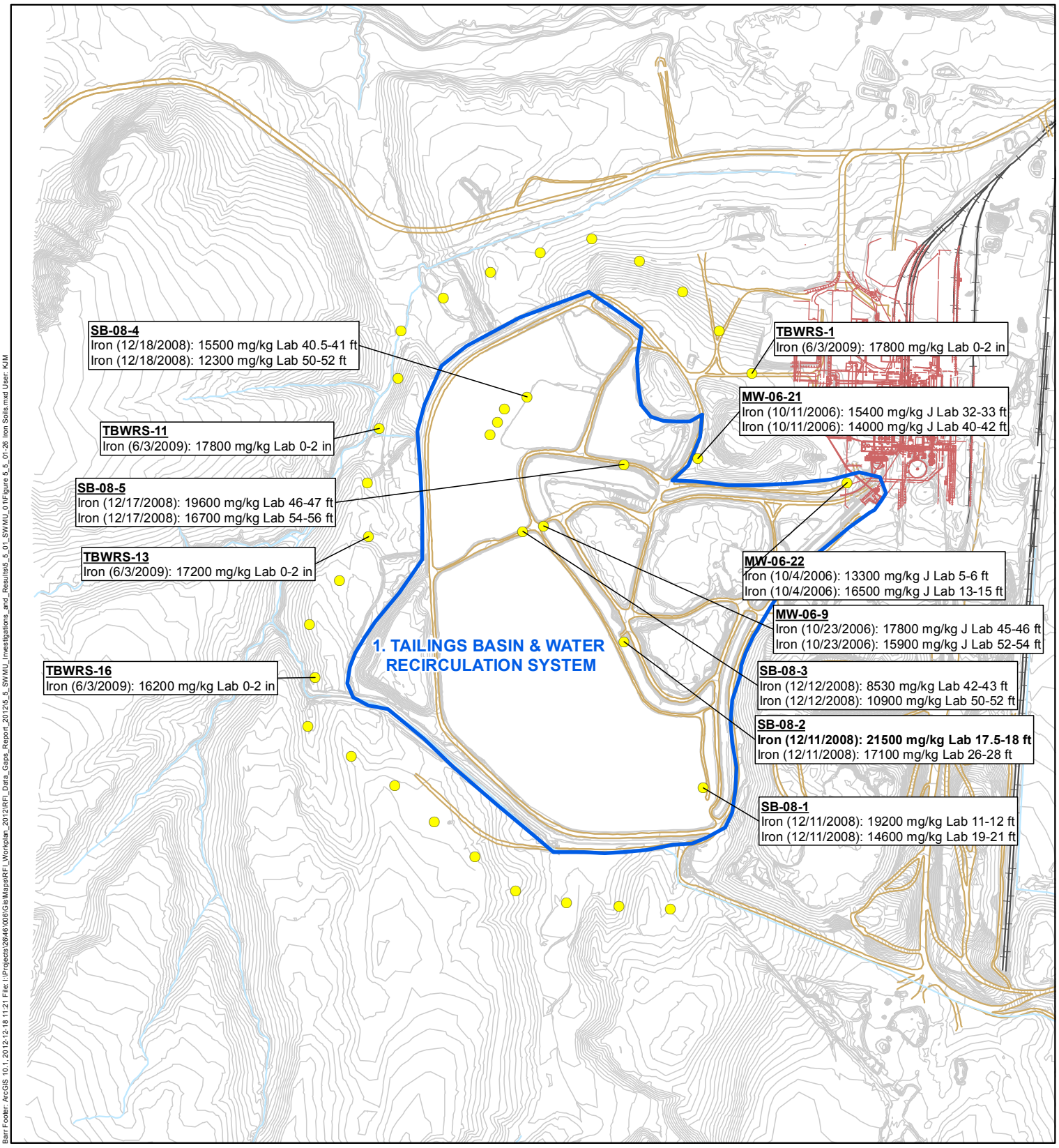
N

Feet

750 0 750

Figure 5.5.1-25

SWMU 1
TAILINGS RESULTS:
IRON
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:21 File: I:\Projects\2646\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-26 Iron Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

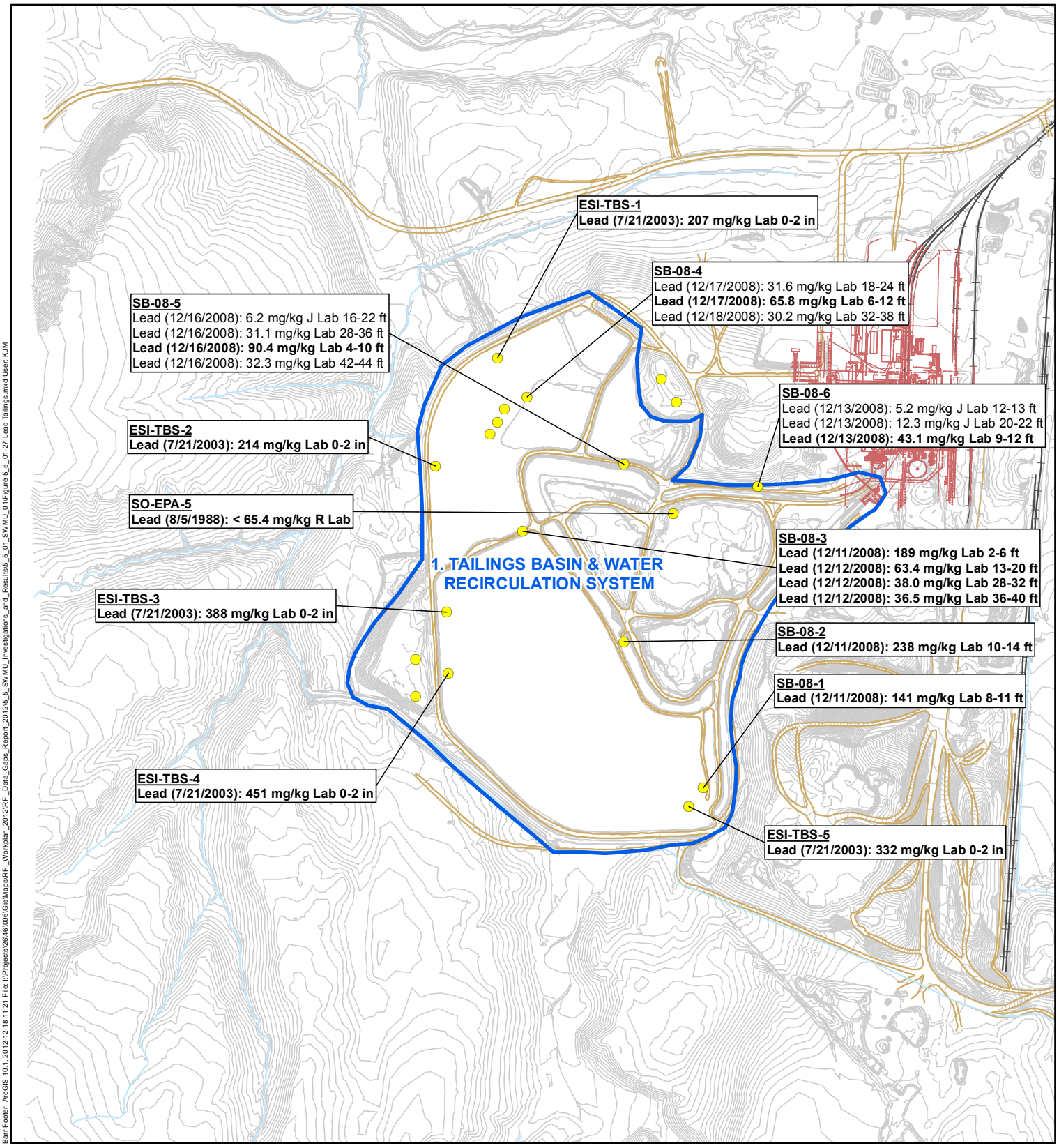
N

Feet

750 0 750

Figure 5.5.1-26

SWMU 1
SOILS RESULTS:
IRON
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:21 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-27 Lead Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

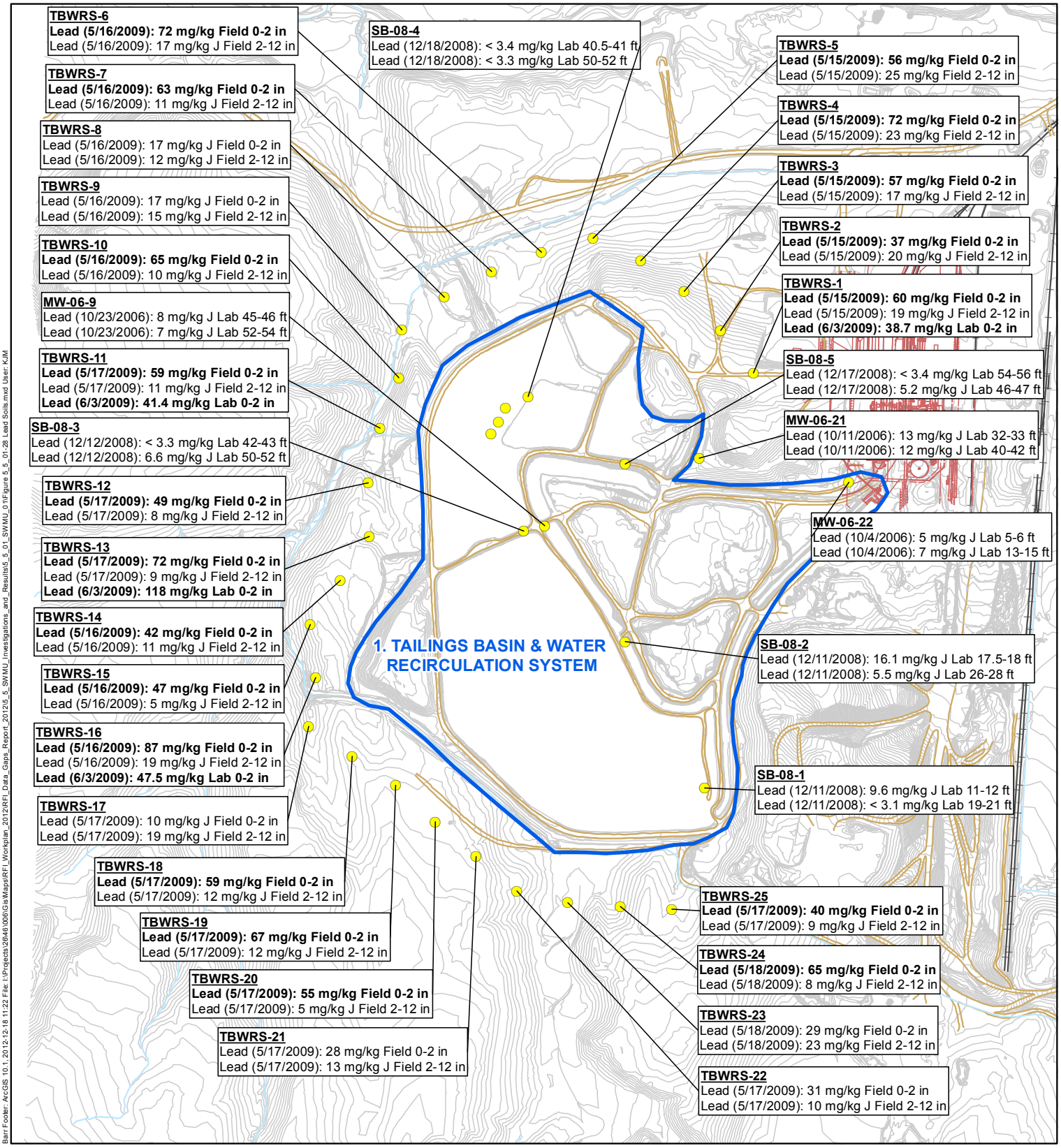
N

Feet

750 0 750

Figure 5.5.1-27

SWMU 1
TAILINGS RESULTS:
LEAD
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:22 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-28_Lead Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

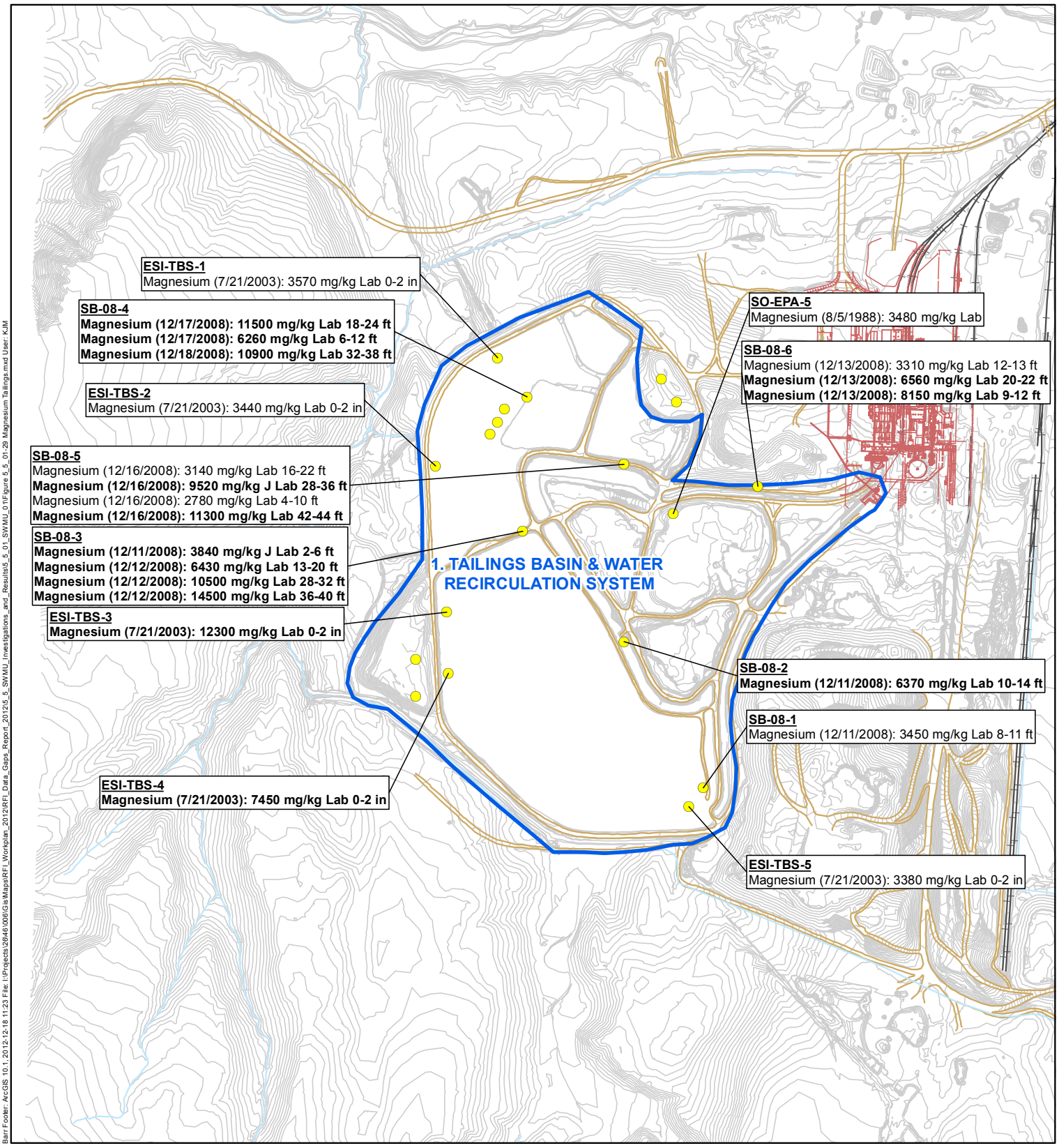
N

Feet

750 0 750

Figure 5.5.1-28

SWMU 1
SOILS RESULTS:
LEAD
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:23 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-29 Magnesium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

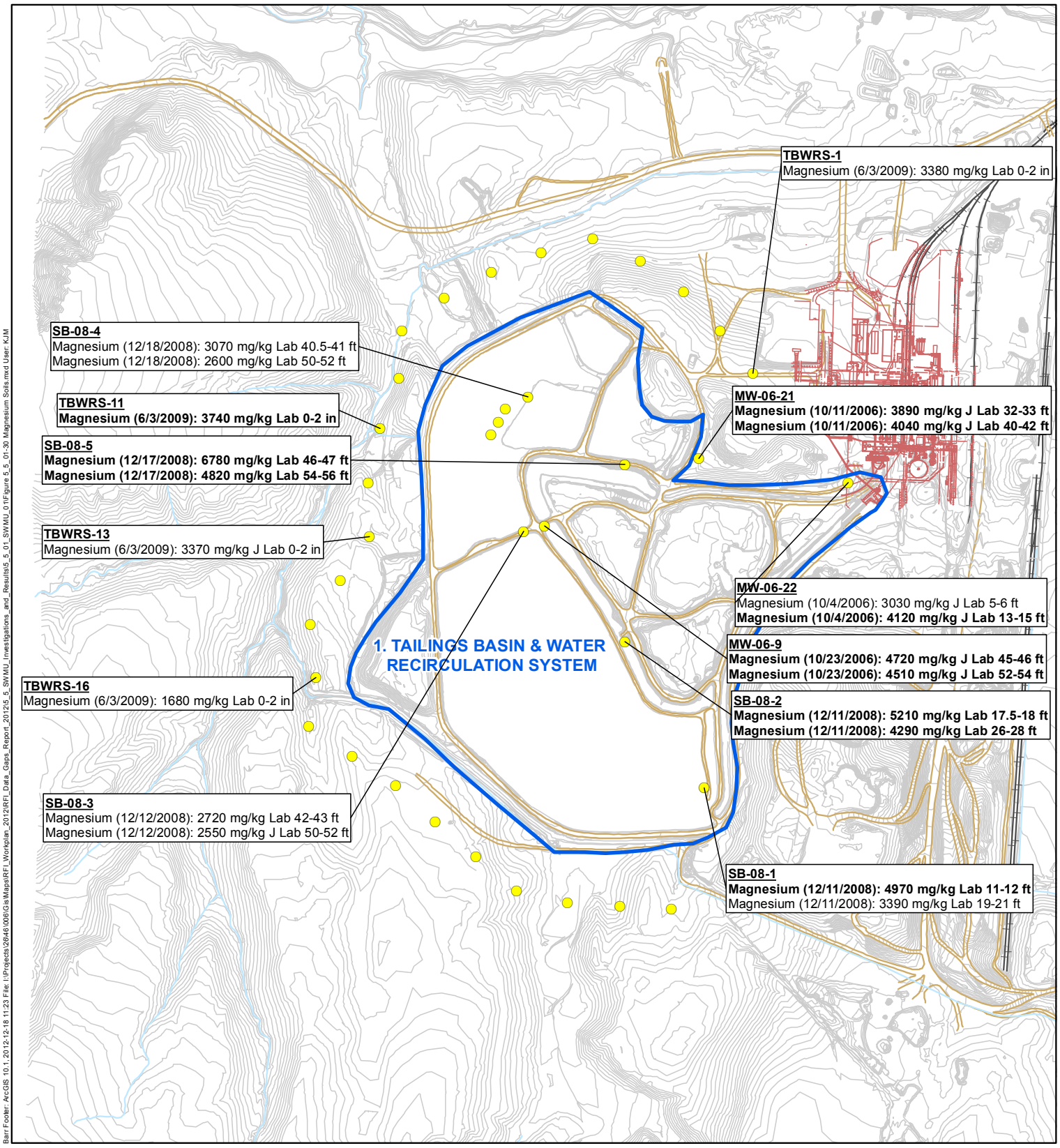
N

Feet

750 0 750

Figure 5.5.1-29

SWMU 1
TAILINGS RESULTS:
MAGNESIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1, 2012-12-18 11:23 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-30 Magnesium Soils.mxd User: KJM

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

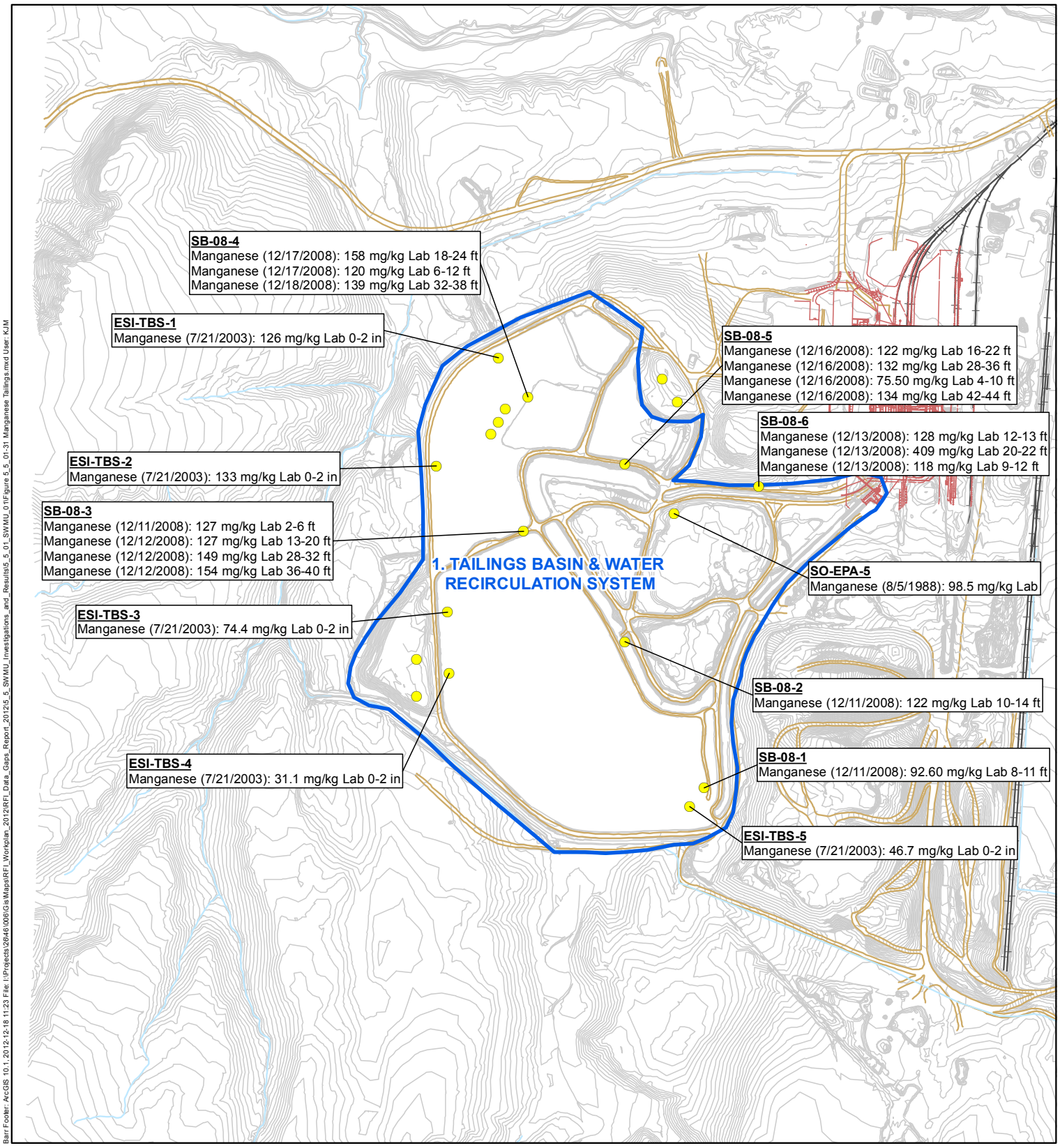
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-30

SWMU 1
SOILS RESULTS:
MAGNESIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:23 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5.5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-31 Manganese Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet

750 0 750

Figure 5.5.1-31

SWMU 1
TAILINGS RESULTS:
MANGANESE
Rhodia Silver Bow Plant
Montana

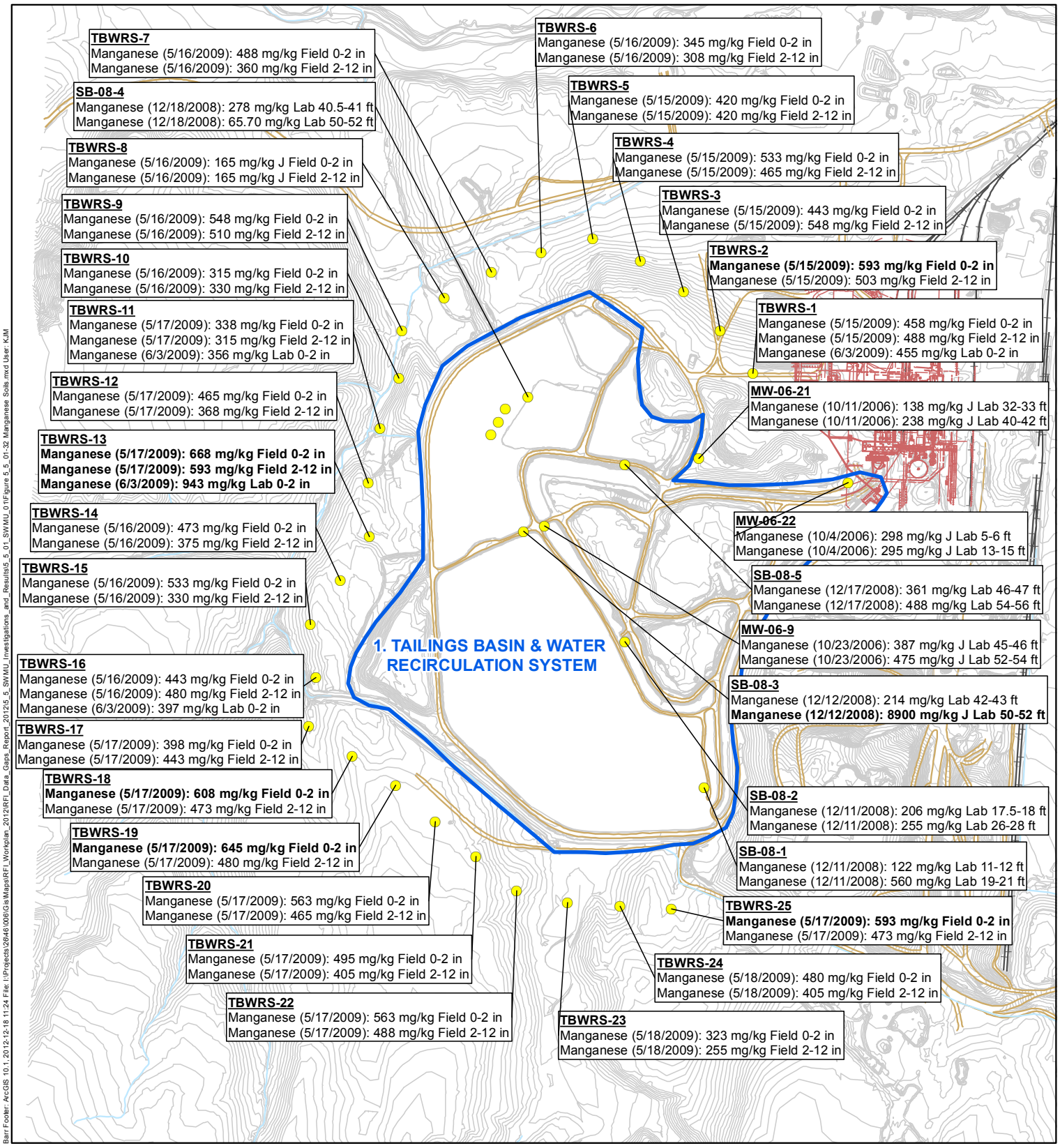
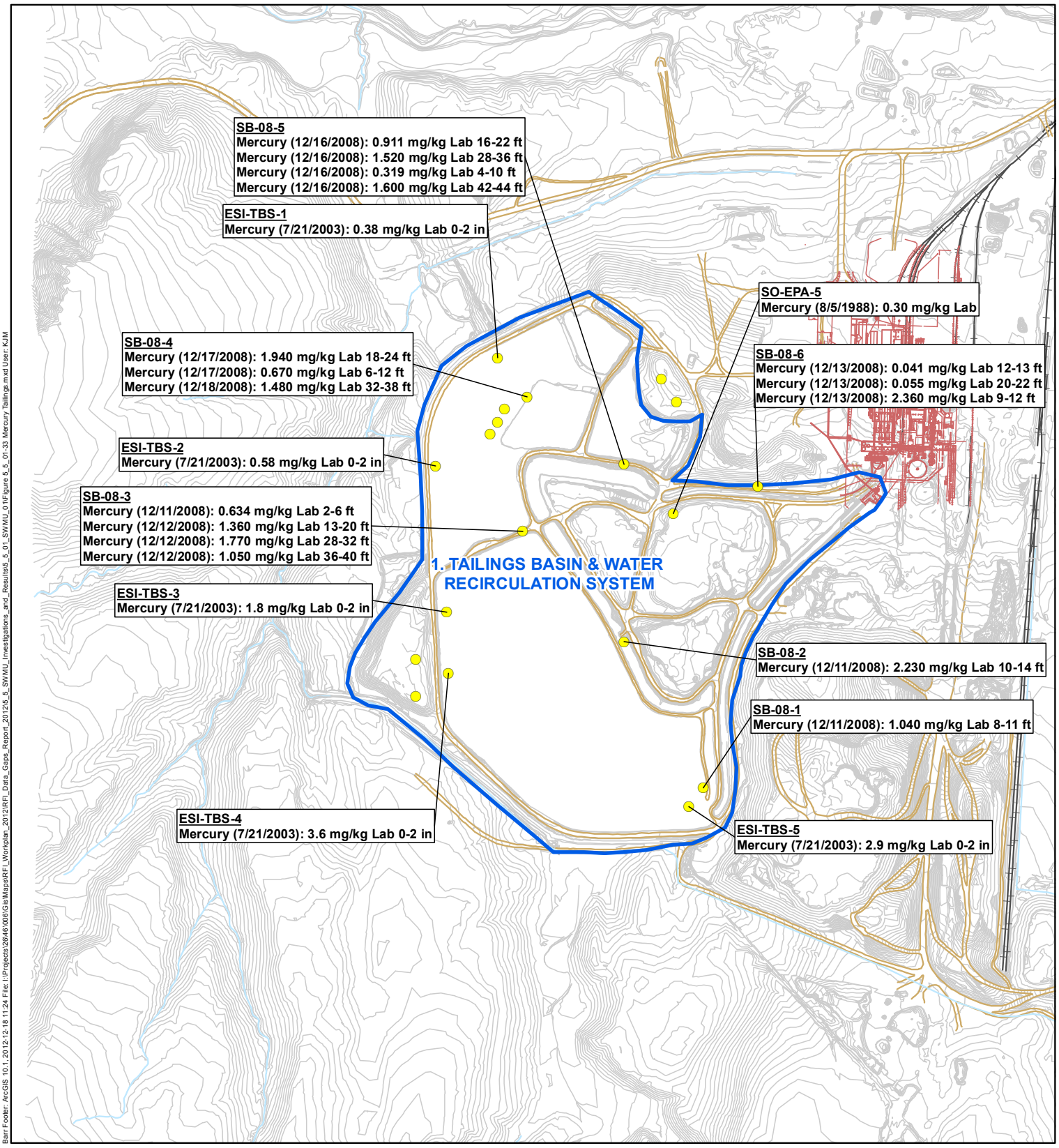


Figure 5.5.1-32

SWMU 1
SOILS RESULTS:
MANGANESE
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:24 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-33 Mercury Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

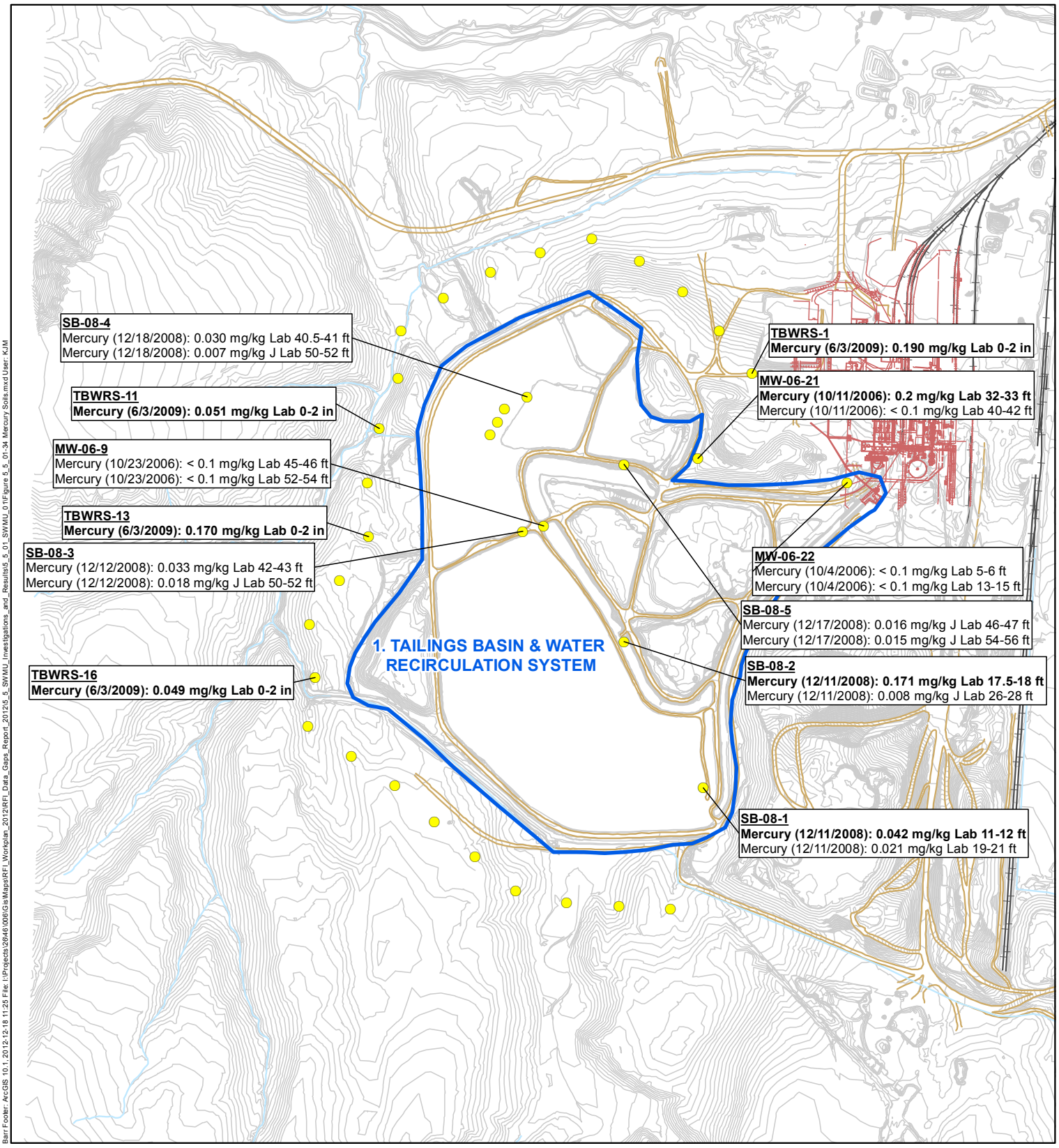
N

Feet

750 0 750

Figure 5.5.1-33

SWMU 1
TAILINGS RESULTS:
MERCURY
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:25 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-34 Mercury Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

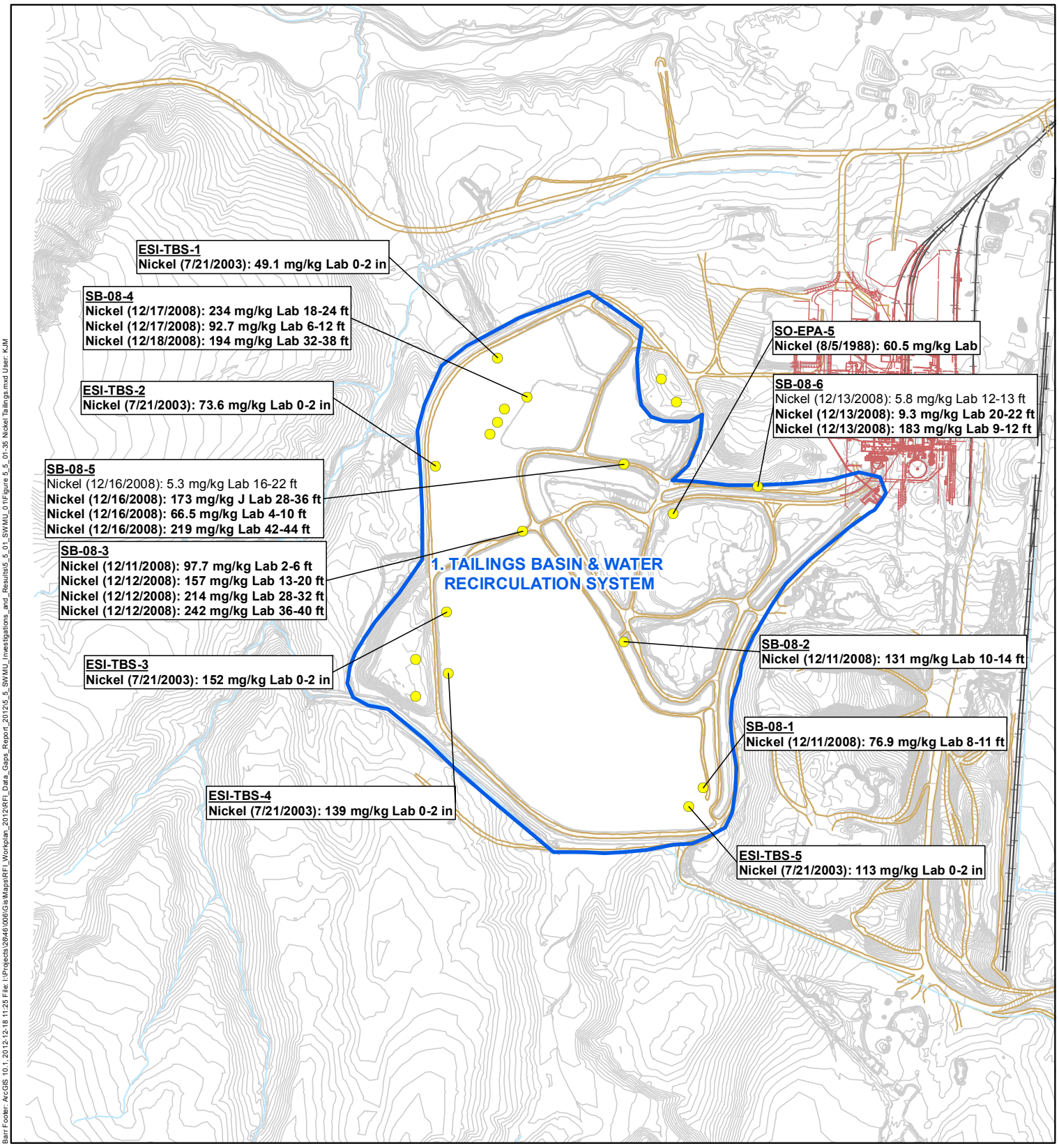
N

Feet

750 0 750

Figure 5.5.1-34

SWMU 1
SOILS RESULTS:
MERCURY
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:25 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-35 Nickel Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

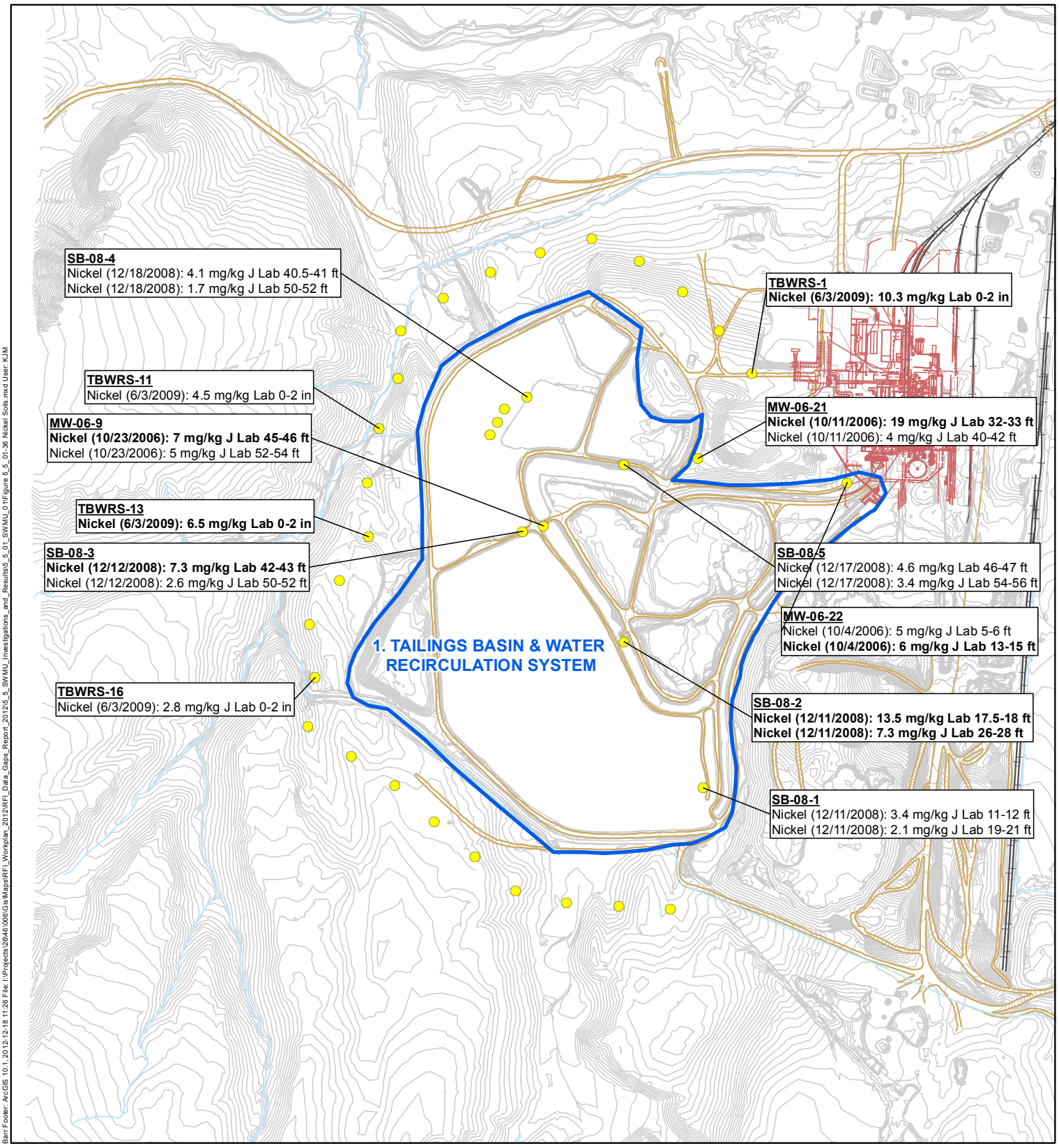
N

Feet

750 0 750

Figure 5.5.1-35

SWMU 1
TAILINGS RESULTS:
NICKEL
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:26 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-36 Nickel Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

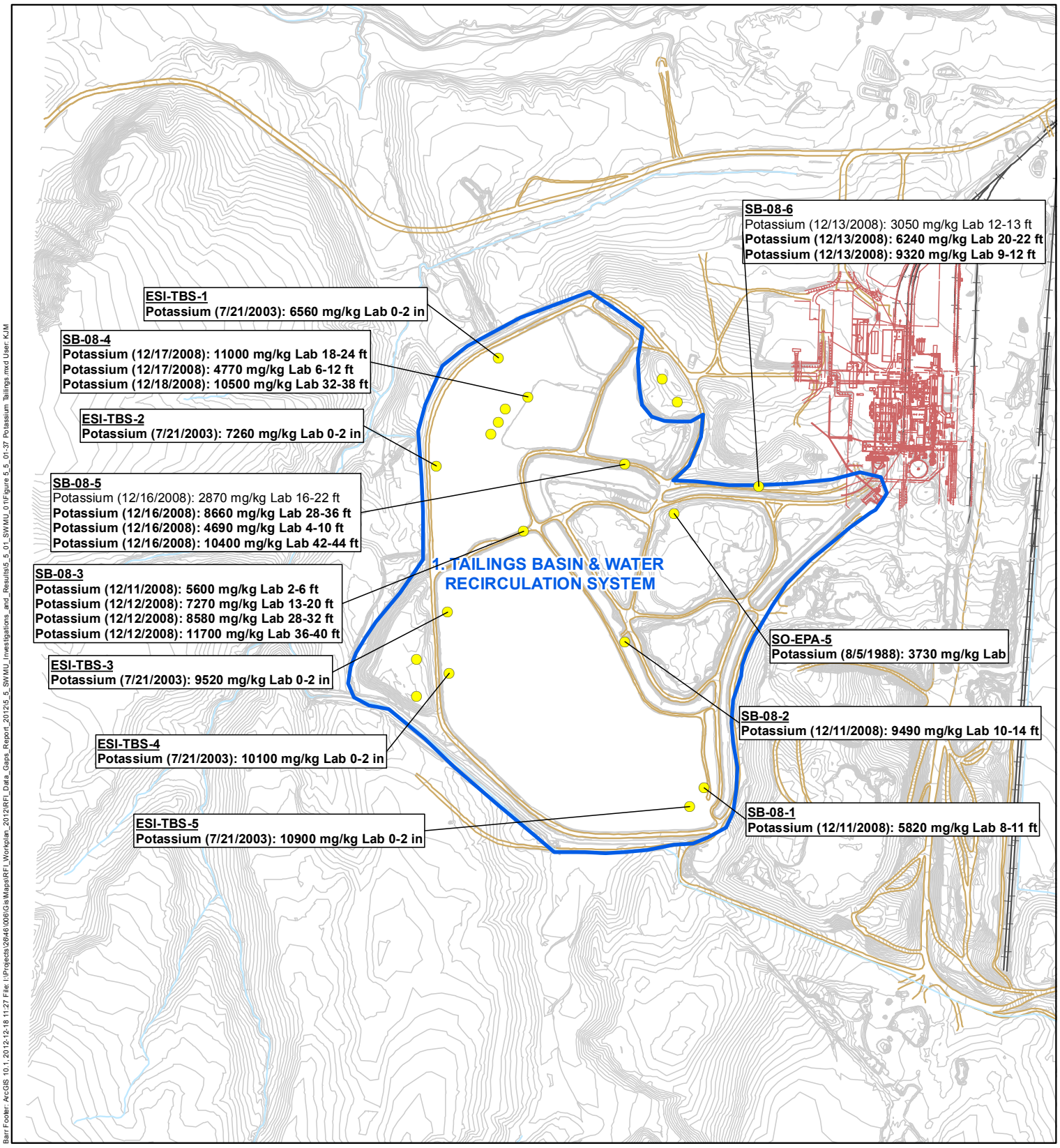
N

Feet

750 0 750

Figure 5.5.1-36

SWMU 1
SOILS RESULTS:
NICKEL
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:27 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-37 Potassium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

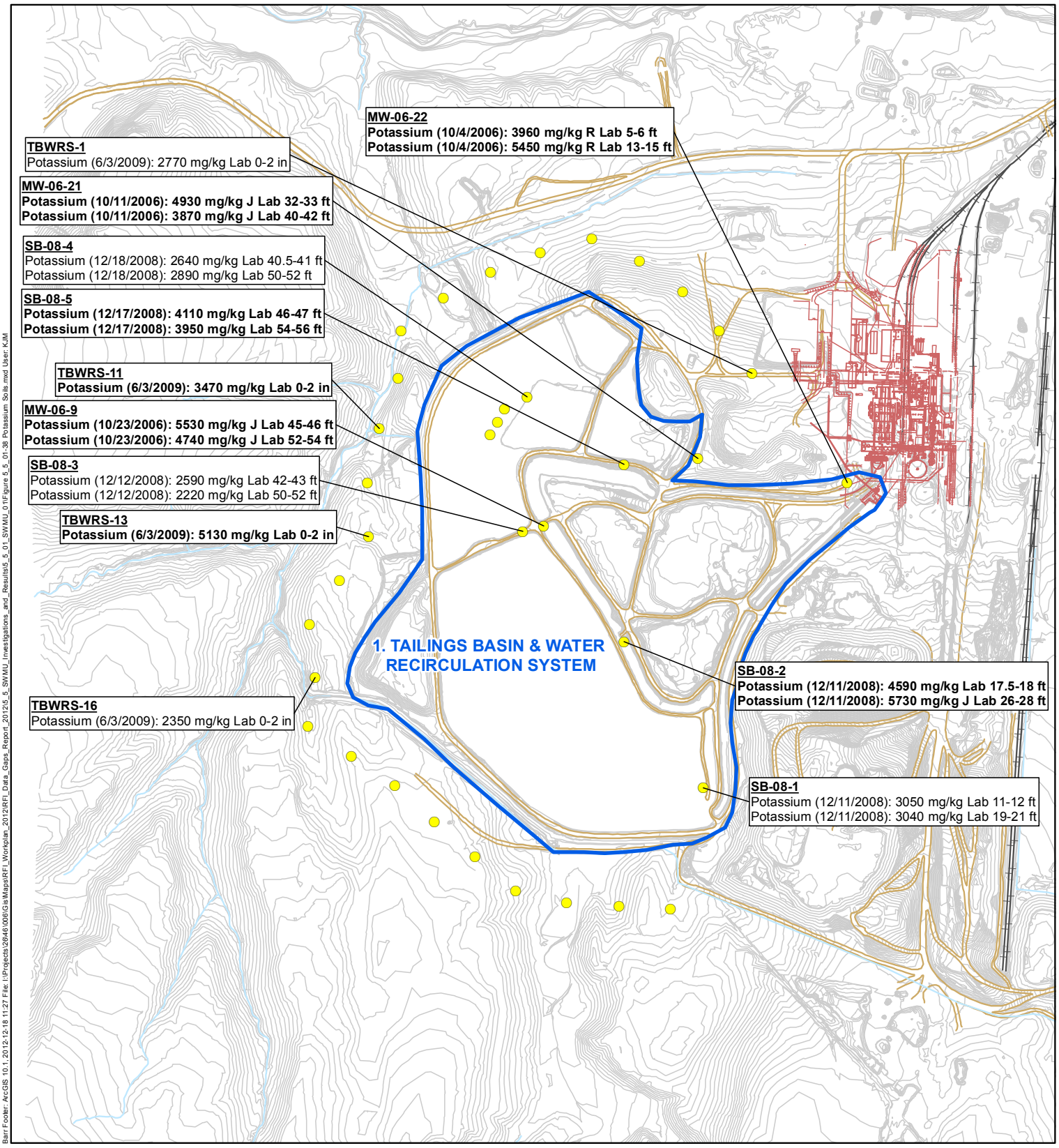
N

Feet

750 0 750

Figure 5.5.1-37

SWMU 1
TAILINGS RESULTS:
POTASSIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:27 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-38 Potassium Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

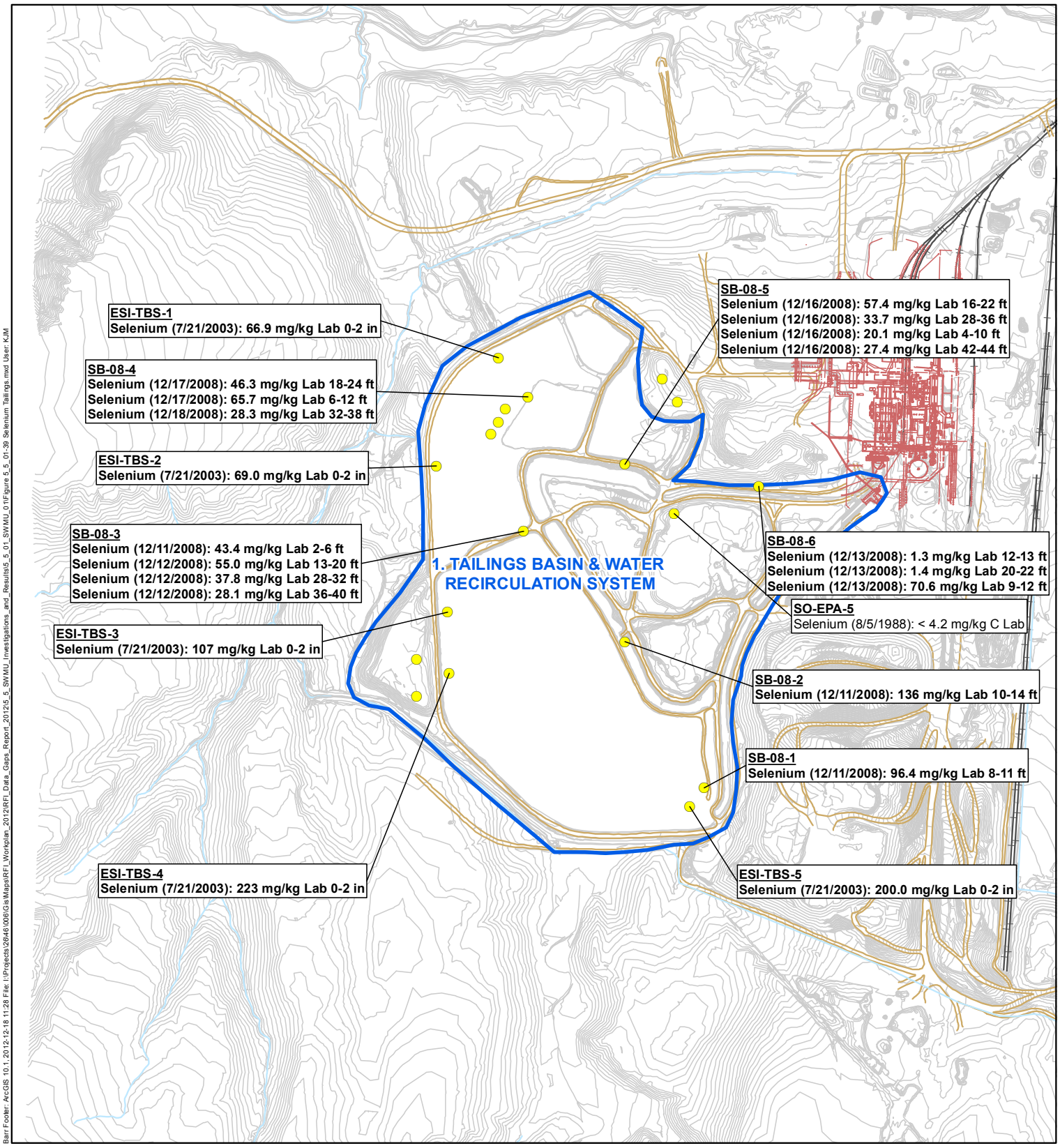
N

Feet

750 0 750

Figure 5.5.1-38

SWMU 1
SOILS RESULTS:
POTASSIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:28 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-39 Selenium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

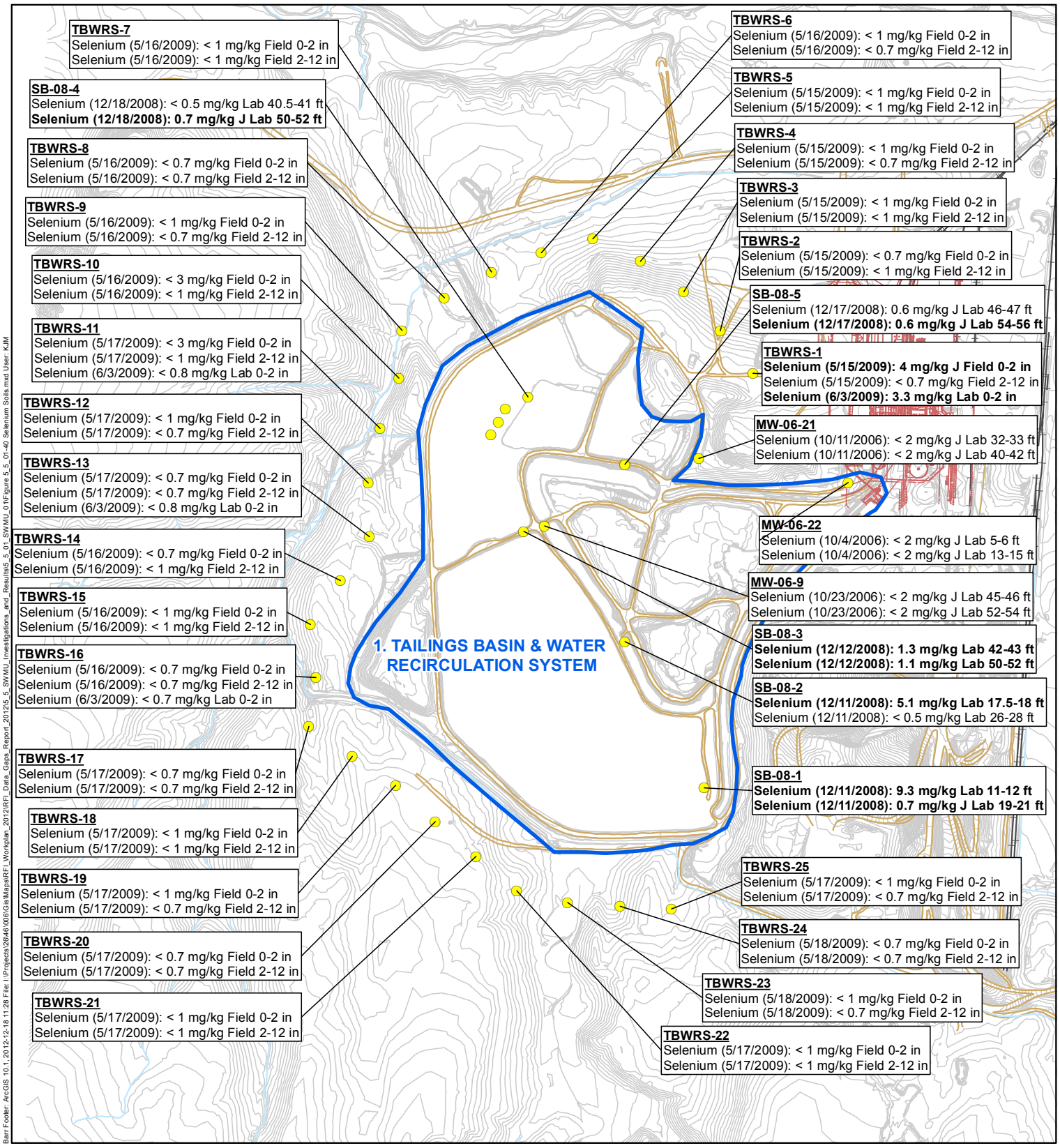
N

Feet

750 0 750

Figure 5.5.1-39

SWMU 1
TAILINGS RESULTS:
SELENIUM
Rhodia Silver Bow Plant
Montana



Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

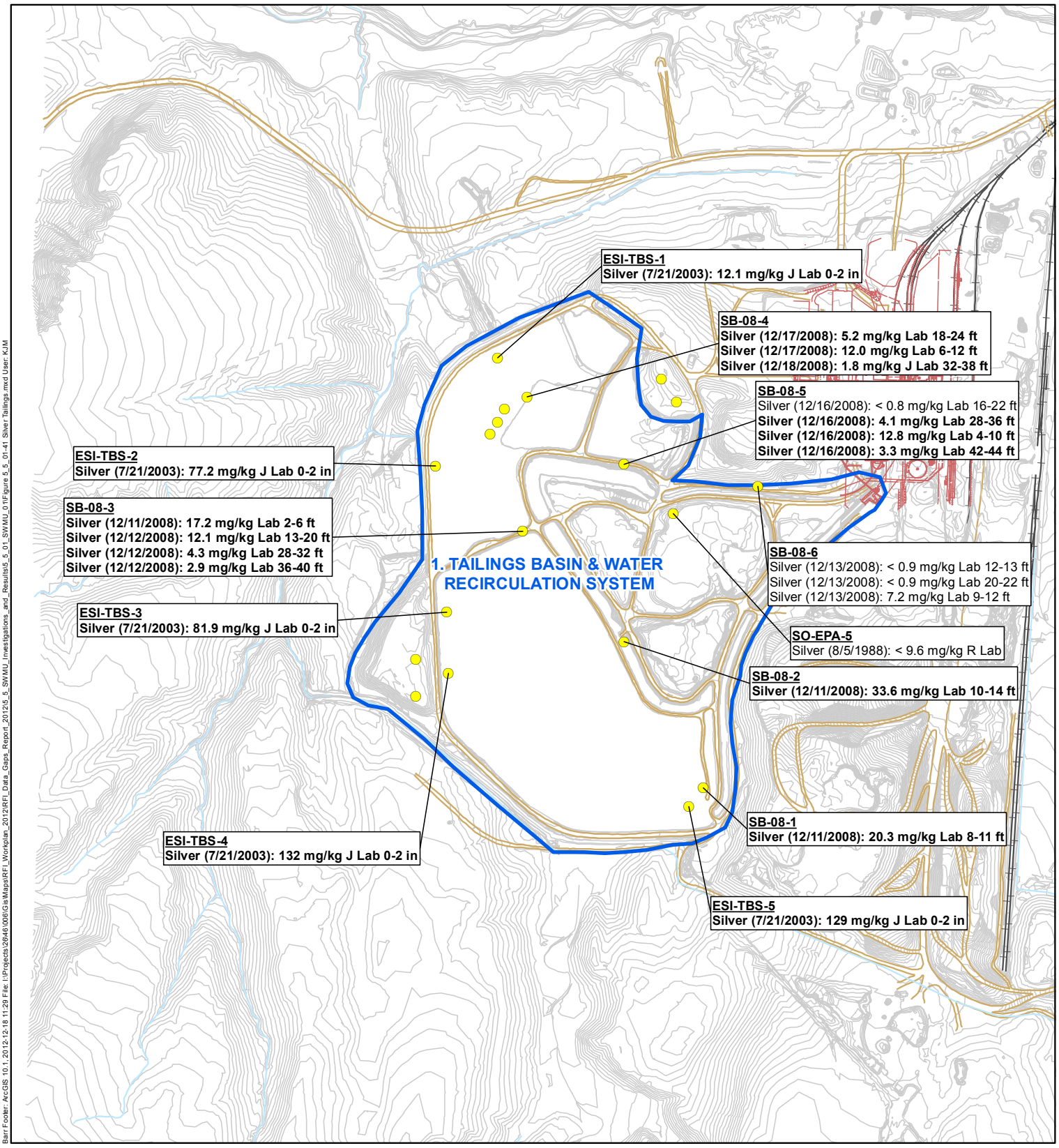
N

Feet

750 0 750

Figure 5.5.1-40

SWMU 1
SOILS RESULTS:
SELENIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:29 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-41 Silver Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

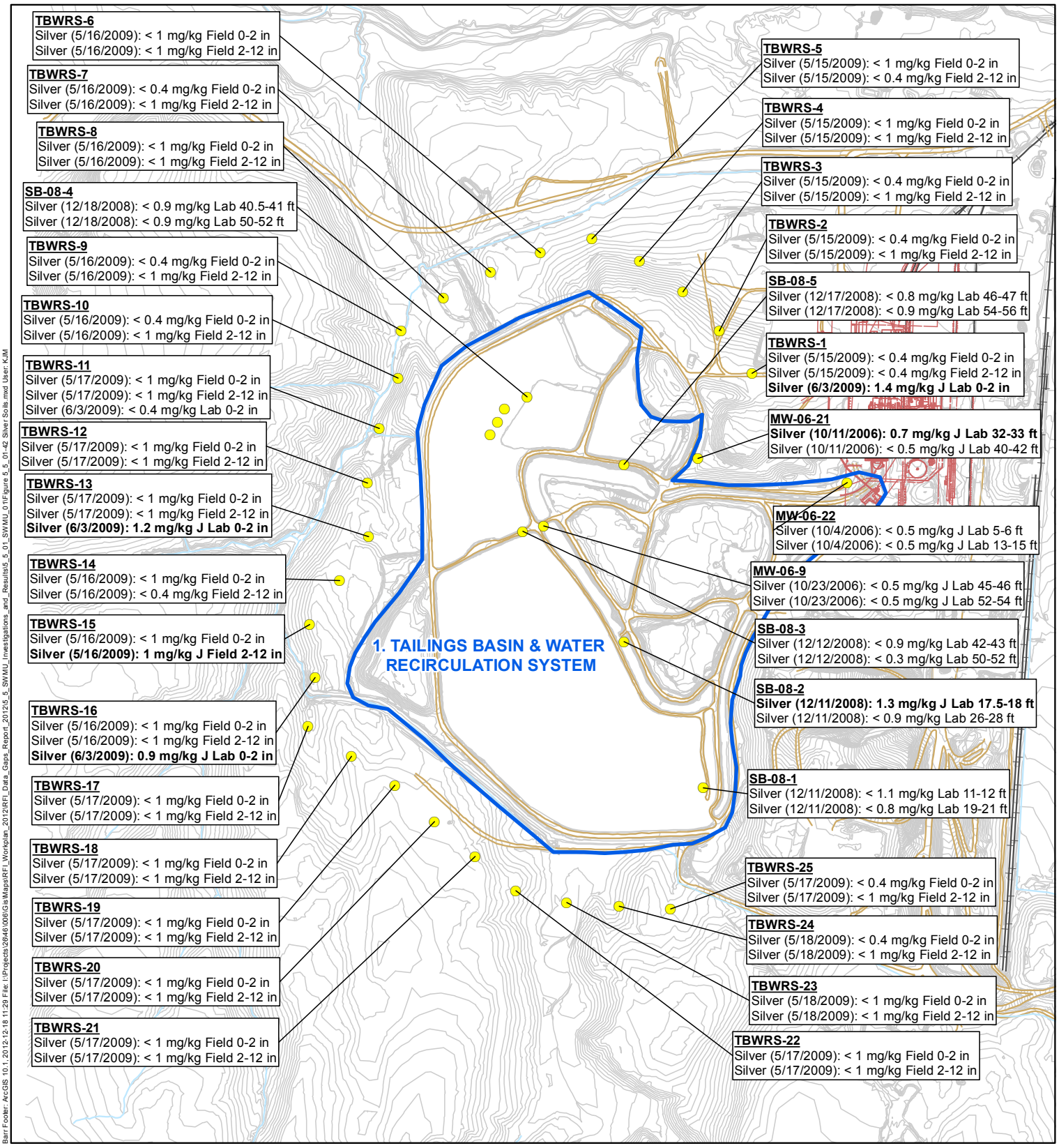
N

Feet

750 0 750

Figure 5.5.1-41

SWMU 1
TAILINGS RESULTS:
SILVER
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1 2012-12-18 11:29 File: I:\Projects\2646\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_20125_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-42_Silver Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

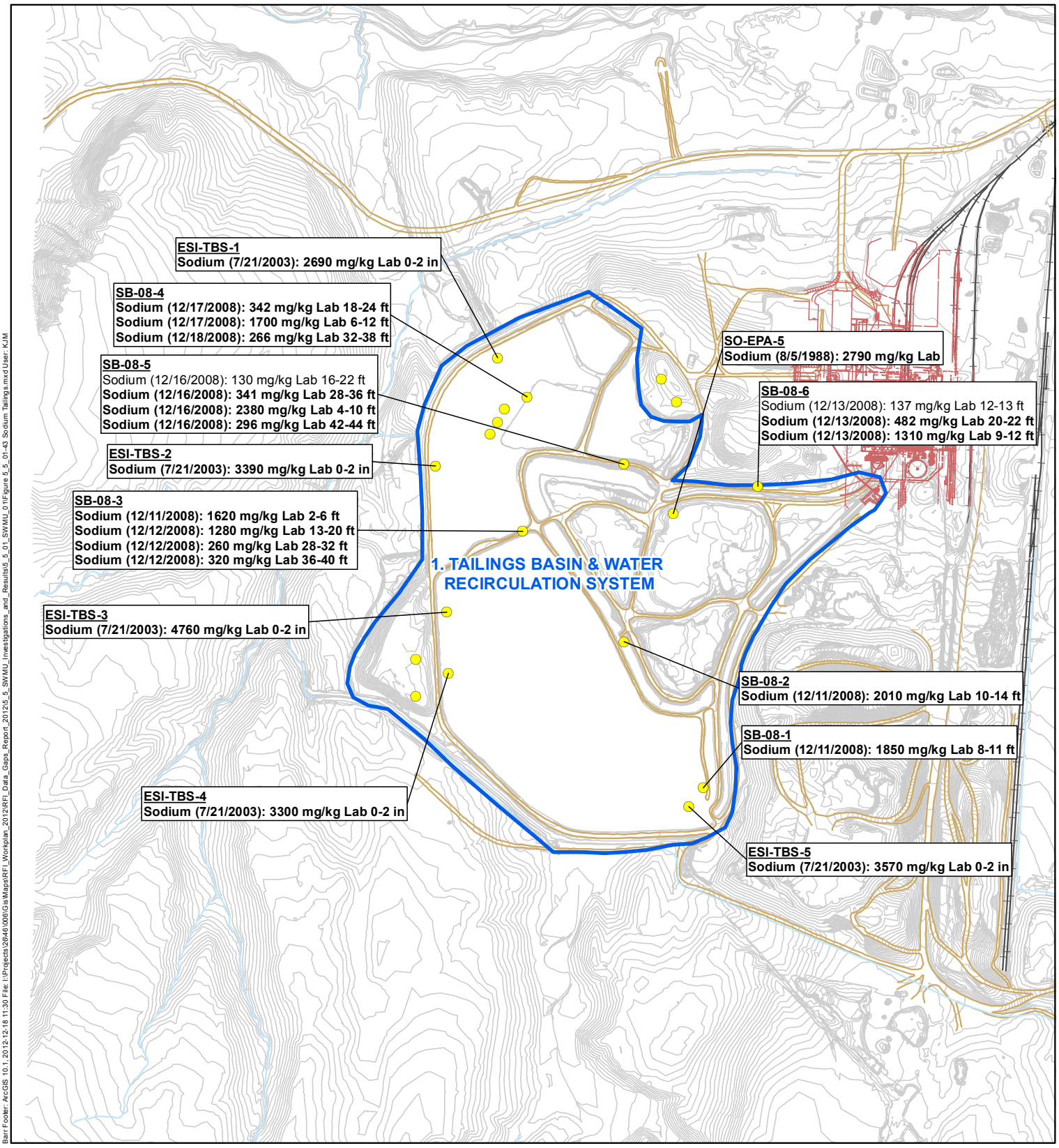
N

Feet

750 0 750

Figure 5.5.1-42

SWMU 1
SOILS RESULTS:
SILVER
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1, 2012-12-18 11:30 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-43 Sodium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

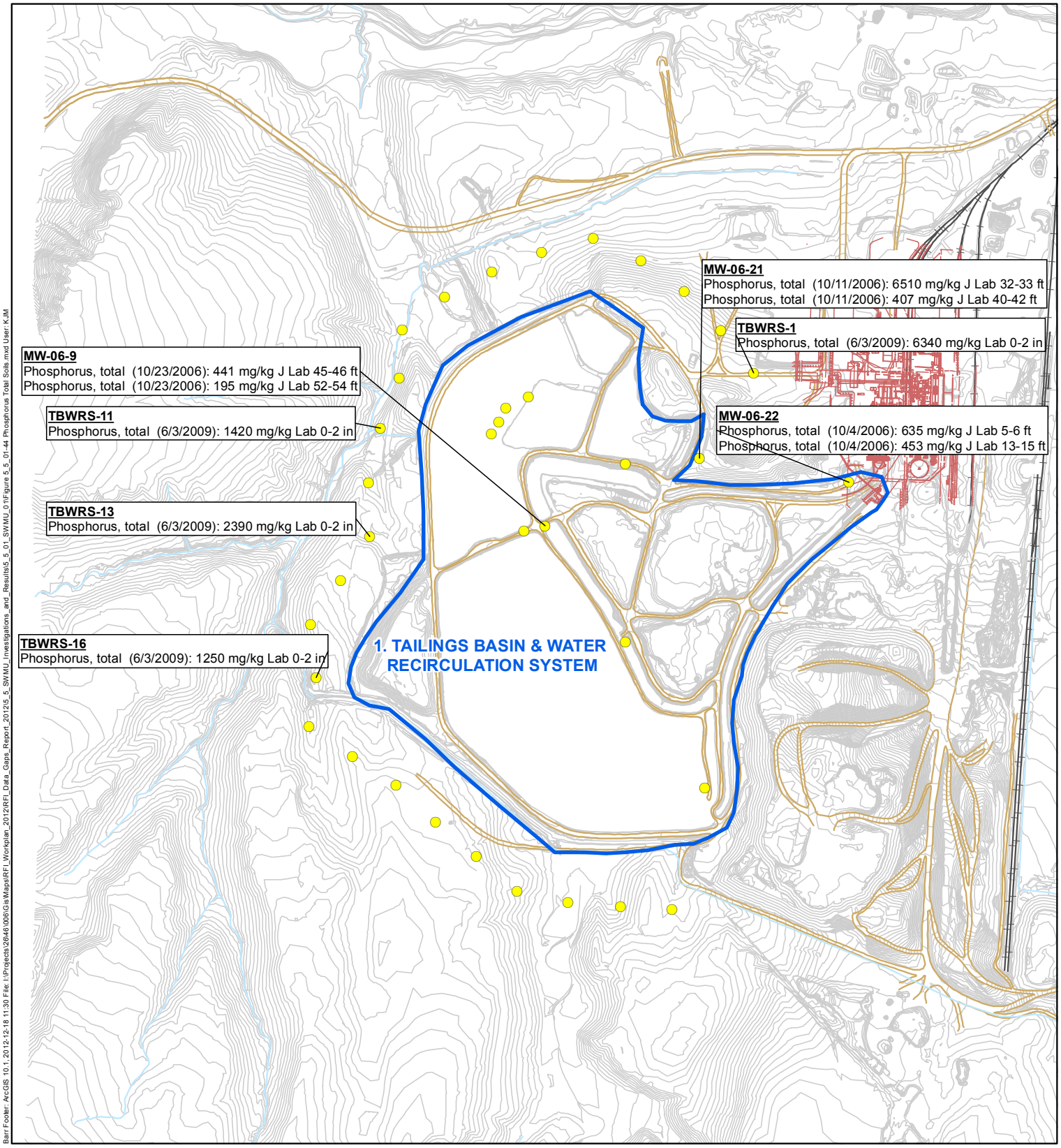
N

Feet

750 0 750

Figure 5.5.1-43

SWMU 1
TAILINGS RESULTS:
SODIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.1, 2012-12-18 11:30 File: I:\Projects\26\46\006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-44 Phosphorus Total Soils.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

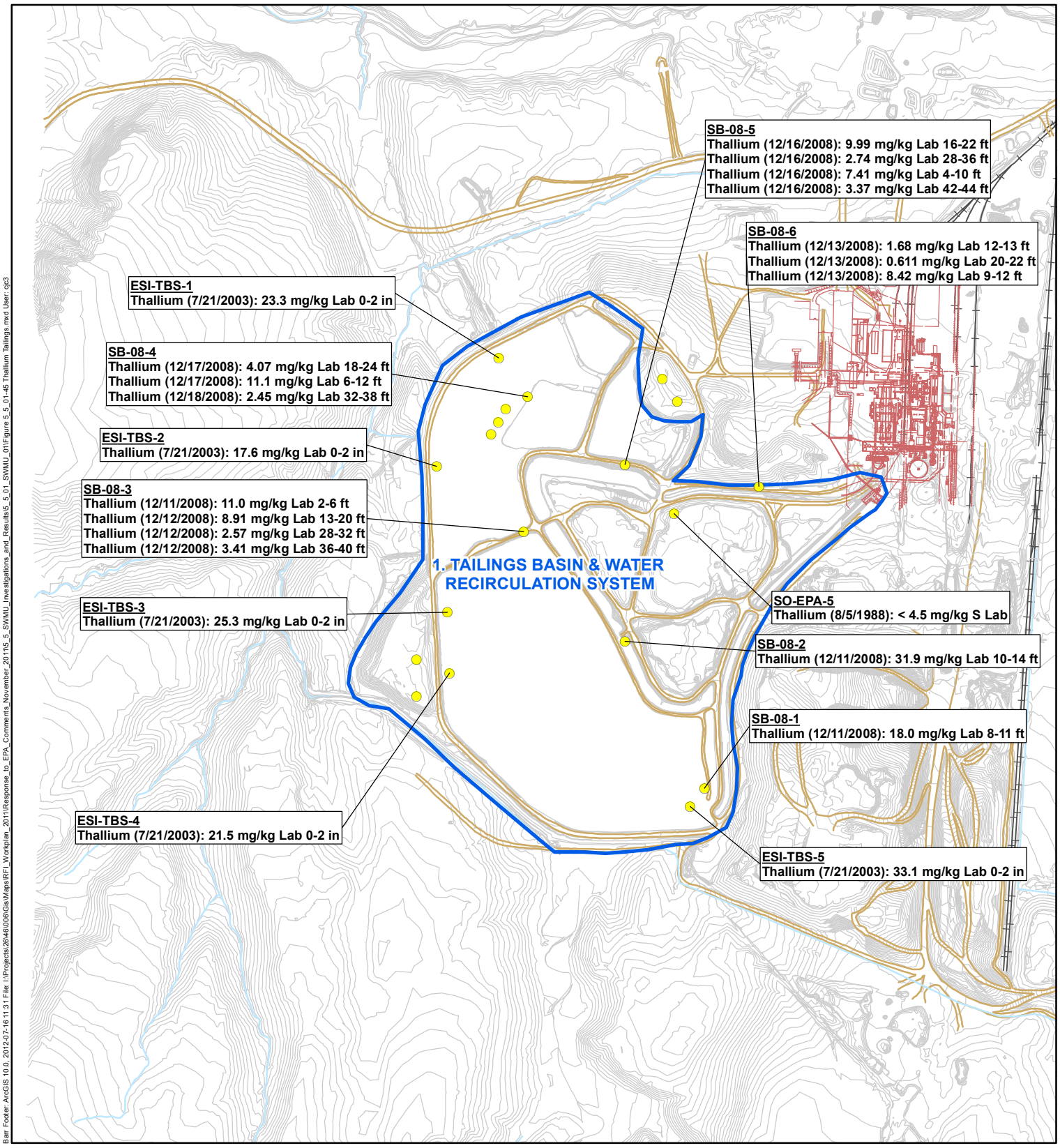
N

Feet

750 0 750

Figure 5.5.1-44

SWMU 1
SOILS RESULTS:
PHOSPHORUS, TOTAL
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-07-16 11:31 File: I:\Projects\26\4\6\006\Gis\Maps\RFI_Workplan_2011\Response_to_EPA_Comments_November_2011\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-45 Thallium Tailings.mxd User: cjc3

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

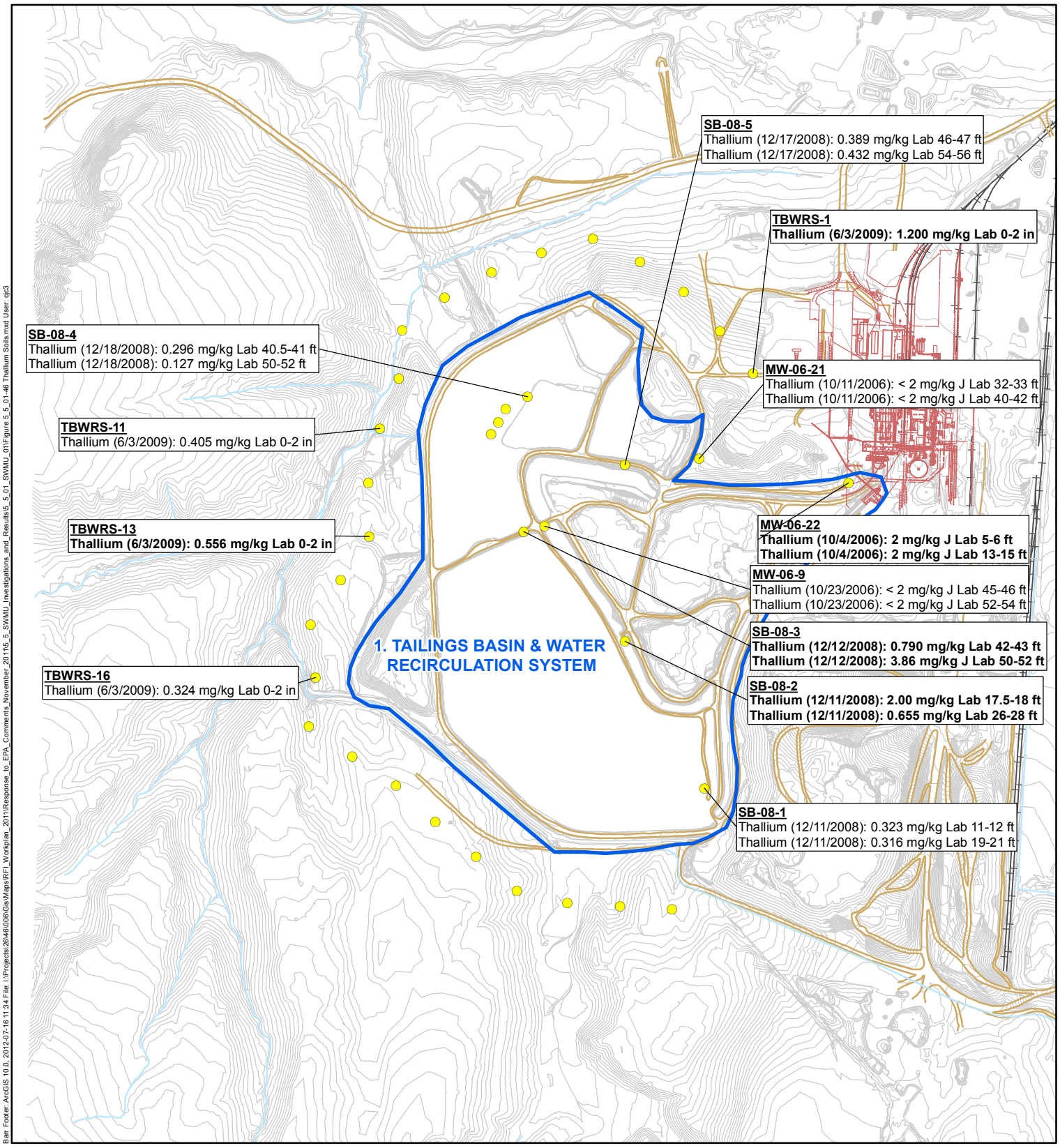
Bold font indicates that sample concentration is greater than the 95% UPL Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-45

SWMU 1
TAILINGS RESULTS:
THALLIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-07-16 11:34 File: I:\Projects\26\4\6\006\Gis\Maps\RFI_Workplan_2011\Response_to_EPA_Comments_November_2011\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-46 Thallium Soils.mxd User: gjc3

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

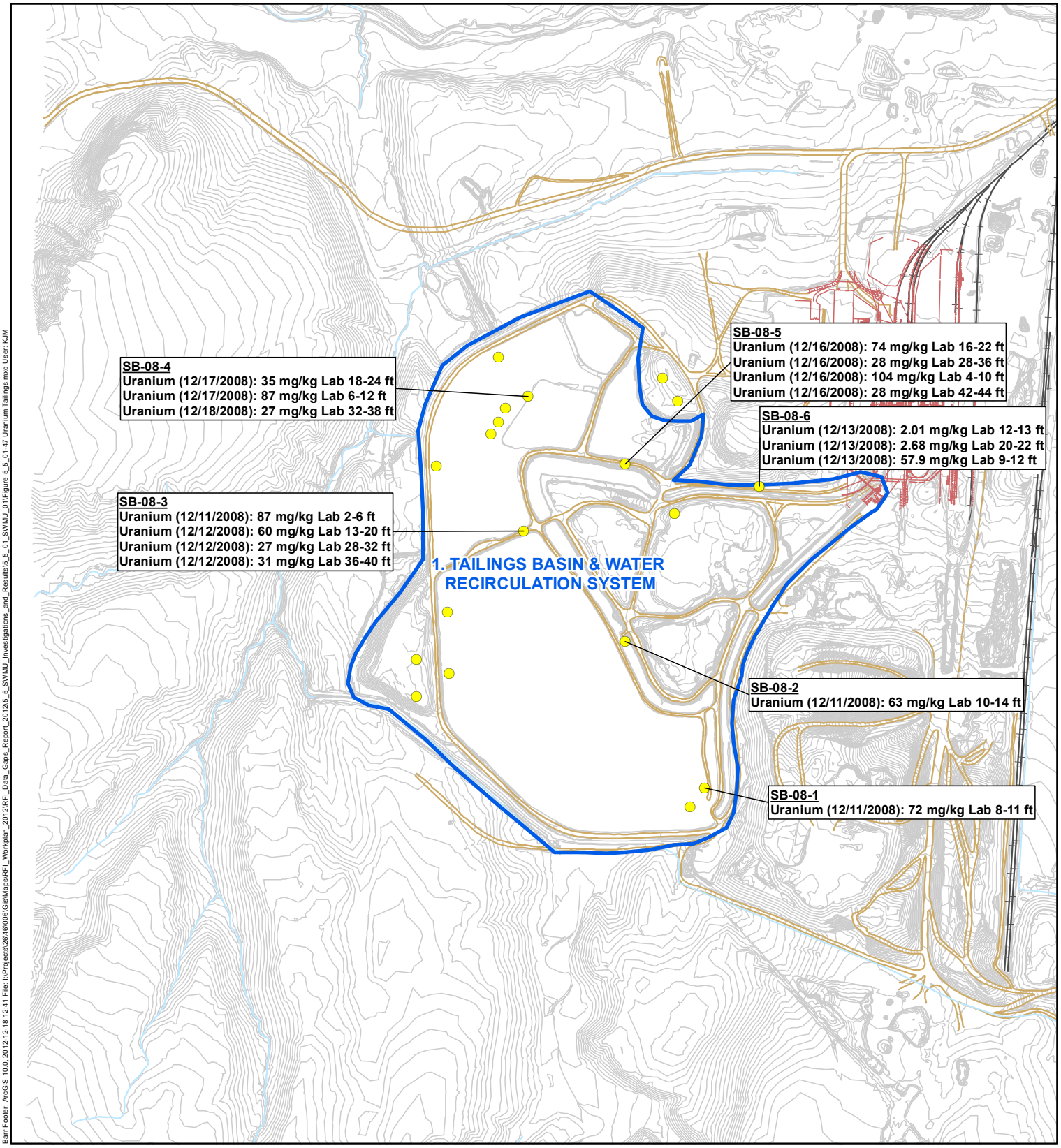
Bold font indicates that sample concentration is greater than the 95% UPL Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-46

SWMU 1
SOILS RESULTS:
THALLIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 12:41 File: I:\Projects\2646\006\GisMaps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5.5_SWMU_Investigations_and_Results\5.5_01_SWMU_01\Figure 5.5_01-47 Uranium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

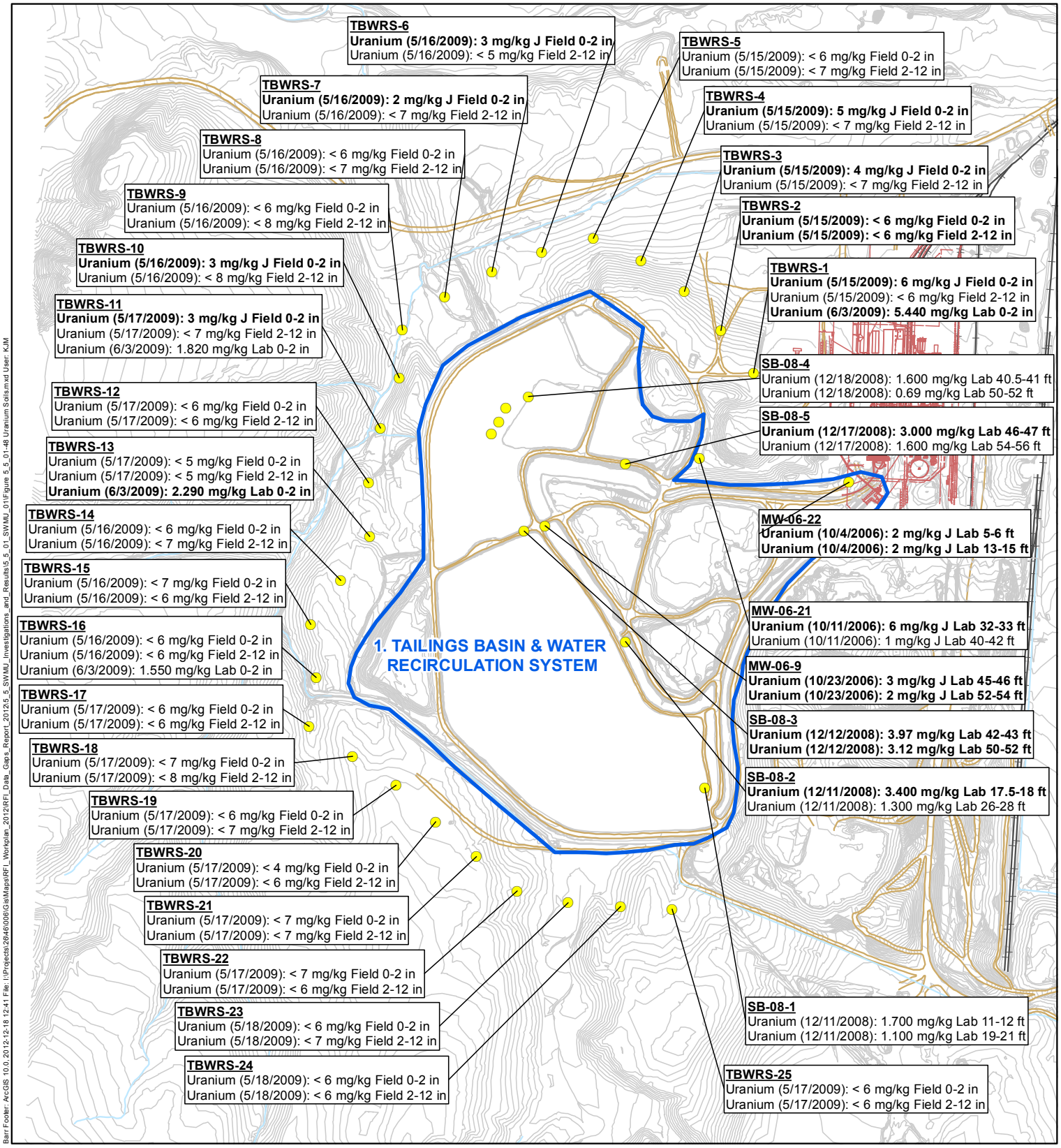
N

Feet

750 0 750

Figure 5.5.1-47

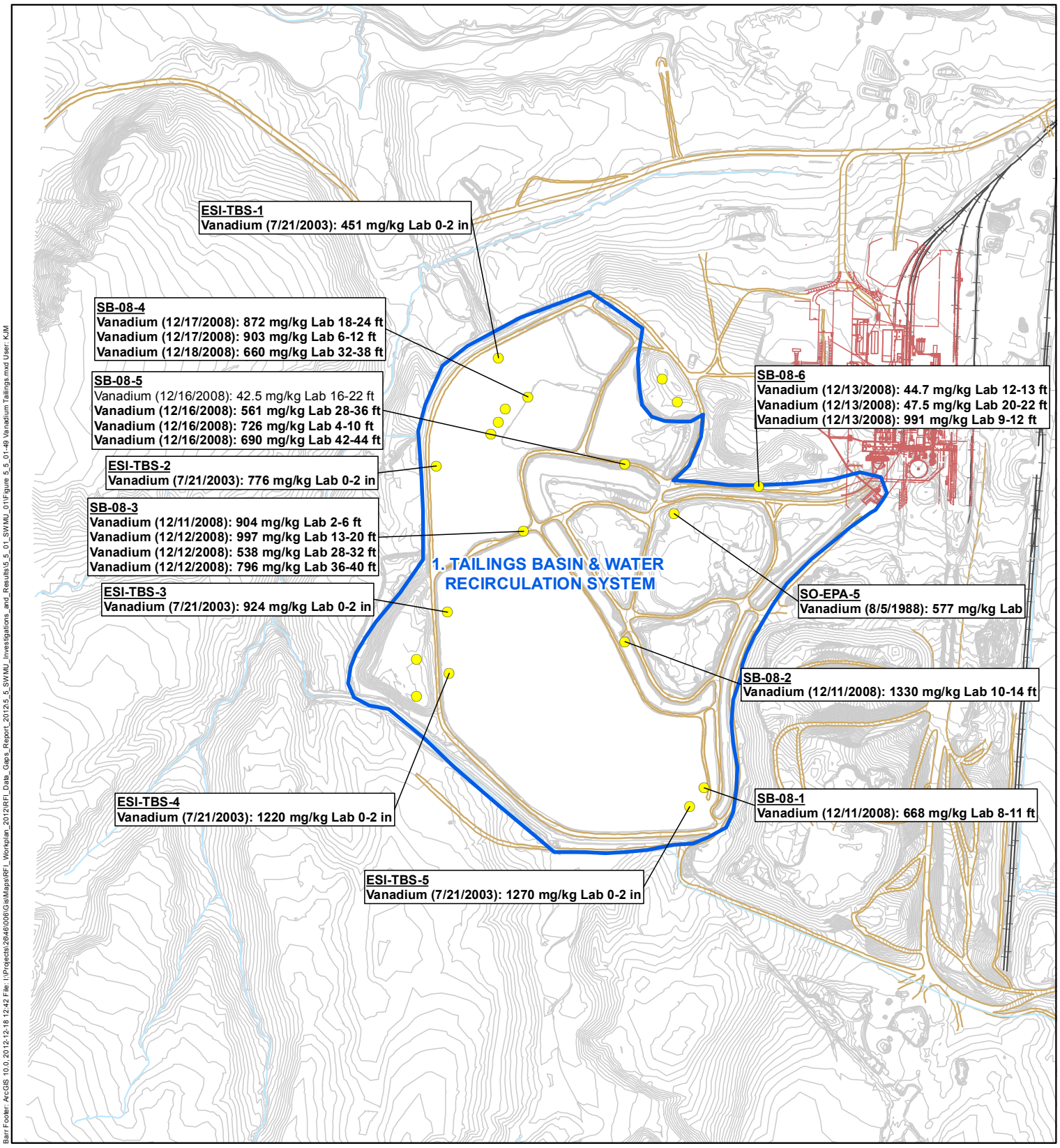
SWMU 1
TAILINGS RESULTS:
URANIUM
Rhodia Silver Bow Plant
Montana



Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

Figure 5.5.1-48

SWMU 1
SOILS RESULTS:
URANIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 12:42 File: I:\Projects\2646\006\GisMaps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5.5_SWMU_Investigations_and_Results\5.5_01_SWMU_01\Figure 5_5_01-49 Vanadium Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

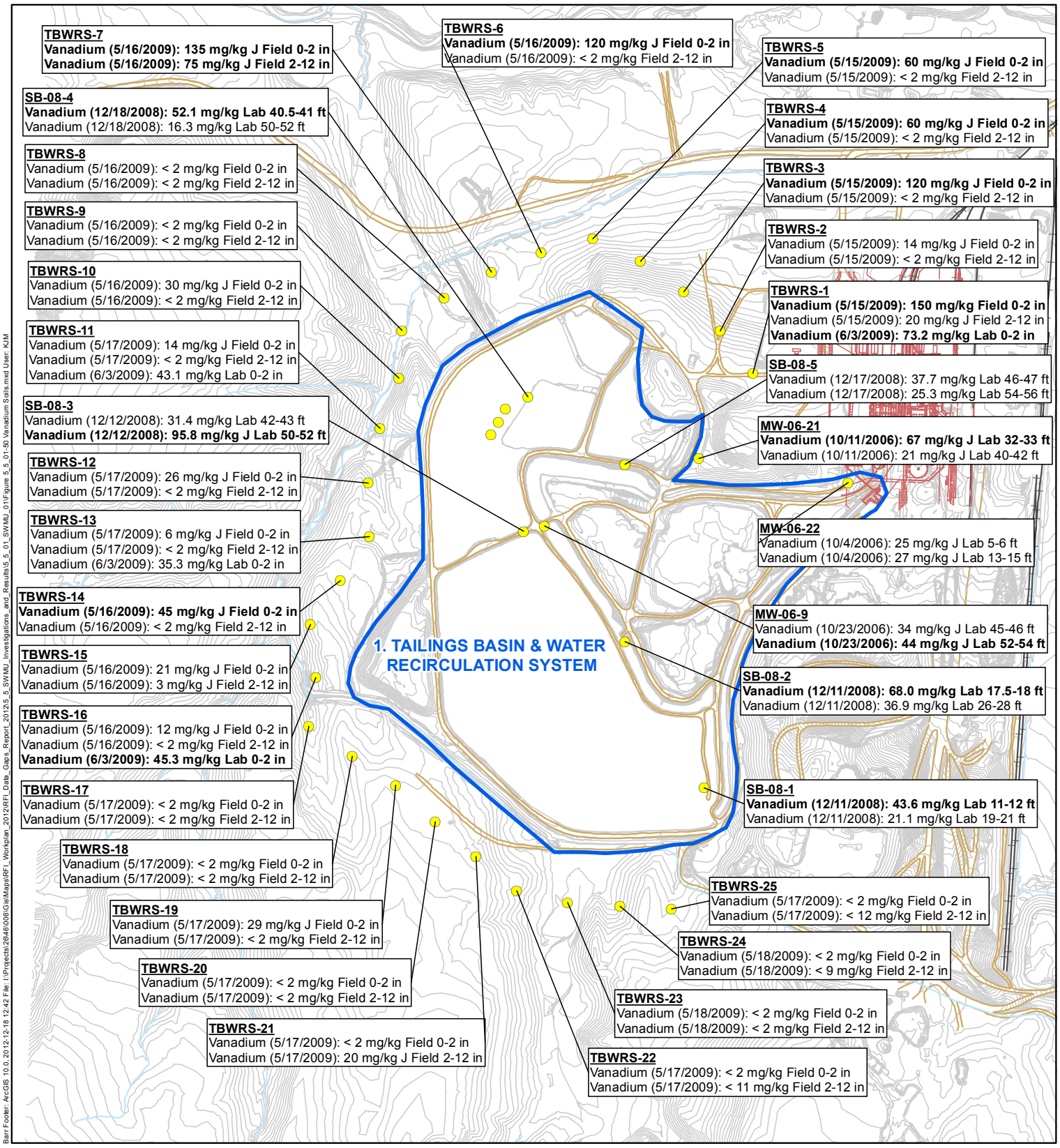
N

Feet

750 0 750

Figure 5.5.1-49

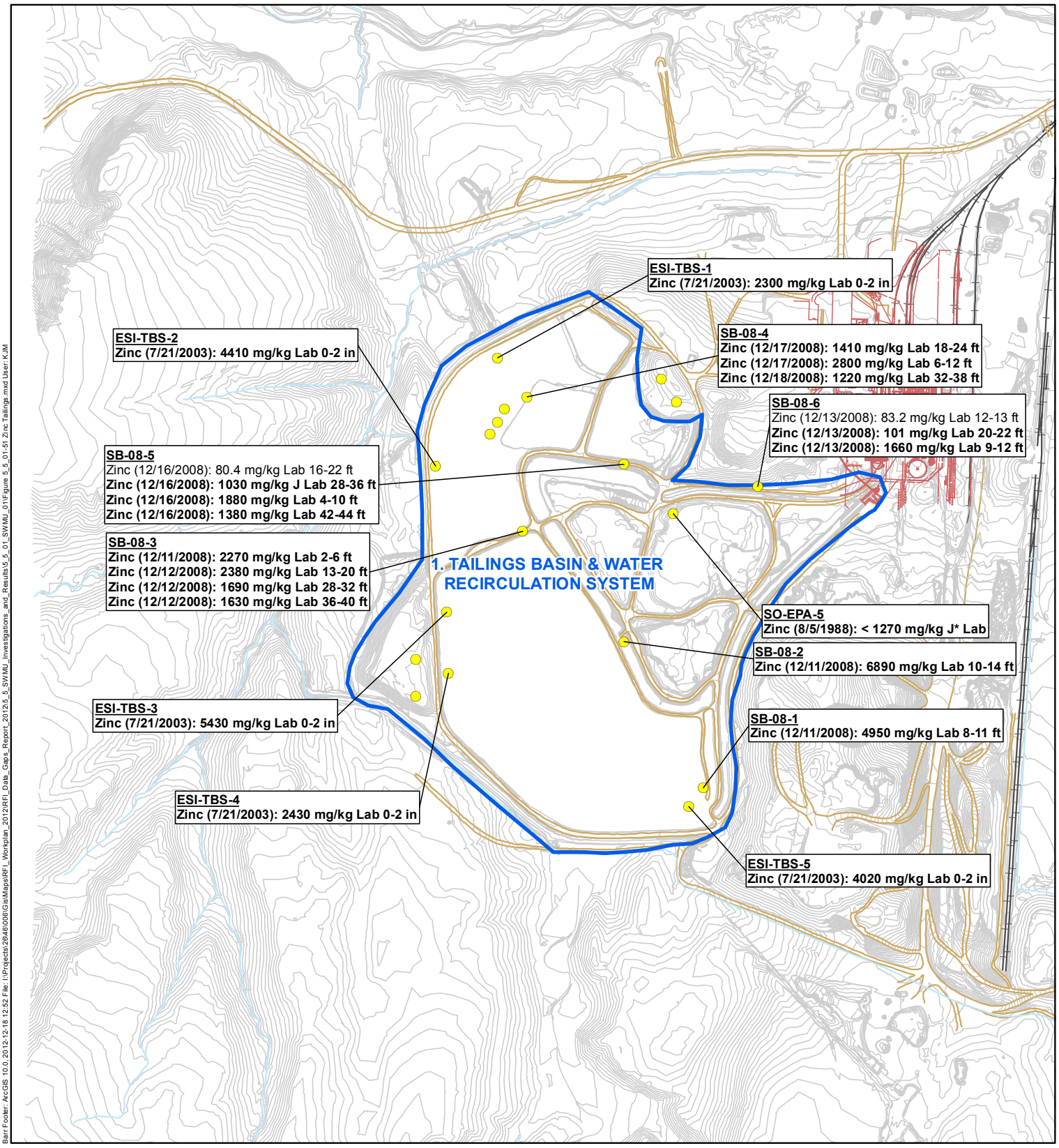
SWMU 1
TAILINGS RESULTS:
VANADIUM
Rhodia Silver Bow Plant
Montana



Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

Figure 5.5.1-50

SWMU 1
SOILS RESULTS:
VANADIUM
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 12:52 File: I:\Projects\2646\006\GisMaps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5.5_SWMU_Investigations_and_Results\5.5_01_SWMU_01\Figure 5_5_01-51 Zinc Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

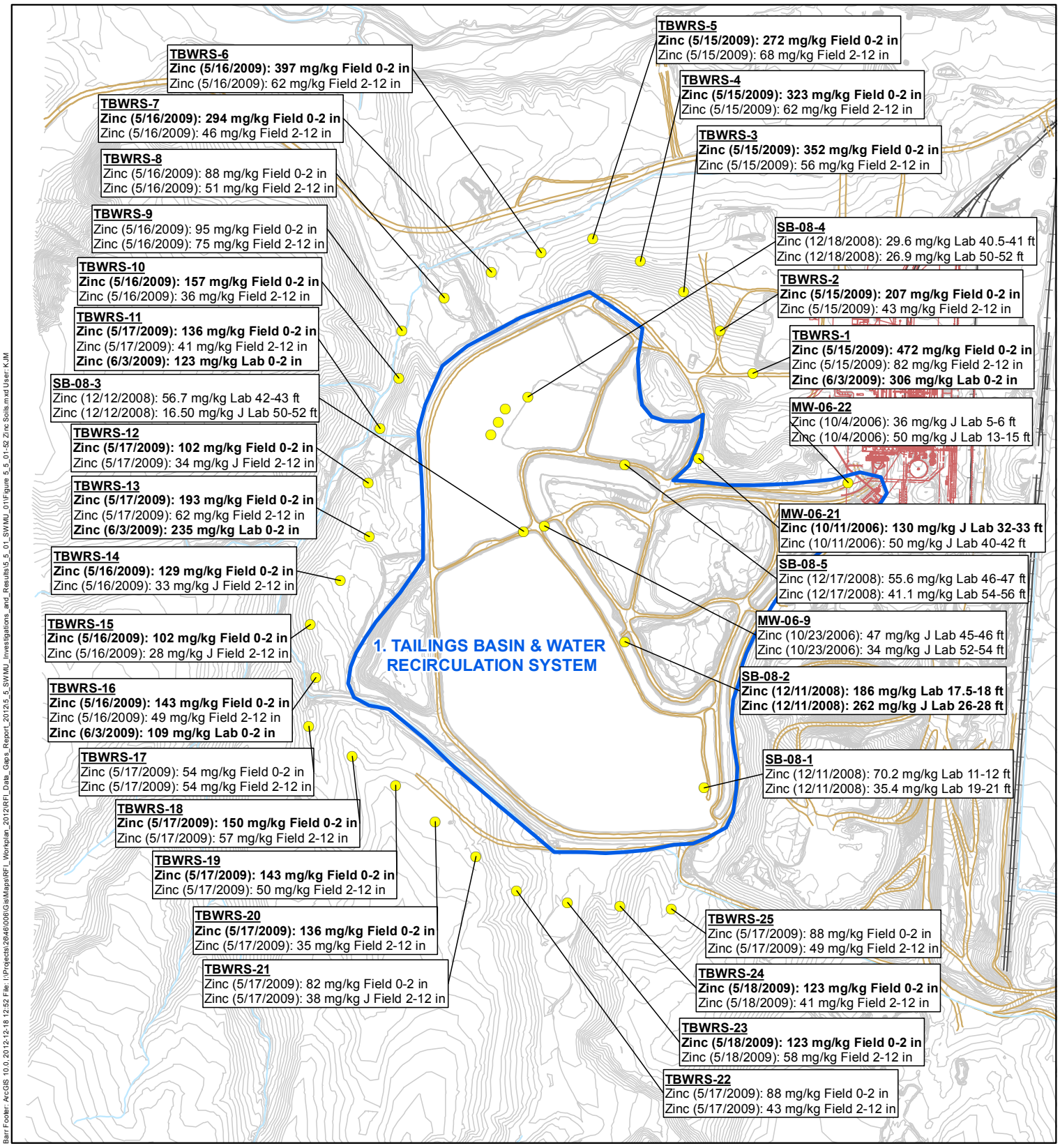
N

Feet

750 0 750

Figure 5.5.1-51

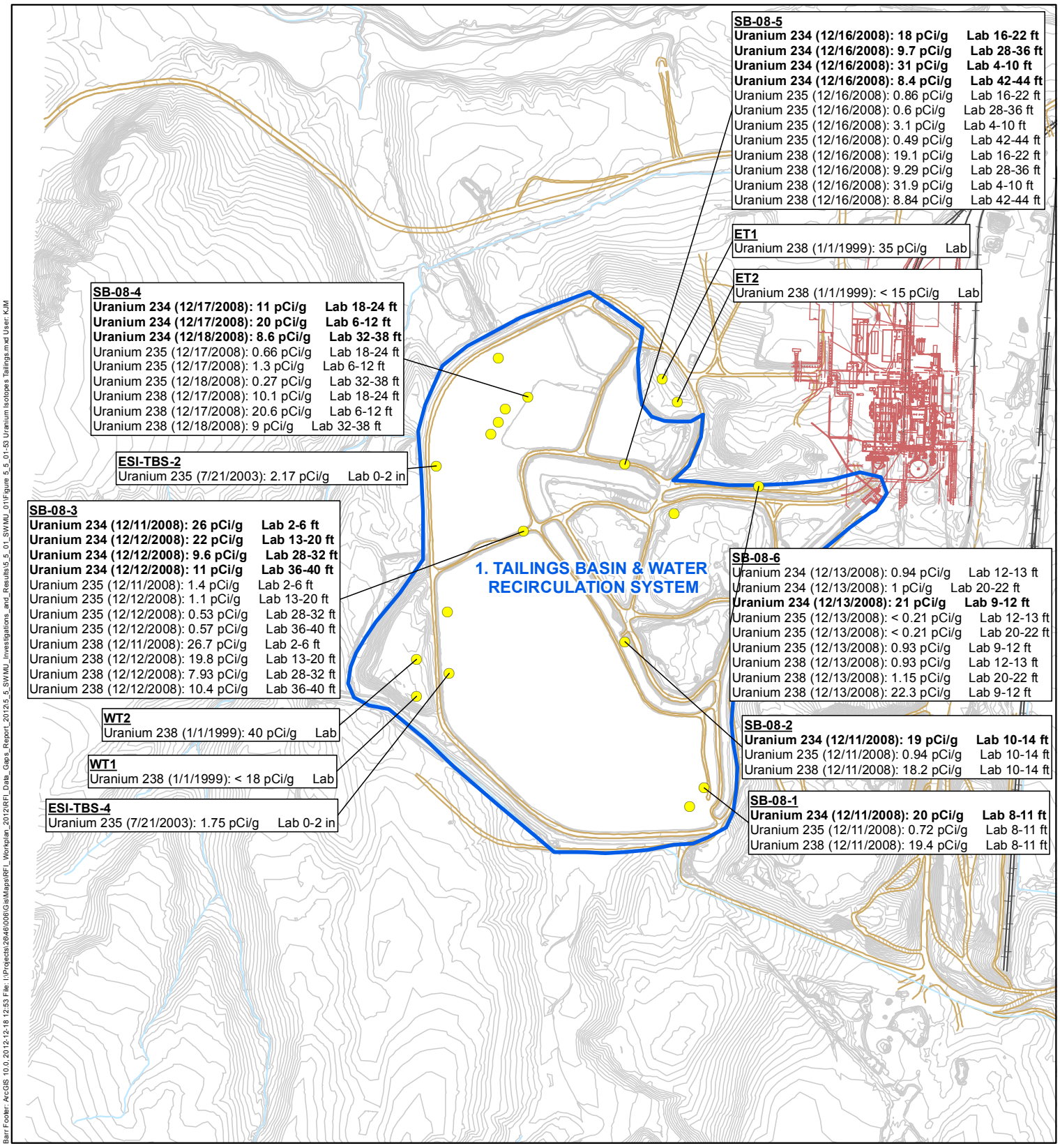
SWMU 1
TAILINGS RESULTS:
ZINC
Rhodia Silver Bow Plant
Montana



Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

Figure 5.5.1-52

SWMU 1
SOILS RESULTS:
ZINC
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 12:53 File: I:\Projects\26461006\GIs\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-53 Uranium Isotopes Tailings.mxd User: KJM

Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

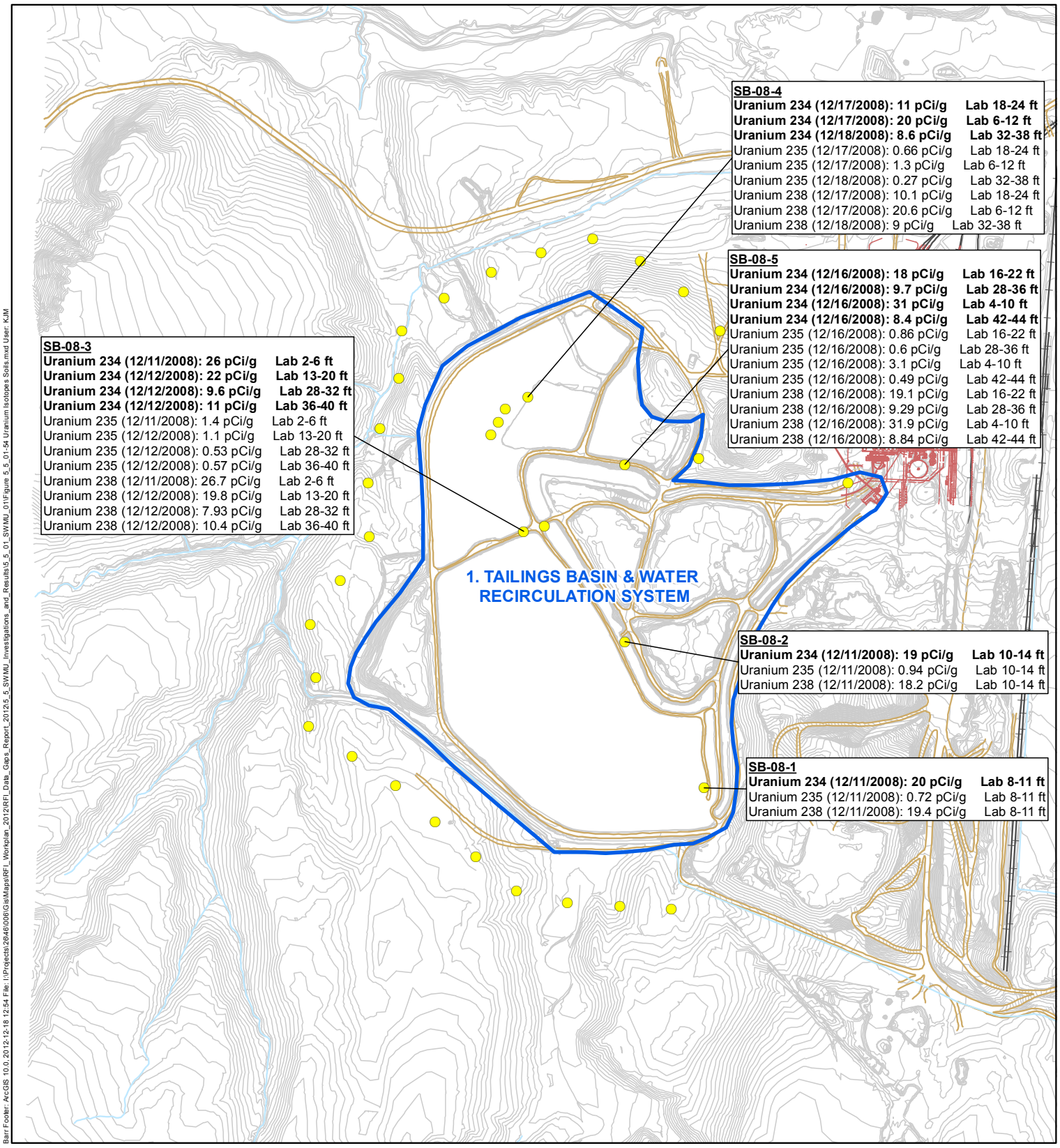
N

Feet

750 0 750

Figure 5.5.1-53

SWMU 1
TAILINGS RESULTS:
URANIUM ISOTOPES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 12:54 File: I:\Projects\2646\006\GisMaps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_01_SWMU_01\Figure 5_5_01-54 Uranium Isotopes Soils.mxd User: KJM

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

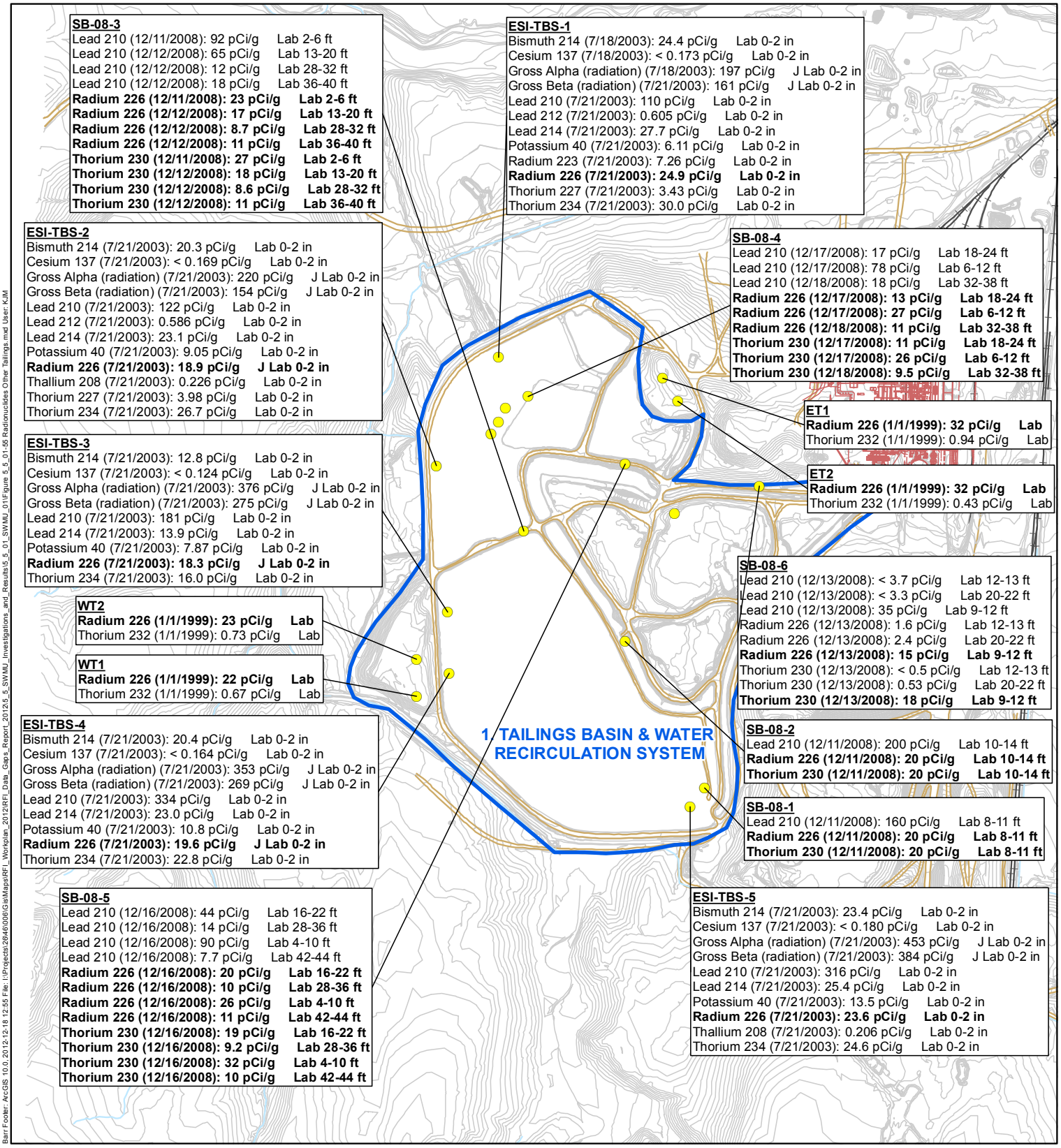
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-54

SWMU 1
SOILS RESULTS:
URANIUM ISOTOPES
Rhodia Silver Bow Plant
Montana



Sample Location

SWMU 1

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

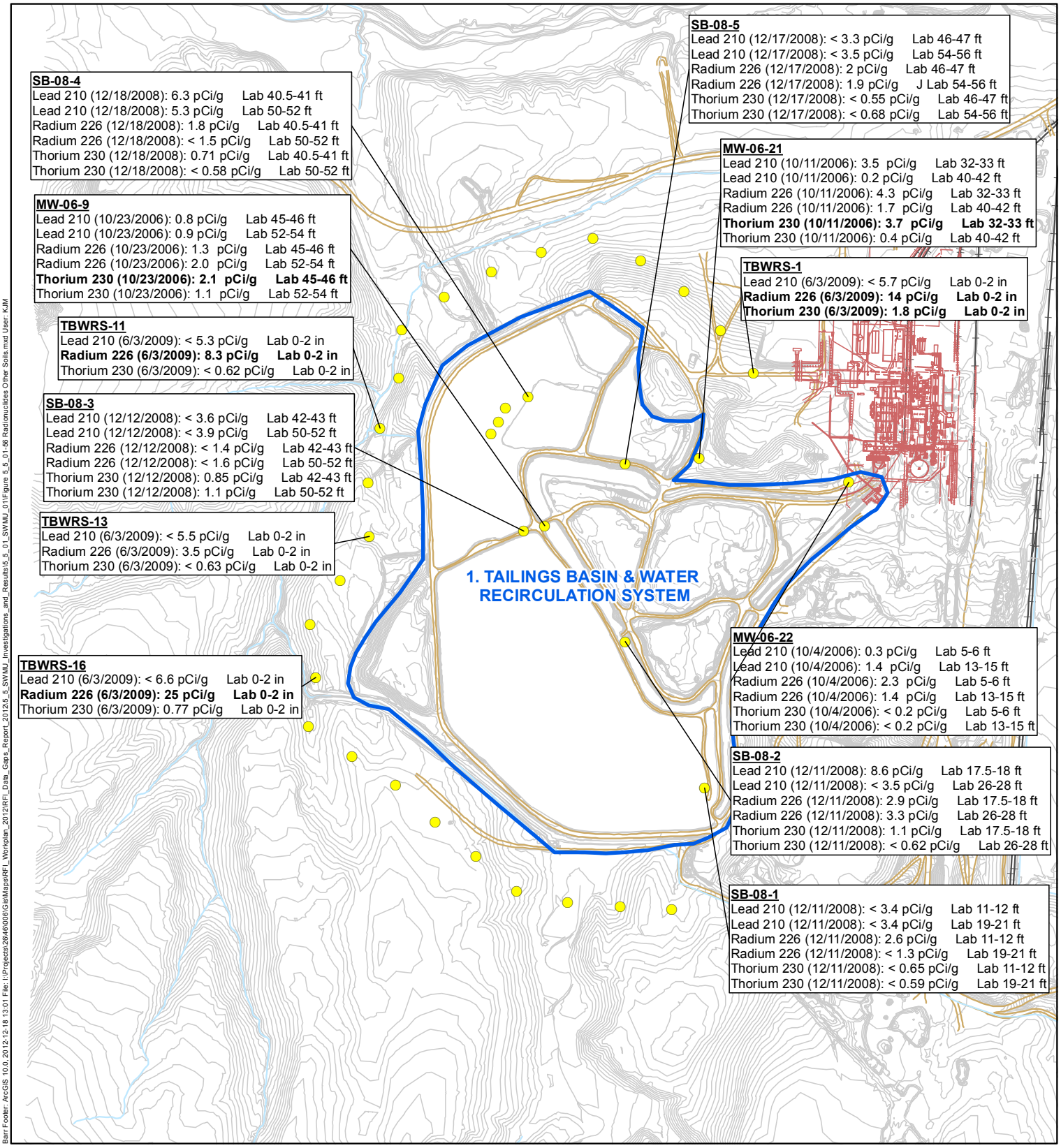
N

Feet

750 0 750

Figure 5.5.1-55

SWMU 1
TAILINGS RESULTS:
RADIONUCLIDES -
OTHER CONSTITUENTS
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 13:01 File: I:\Projects\26\46\006\GisMaps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5.5_SWMU_Investigations_and_Results\5.5_01_SWMU_01\Figure 5.5_01-56 Radionuclides Other Soils.mxd User: KJM

Sample Location
SWMU 1
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

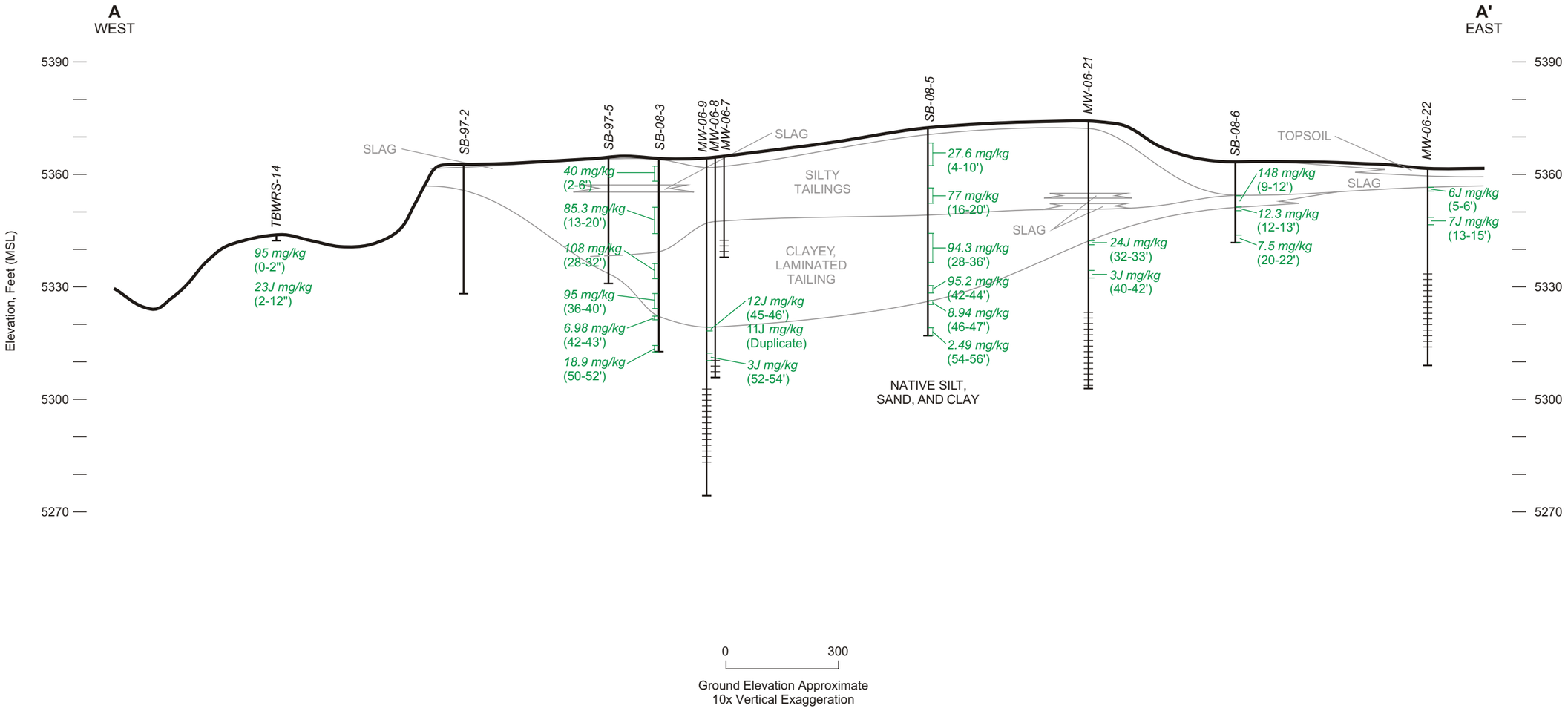
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
750 0 750

Figure 5.5.1-56

SWMU 1
SOILS RESULTS:
RADIONUCLIDES - OTHER CONSTITUENTS
Rhodia Silver Bow Plant
Montana



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-57

SWMU 1
CONCEPTUAL CROSS SECTION A-A'
ARSENIC DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section A-A' Arsenic Diagram.CDR RLG 12-28-12

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SILT
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY

44 mg/kg (0-2")
35 mg/kg (2-12")
48.3 mg/kg (0-2")
? 49.8 mg/kg (6-12')
110 mg/kg (18-24')
83 mg/kg (30.5-33')
96.1 mg/kg (32-38')
2.49 mg/kg (40.5-41')
0.95 mg/kg (50-52')
62 mg/kg (43.5-46')
<5 mg/kg (56.5-58.5')
<5 mg/kg (64-64.5')
79 mg/kg (42-44.5')
80 mg/kg (39-41.5')
81 mg/kg (41.5-44')
5 mg/kg (44.5-46.5')
5 mg/kg (53.5-55.5')
48 mg/kg (56-58')
9.5 mg/kg (63.5-65.5')
12J mg/kg (45-46')
11J mg/kg (Duplicate)
3J mg/kg (52-54')
112 mg/kg (10-14')
115 mg/kg (Duplicate)
8.42 mg/kg (17.5-18')
5.77 mg/kg (26-28')
4.82 mg/kg (Duplicate)
68.5 mg/kg (8-11')
6 mg/kg (11-12')
1.96 mg/kg (19-21')
77.5 mg/kg (0-2")
114 mg/kg (0-2")
15J mg/kg (2-12")

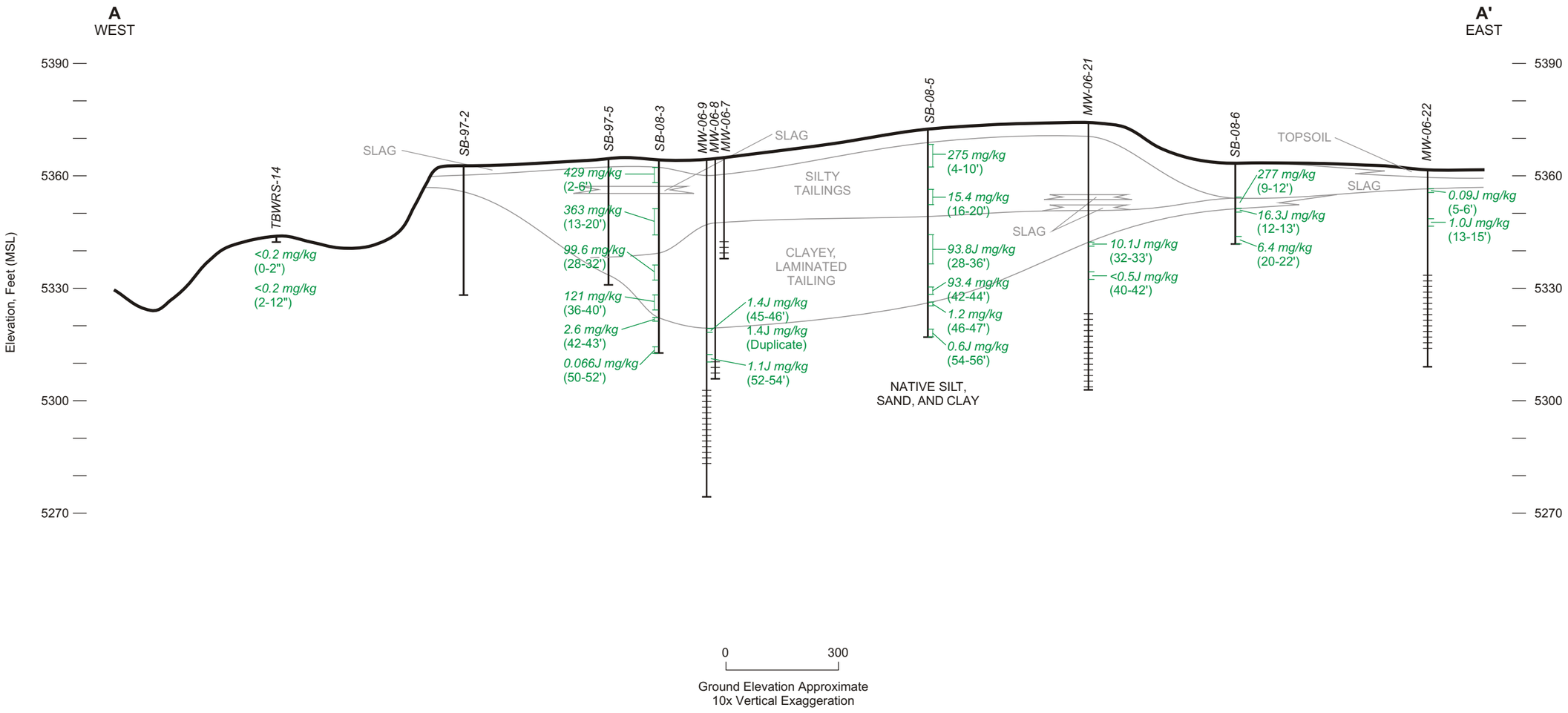
0 300
Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND
Geologic Contact (Dashed where inferred)
Boring
Monitoring Well Screened Interval

Figure 5.5.1-58

SWMU 1
CONCEPTUAL CROSS SECTION B-B'
ARSENIC DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section B-B' Arsenic Diagram.CDR RLG 12-28-12



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-59

SWMU 1
CONCEPTUAL CROSS SECTION A-A'
CADMIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\264606\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section A-A' Cadmium Diagram.CDR RLG 12-28-12

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SILT
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY

17J mg/kg (0-2")
<0.2 mg/kg (2-12")
946 mg/kg (0-2")
? 550 mg/kg (6-12')
123 mg/kg (18-24')
69 mg/kg (30.5-33')
71.6 mg/kg (32-38')
0.7J mg/kg (40.5-41')
<0.2 mg/kg (50-52')
50 mg/kg (43.5-46')
<1 mg/kg (56.6-58.5)
<1 mg/kg (64-64.5')
31 mg/kg (42-44.5')
65 mg/kg (39-41.5')
57 mg/kg (41.5-44')
1 mg/kg (44.5-46.5')
<1 mg/kg (53.5-55.5')
1 mg/kg (56-58')
2 mg/kg (63.5-65.5')
1.4J mg/kg (45-46')
1.4J mg/kg (Duplicate)
1.1J mg/kg (52-54')
1160 mg/kg (10-14')
1190 mg/kg (Duplicate)
26 mg/kg (17.5-18')
1.3J mg/kg (26-28')
0.4J mg/kg (Duplicate)
711 mg/kg (8-11')
1.6 mg/kg (11-12')
0.5J mg/kg (19-21')
737 mg/kg (0-2")
<0.2 mg/kg (0-2")
<0.2 mg/kg (2-12")

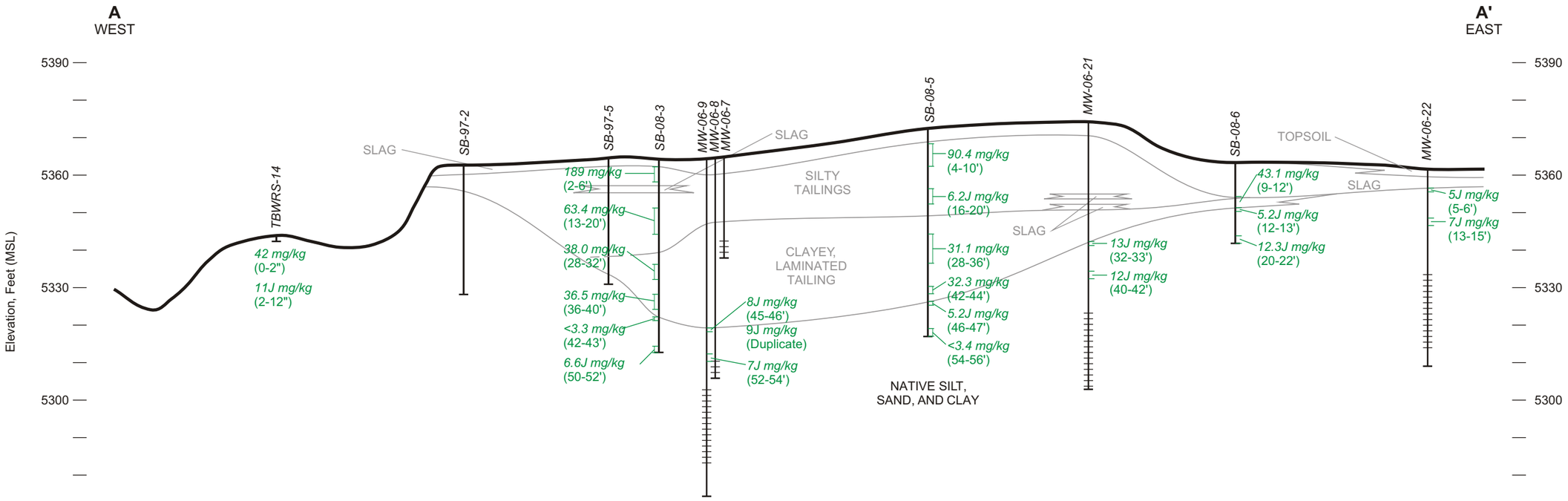
0 300
Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND
Geologic Contact (Dashed where inferred)
Boring
Monitoring Well Screened Interval

Figure 5.5.1-60

SWMU 1
CONCEPTUAL CROSS SECTION B-B'
CADMIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\26460\06\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section B-B' Cadmium Diagram.CDR RLG 12-28-12



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

P:\Mpls\26 MT\46\26460061\WorkFiles\Figures_Graphics\2012Cross Sections\Conceptual Cross Section A-A' Lead Diagram.CDR RLG 12-28-12

Figure 5.5.1-61

SWMU 1
CONCEPTUAL CROSS SECTION A-A'
LEAD DIAGRAM
Rhodia Silver Bow Plant
Montana

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY

63 mg/kg (0-2")
11J mg/kg (2-12")
207 mg/kg (0-2")
? 65.8 mg/kg (6-12')
31.6 mg/kg (18-24')
30.2 mg/kg (32-38')
<3.4 mg/kg (40.5-41')
<3.3 mg/kg (50-52')
8J mg/kg (45-46')
9J mg/kg (Duplicate)
7J mg/kg (52-54')
238 mg/kg (10-14')
242 mg/kg (Duplicate)
16.1 mg/kg (17.5-18')
5.5J mg/kg (26-28')
<3.5 mg/kg (Duplicate)
141 mg/kg (8-11')
9.6J mg/kg (11-12')
<3.1 mg/kg (19-21')
332 mg/kg (0-2")
40 mg/kg (0-2")
9J mg/kg (2-12")

0 300

Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND

Geologic Contact
(Dashed where inferred)

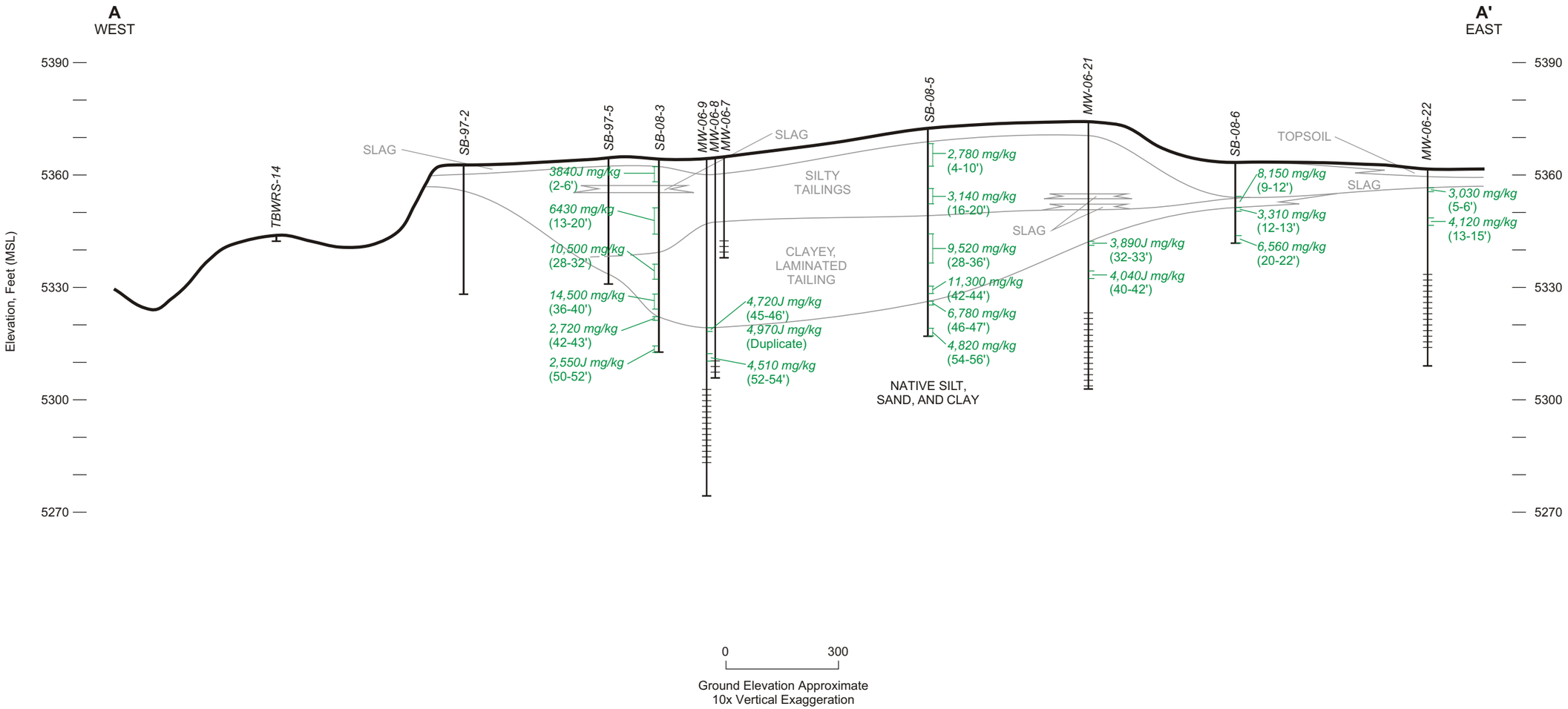
Boring

Monitoring Well Screened Interval

Figure 5.5.1-62

CONCEPTUAL CROSS SECTION B-B'
LEAD DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\264606\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section B-B' Lead Diagram.CDR RLG 12-28-12



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-63

SWMU 1
CONCEPTUAL CROSS SECTION A-A'
MAGNESIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\26460061\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section A-A' Magnesium Diagram.CDR RLG 12-28-12

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILT
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SLAG

3,570 mg/kg (0-2")
? 6,260 mg/kg (6-12')
11,500 mg/kg (18-24')
10;900 mg/kg (32-38')
3,070 mg/kg (40.5-41')
2,600 mg/kg (50-52')
4,720J mg/kg (45-46')
4,970J mg/kg (Duplicate)
4,510J mg/kg (52-54')
6,370 mg/kg (10-14')
6,280 mg/kg (Duplicate)
5,210mg/kg (17.5-18')
4,290 mg/kg (26-28')
3,560 mg/kg (Duplicate)
3,450 mg/kg (8-11')
4,970 mg/kg (11-12')
3,390 mg/kg (19-21')
3,380 mg/kg (0-2")

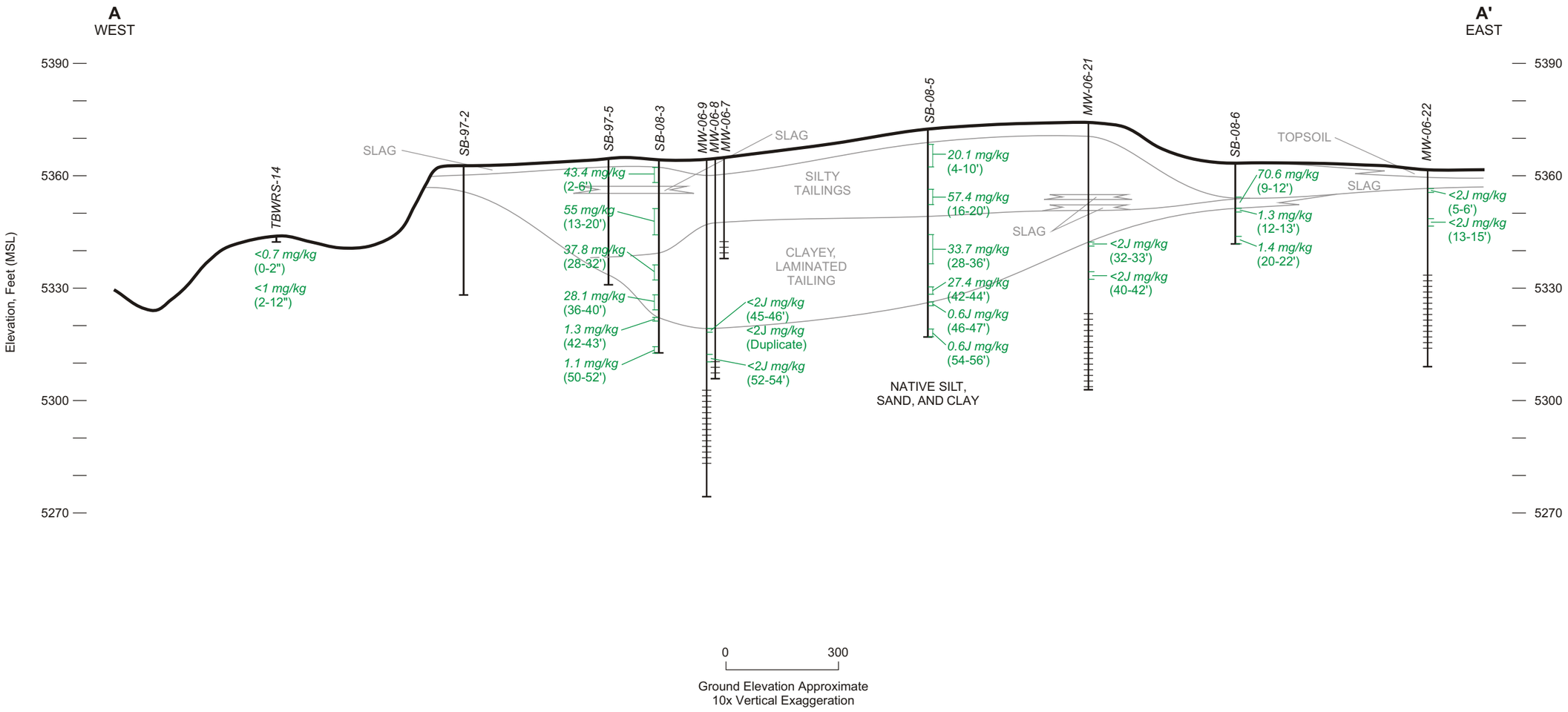
0 300
Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND
Geologic Contact (Dashed where inferred)
Boring
Monitoring Well Screened Interval

Figure 5.5.1-64

SWMU 1
CONCEPTUAL CROSS SECTION B-B'
MAGNESIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\26460\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section B-B' Magnesium Diagram.CDR RLG 12-28-12



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-65

SWMU 1
CONCEPTUAL CROSS SECTION A-A'
SELENIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section A-A' Selenium Diagram.CDR RLG 12-28-12

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILT
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SLAG

<1 mg/kg (0-2")
<1 mg/kg (2-12")
66.9 mg/kg (0-2")
? 65.7 mg/kg (6-12')
46.3 mg/kg (18-24')
28.3 mg/kg (32-38')
<0.5 mg/kg (40.5-41')
0.7J mg/kg (50-52')
<2J mg/kg (45-46')
<2J mg/kg (Duplicate)
<2J mg/kg (52-54')
136 mg/kg (10-14')
139 mg/kg (Duplicate)
5.1 mg/kg (17.5-18')
<0.5 mg/kg (26-28')
0.5J mg/kg (Duplicate)
96.4 mg/kg (8-11')
9 mg/kg (11-12')
0.7J mg/kg (19-21')
200 mg/kg (0-2")
<1 mg/kg (0-2")
<0.7mg/kg (2-12")

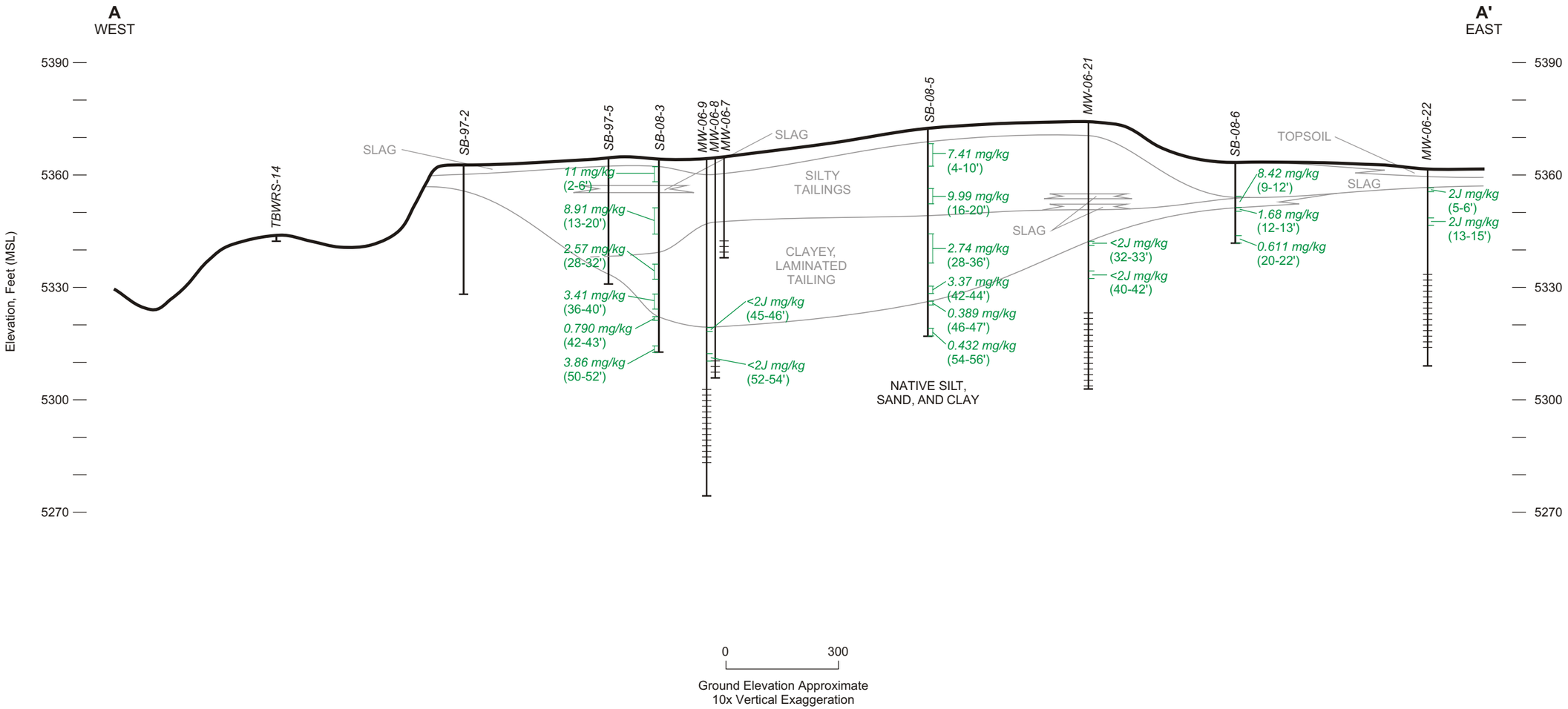
0 300
Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND
Geologic Contact (Dashed where inferred)
Boring
Monitoring Well Screened Interval

Figure 5.5.1-66

SWMU 1
CONCEPTUAL CROSS SECTION B-B'
SELENIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\26460061\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section B-B' Selenium Diagram.CDR RLG 12-19-12



LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-67

SWMU 1
CONCEPTUAL CROSS SECTION A-A'
THALLIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\264606\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section A-A' Thallium Diagram.CDR RLG 12-28-12

B
NORTH

B'
SOUTH

Elevation, Feet (MSL)

5390
5360
5330
5300
5270
5240
5210
5180
5150

TBWRS-7
MW-06-12
MW-97-4
MW-97-3
ESI-TBS-1 (Projected)
SB-08-4
T-99-1 (Projected)
T-99-2 (Projected)
T-99-3 (Projected)
MW-06-9
MW-06-8
MW-06-7
SB-08-2
SB-08-1
ESI-TBS-5 (Projected)
TBWRS-25

SLAG
SILTY SAND
SILT
SILTY CLAY
CLAYEY GRAVEL
SILTY CLAY
CLAY
SAND
SILT
CLAY
SILTY TAILINGS
CLAYEY, LAMINATED TAILING
NATIVE SILT, SAND, AND CLAY
SLAG

23.3 mg/kg (0-2")
? 11.1 mg/kg (6-12')
4.07 mg/kg (18-24')
2.45 mg/kg (32-38')
0.296 mg/kg (40.5-41')
0.127 mg/kg (50-52')
<2J mg/kg (45-46')
<2J mg/kg (Duplicate)
<2J mg/kg (52-54')
31.9mg/kg (10-14')
30.1 mg/kg (Duplicate)
2.0 mg/kg (17.5-18')
0.655 mg/kg (26-28')
0.626 mg/kg (Duplicate)
18 mg/kg (8-11')
0.323 mg/kg (11-12')
0.316 mg/kg (19-21')
33.1 mg/kg (0-2")

0 300
Ground Elevation Approximate
10x Vertical Exaggeration

LEGEND

Geologic Contact
(Dashed where inferred)

Boring

Monitoring Well Screened Interval

Figure 5.5.1-68

SWMU 1
CONCEPTUAL CROSS SECTION B-B'
THALLIUM DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\26460061\WorkFiles\Figures_Graphics\2012Cross Sections\SWMU 1 Conceptual Cross Section B-B' Thallium Diagram.CDR RLG 12-28-12

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\Conceptual Cross Section During Operations.CDR RLG 12-19-12

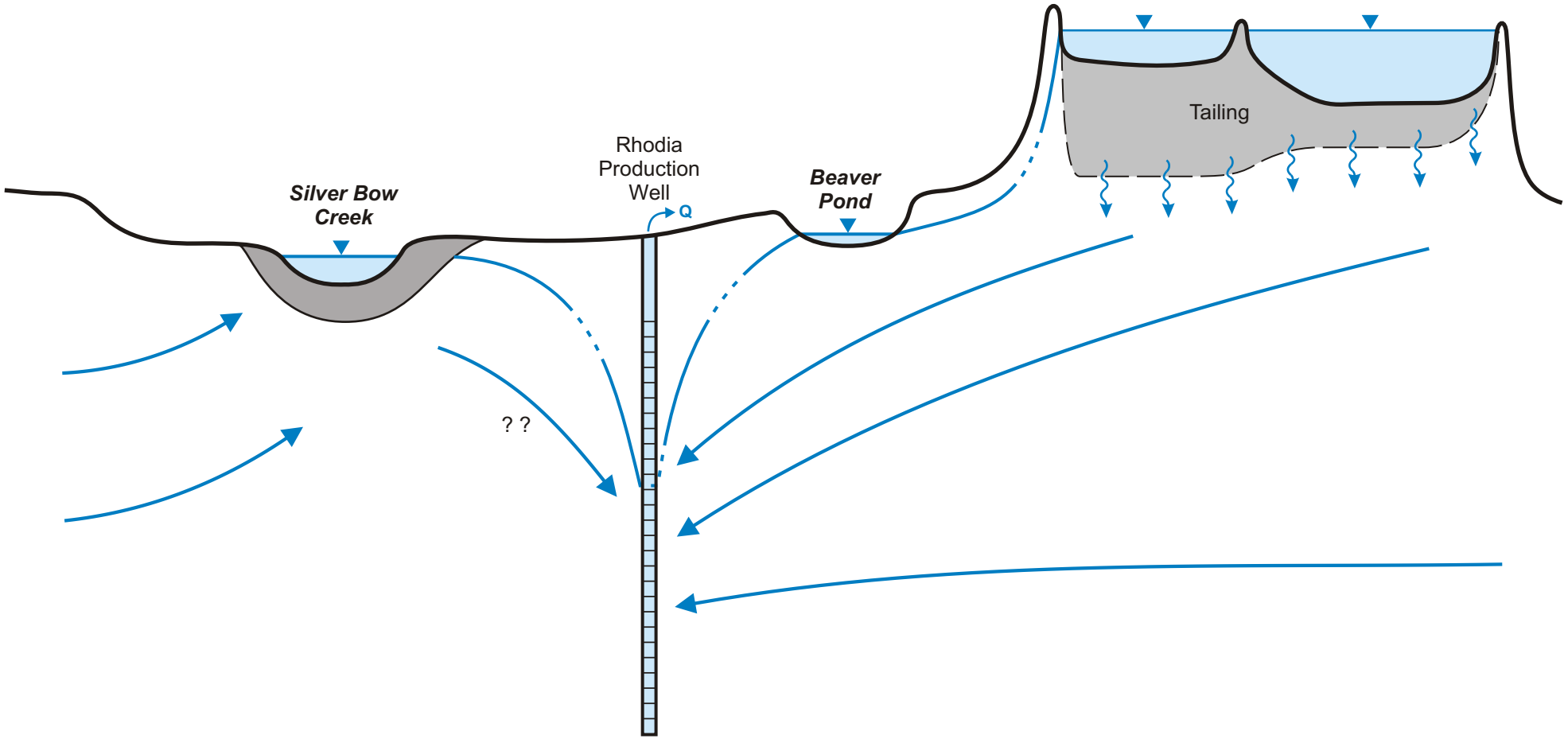


Figure 5.5.1-69

CONCEPTUAL CROSS SECTION DURING OPERATIONS
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\Conceptual Cross Section Post Shutdown.CDR RLG 12-19-12

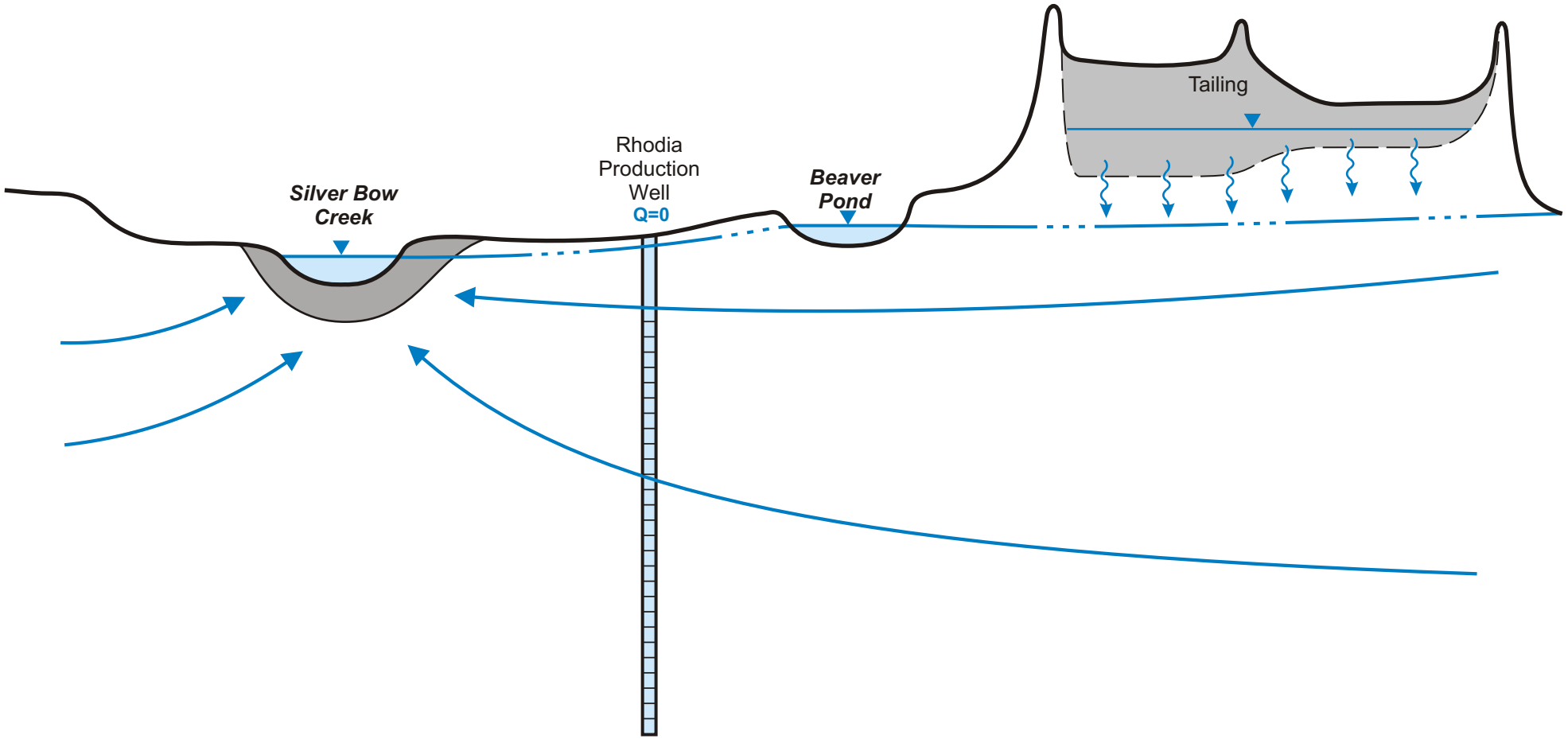


Figure 5.5.1-70

CONCEPTUAL CROSS SECTION POST SHUTDOWN
Rhodia Silver Bow Plant
Montana

Appendices

Appendix 5.5.1-A

Photographs of Tailing Basin Construction

Tailings Dam 9-20-54

Tailings Dam 9-20-54

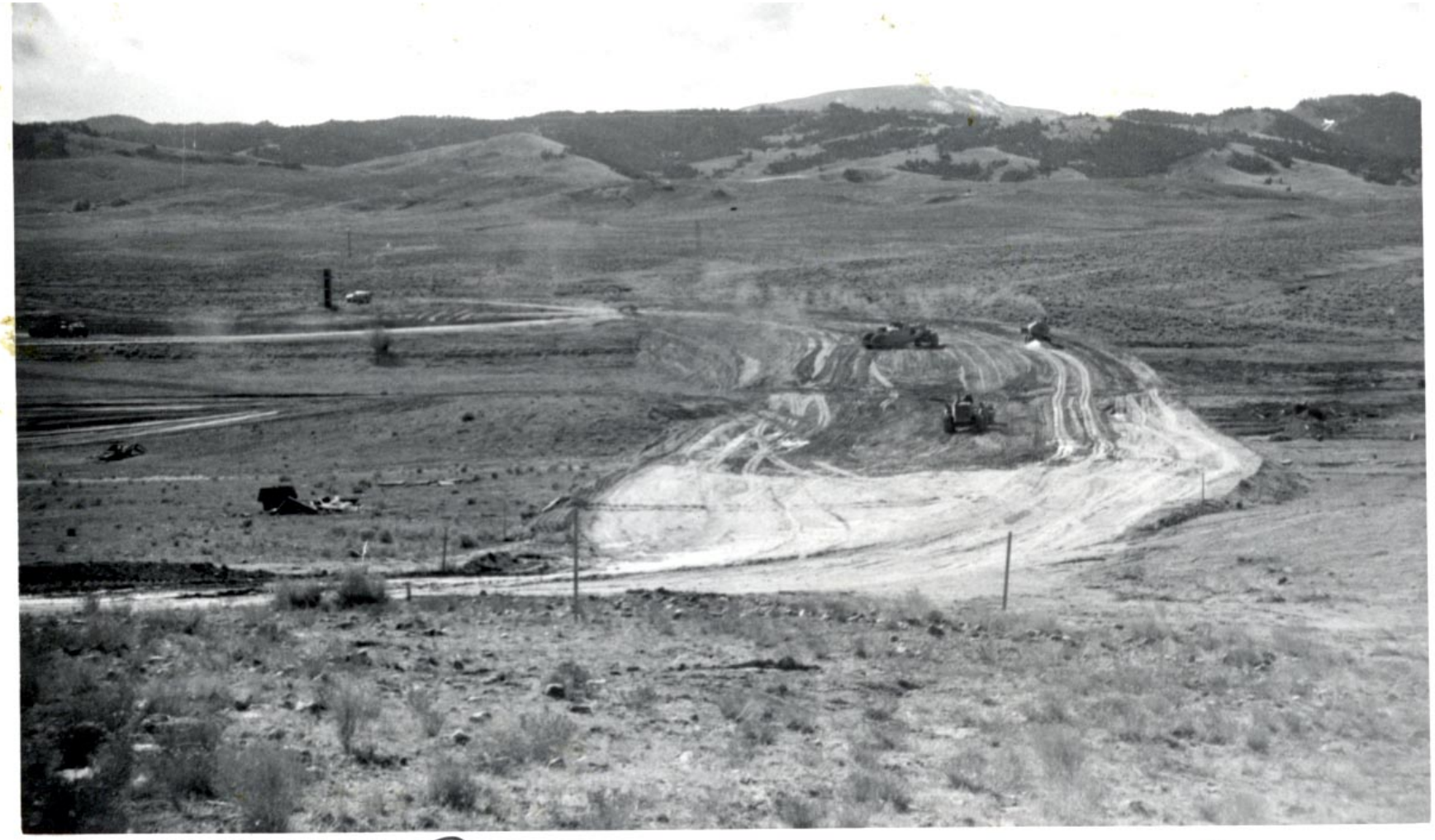
SB-275

Tailings Dam 9-20-54

Dam 9-20-54

Dam 9-30-54

Dam 10-10-54



Dam 10-10-54

Appendix 5.5.1-B

Silver Bow Facility Tailings Pond and Groundwater Review

RHÔNE-POULENC

MEMO

SILVER BOW PLANT

Date: November 18, 1996

To: Cam Balentine

From: Eric R. Tilman

Subject: Well Water Hardness Reporting Correction

When developing the well water trends, the hardness data showed a large jump at the start of 1993. After researching the data and trying to find an explanation for this sudden jump, I believe that the increase was caused by a misinterpretation of the units. When assembling the data for the trending, summary tables for the time period of 1985 to 1992 were used. These tables didn't have units listed on them and it was assumed that the hardness units were parts per million (ppm). After comparing the logbook with the summary tables, the hardness data in the summary tables was in the units of grains per gallon, not ppm. The data used in the trending for the time period after 1993 was in the units of ppm. Grains per gallon are a factor of ten smaller than ppm. This would explain the jump by a factor of ten in the hardness data trending occurring at the start of 1993.

RHÔNE-POULENC

SILVER BOW PLANT

119130 GERMAN GULCH ROAD
SILVER BOW, MT 59750

TEL: (406) 782-1215
FAX: (406) 782-4498

November 8, 1996

Mr. Tim Byron
Department of Environmental Quality
Permitting and Compliance Section
P.O. Box 200901
Helena, Mt 59620-0901

REGISTERED MAIL
RETURN RECEIPT REQUESTED:

Dear Mr. Byron:

The purpose of this letter is to complete the response to your letter of January 16, 1996. By our letter of May 21, 1996, we indicated that Rhône Poulenc Inc. (RPI) would submit a description of the history of the Silver Bow Plant tailings pond and a summary and analysis of all available groundwater data for the facility. The attached report contains the promised information for your review. While the attached data and information were not generated as part of a comprehensive groundwater study, we believe it provides substantial evidence that the groundwater at the site has not been impacted significantly, if at all, by the tailings pond or site operations.

As we stated in our May 21, 1996 letter, the Silver Bow Plant is still an operating facility, and no decision has been made by Rhône Poulenc to close the facility. Consequently, we continue to believe that the Department's (DEQ) request for a pre-closure assessment of water quality issues is premature. Nevertheless, we hope that the enclosed information will help alleviate your concerns about potential groundwater impacts at the site.

Eric Tilman and I will continue to be the your main site contacts concerning relevant environmental issues and regulations. Please feel free to contact us if you have any questions or comments concerning this information.

Sincerely,

Cam Balentine

F.C. Balentine
Environmental Manager

enclosures:

SILVER BOW PLANT

TAILINGS POND AND GROUNDWATER REVIEW

October 28, 1996

Prepared By:

Eric Tilman
Environmental Engineer
Silver Bow Plant

and

Paul Nemanic
Hydrogeologist
Rhone-Poulenc Inc.

1.0 INTRODUCTION

This document provides a description and history of the Silver Bow facility tailings pond. All available groundwater data is summarized, analyzed and discussed. The focus of the document is to evaluate possible impacts of the tailings pond on local groundwater quality.

2.0 TAILINGS POND HISTORY

The Silver Bow Plant was constructed in the early 1950's. Phosphate ore was delivered to the plant from the Maiden Rock Mine located approximately seventeen miles south of the plant. To help increase the phosphate concentration of the Maiden Rock ore, a phosphate ore washing plant was part of the initial plant construction. The wash plant included a small tailings pond. During the late 1960's, the wash plant was decommissioned when ore from Woolly Valley, Idaho replaced the Maiden Rock ore. The Woolly Valley ore could be mined at a lower cost and possessed a higher phosphate grade versus the Maiden Rock ore.

In 1970, new air pollution abatement equipment was installed on the kiln nodulizing process building, which produced a significantly greater volume of tailings than that previously produced by the wash plant. These new wet scrubbing devices required the expansion of the pond to its current capacity. When the tailings pond was expanded, the wash plant tailings and surrounding clay soils were used as the lining material. Because the removal of clay from the phosphate ore was the main purpose of the wash plant, the wash plant tailings consisted mostly of clay. No data is available regarding the compaction of the liner or any other construction standard used during the pond expansion project.

The tailings pond was designed and operated as a "closed-loop" or a recirculation system. All of the water utilized in the plant (Predominantly kiln scrubbing equipment blow-down water) discharges into the pond where suspended solids settle out before the water is returned back to the kiln scrubbers. During the pond expansion, a lime addition system was installed to control the pH of the pond return water and to increase precipitation of heavy metals.

In 1983, the Silver Bow Plant petitioned the Montana Water Quality Bureau (WQB) for an exemption from all permitting requirements regarding the tailings pond. The WQB granted this request in a letter dated October 13, 1983. As part of the exemption, the WQB required the Silver Bow Plant to submit quarterly analytical results from site production wells. Section 5.1 of this report discusses the results of this sampling.

3.0 CURRENT TAILINGS POND STATUS

During plant operation, the plant recirculates approximately 10,000 gallons per minute of water through the tailings pond. Effluent from the kiln scrubber has a low pH and is high in dissolved metals (mainly arsenic and cadmium). A large portion of the dissolved metals precipitate out in the pond when the pH of the water is raised as a result of the lime addition

system. Table 1 summarizes the condition of the water entering the pond versus that leaving the pond prior to recirculation.

4.0 SITE GEOLOGY AND HYDROGEOLOGY

The plant is located in the Upper Silver Bow Basin which is bounded by mountainous groundwater divides. The alluvial filled central valley of the basin is about 3.5 miles wide and 7 miles long. The alluvium in the valley is derived from weathering and erosion of rocks comprising the surrounding mountains. The alluvium consists of heterogeneous, unconsolidated, and discontinuous layers and lenses composed of mixtures of sand, silt, clay, and fine gravel (Botz, 1969). The thickness of the alluvium is poorly known. Geophysical work in parts of the valley suggests that bedrock is at a depth of 600 to 880 feet below ground surface (bgs). Site production wells extend to a maximum depth of 295 feet bgs and do not encounter bedrock.

Silver Bow Creek in the vicinity of the plant is gaining water, indicating that it is effectively removing groundwater from the adjacent alluvial aquifer. Groundwater flow beneath the site is northward (Botz, 1969). Groundwater is recharged from the mountains south of the plant, flows through the alluvium beneath the plant and discharges into Silver Bow Creek to the north of the plant. Hydrologic data garnered from the Hydrology Division of the Montana Bureau of Mines and Geology indicates that transmissivities in the area range between 110 gal/day/ft and 1,646 gal/day/ft.

5.0 GROUNDWATER DATA

All available groundwater data collected to date is summarized and discussed in this section of the report. Where sufficient data is present, trending analysis is performed. Additionally, federal drinking water standards are used for comparison purposes. The data sources available are as follows:

- Production Well Monitoring Program.
- EPA Monitoring Wells.
- Safe Drinking Water Act Sampling.
- Selective Sampling events.

Groundwater samples have been collected from either a production well or a monitoring well. Well locations are depicted on figure 1. There are 7 site production wells extending to depths ranging from 200 to 295 feet bgs, and screened at various intervals extending from 20 feet to 295 feet bgs. There are 3 shallow monitoring wells screened across the water table to depths ranging from 31 to 46 feet bgs. Depth to the water table varies from approximately 17 to 30 feet bgs.

5.1 Production Well Monitoring Program

As Stated above, the Silver Bow Plant is required by the WQB to conduct a monitoring program using the site production wells. The program consists of monthly sampling of site production wells 1, 4, 5, 6 and 7, and the plant tap water. The water samples are filtered and analyzed at the Silver Bow Plant laboratory for hardness, fluoride, chloride, dissolved solids and specific conductance. The monthly analysis data is then averaged for the quarter and submitted in a summary report to the WQB. The WQB stated in their October 13, 1983 letter that this program would serve as verification that the groundwater quality standards were not being violated by any discharge from the tailings pond.

Attached Appendix A contains graphs of all quarterly report data, for each analyte, from each well. In general, the trend of concentration versus time is flat to very slightly increasing, and the data does not indicate a groundwater concern.

Fluoride is the only parameter in this data set for which we also have data from the tailings pond. The trending analysis shows that fluoride concentrations have remained stable in all wells (i.e., not increasing with time), and that the fluoride concentration in groundwater is 2 orders of magnitude lower than that in the pond (approximately 3 mg/l maximum in groundwater versus greater than 100 mg/l in the pond). It is also worth noting that the fluoride concentration in all wells is below the MCL.

Although the production well monitoring program is not comprehensive with respect to the number of analytes, the data supports a conclusion that seepage from the tailings basin, if at all, is not significant.

5.2 EPA Monitoring Wells

On August 1-8, 1988, EPA Consultants (Ecology and Environment) conducted a CERCLA site investigation at the Silver Bow plant. As part of this investigation, water samples were collected from two of the site production wells (IW-4 and IW-6) and from the three shallow monitoring wells (MW-1, MW-3 and MW-4) which were installed by EPA for this purpose. A copy of the analytical results summary tables is attached as Appendix B.

The Ecology and Environment report discussion of groundwater organic analytical data is as follows:

> "The organic analyses for groundwater contains the laboratory contaminants, acetone and methylene chloride. Bis (2-ethylhexyl)-phthalate was also detected below the contract required detection limits (CRDL) in SCC-MW-4. This compound is a common contaminant which is usually the result of samples coming in contact with plastic or plastic liners including PVC well casing materials. SCC-IW-6 and SCC-IW-6 also showed the presence of toluene below the CRDL. 2-Butanone was detected below the CRDL in SCC-MW-5 (rinsate blank)."

As such, trace detections of organic compounds appear to be attributable to sample or laboratory contamination, or are estimated values below the analytical detection limits. In fact, all organic detections are flagged with lab qualifiers.

Metals analyses were all below published MCL's except for antimony which exceeded the MCL of 6 ug/l. It is believed that this is an error, however, because antimony was reportedly detected at 29.0 ug/l in every sample analyzed, including laboratory blanks.

Rhone-Poulenc contracted Hydrometrics to resample the three shallow monitoring wells in September of 1994. The samples were analyzed for metals and BTEX compounds. A copy of the analytical results summary sheet is attached as Appendix C.

All wells were non-detect for BTEX compounds. All metals were below MCL's. Arsenic was detected in both upgradient and downgradient wells, prompting Hydrometrics to state that "The presence of arsenic in the most upgradient well indicates that arsenic may be indigenous to the regional aquifer system at the concentration observed." Antimony was non-detect for all three wells, which supports the contention that the elevated values reported in the Ecology and Environment report were in error.

5.3 Safe Drinking Water Act Sampling

Since the production wells also provide water to the employees, the Silver Bow Plant is subject to the requirements of the Safe Drinking Water Act (SDWA). Under the SDWA requirements, human contact water sources must be periodically sampled for organic, inorganic and biological contaminants. Historically, only total coliform, lead and copper testing have been completed with the results being below the SDWA standards.

In November of 1995 a sample was collected and a full inorganic and organic analysis was performed. The results of this sampling effort are attached as Appendix D. Note that although the sample is designated as Well # 3, in actuality this sample is a composite of equal amounts of water from site production wells 4, 5 and 6.

No organics were detected. All inorganics were below the MCL's except for sulfate, iron and manganese which were detected at 908, 3.34 and 0.40 mg/l respectively.

5.4 Selective Sampling Events

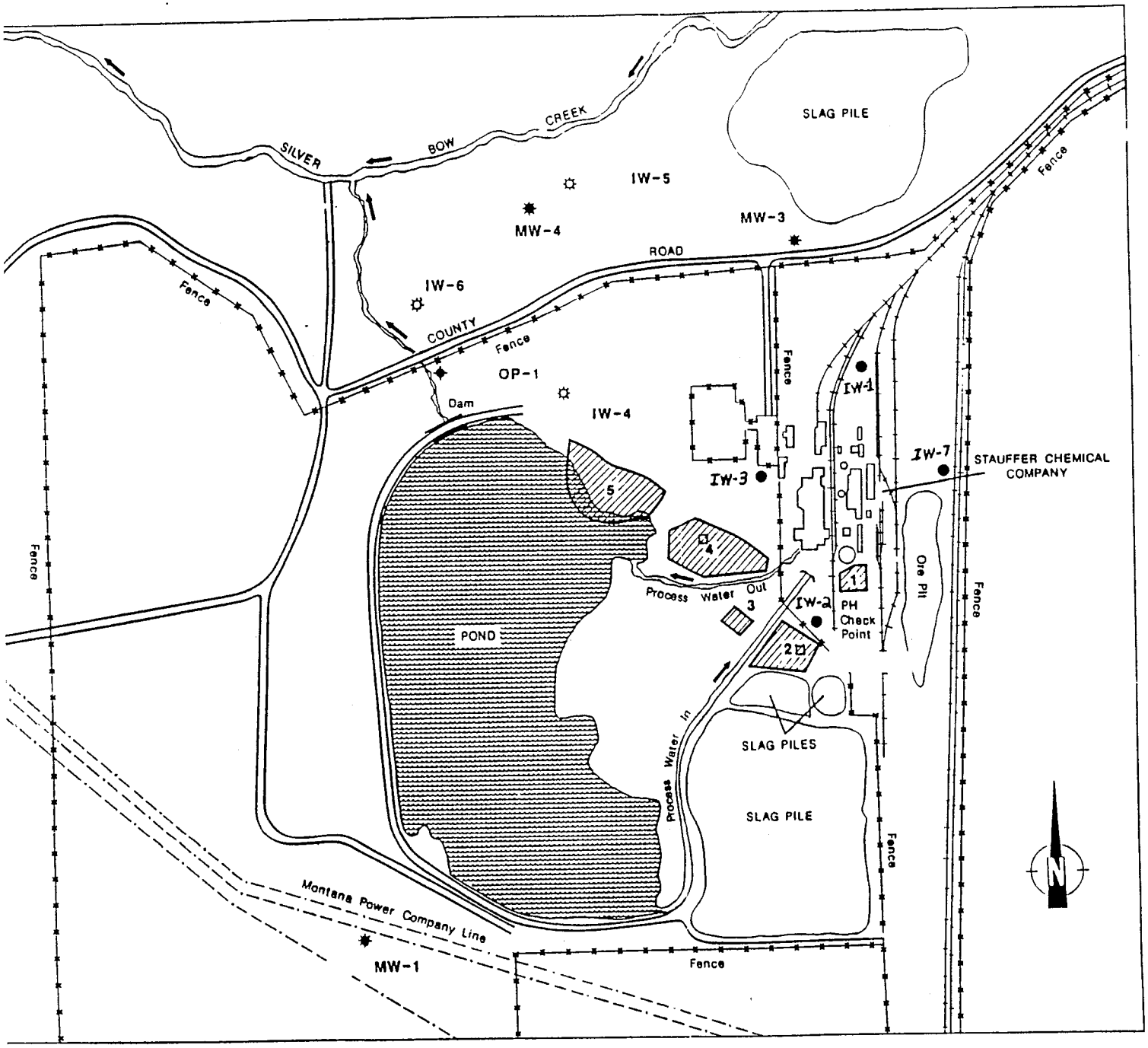
Selective in-house sampling has been conducted at the Silver Bow Plant over the years. The resultant metals analysis of production well water is relevant to the purpose of this document. This data is compiled in Table 2. Thirteen samples have been collected from 5 of the site production wells and analyzed for metals and nitrate. When compared to MCL's, only the following slight exceedances have occurred:

- The cadmium concentration exceeded the MCL of 0.01 mg/l in two samples. Cadmium was detected at 0.23 mg/l in a sample from well # 4 collected 5/26/83. Two previous samples collected from this well were non detect for cadmium. Cadmium was detected at 0.24 mg/l in a sample from well # 6 collected 5/26/83. Cadmium was an order of magnitude below the MCL for the two previous samples and the three subsequent samples collected from this well.
- The lead concentration exceeded the MCL of 0.05 mg/l in two samples. Lead was detected at 0.11 and 0.08 in samples collected from well # 6 on 5/26/83 and 4/1/86 respectively. Two subsequent samples collected from this well were non detect for lead.
- The mercury concentration exceeded the MCL of 0.002 mg/l in one sample. Mercury was detected at 0.0021 mg/l in a sample from well # 4 collected 8/5/82. Previous and subsequent samples were non detect and below the MCL for mercury respectively.
- The selenium concentration exceeded the MCL of 0.01 mg/l in one sample. Selenium was detected at 0.055 mg/l in a sample from well # 4 collected 8/5/82. Previous and subsequent samples were below the MCL and non detect for selenium respectively.

Trending analysis has been performed for well # 6 (6 sample events have occurred). This analysis is not appropriate for the other wells since none have been sampled more than 3 times. Graphs of well #6 metal concentrations versus time are presented on Figure 2.

6.0 CONCLUSIONS

This document summarizes the Silver Bow Plant's Tailings Pond operation and provides all available site groundwater data. While the data was not generated as part of a comprehensive focused groundwater study, taken as a whole there is substantial evidence that site groundwater has not been impacted significantly, if at all, by the tailings basin or site operations. While a limited number of random slight exceedances of MCL's have been reported, there is not a consistent trend to support a conclusion that site groundwater has been impacted significantly, if at all, by site activities.



LEGEND

- Existing Production well
- Existing monitoring well
- Opportunity well
- Existing Production Well

FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES
TASK REPORT TO THE E.P.A.

TITLE:
STAUFFER CHEMICAL COMPANY
Ramsay, Montana
SAMPLE LOCATION MAP

T.D.D. F08-8801-05

ecology & environment, inc.
DENVER, COLORADO

FIG. 2

Date: 01/89 Drawn by: RSM Scale: _____

TABLE 1

POND WATER ANALYSIS

Source	GPM	As ppm	Ba ppm	Cd ppm	Cr ppm	Pb ppm	Hg ppm	Nitrate ppm	Se ppm	F ppm	pH
#3 Catch Basin	350	0.339	0.092	0.085	0.246	0.519	0.001	NA	ND	NA	6
100' Overflow	300	0.339	0.092	0.085	0.246	0.519	0.001	NA	ND	NA	6
Moat	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
#1 Kiln	1200	1.810	0.087	18.700	0.201	0.517	0.007	ND	ND	122.000	2
#2 Kiln	1800	1.810	0.087	18.700	0.201	0.517	0.007	ND	ND	122.000	2
Lime Treatment	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hazelton Line	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Final Pump Station	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	10540										
Pond Return	10000	0.500	0.272	6.000	0.054	0.070	ND	NA	0.266	NA	5

Note: NA = not available
ND = non-detectable

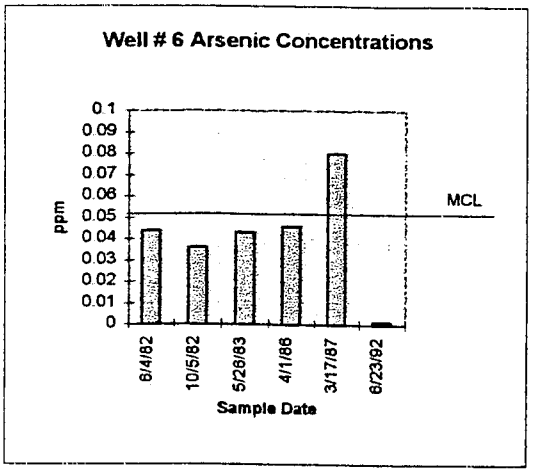
TABLE 2

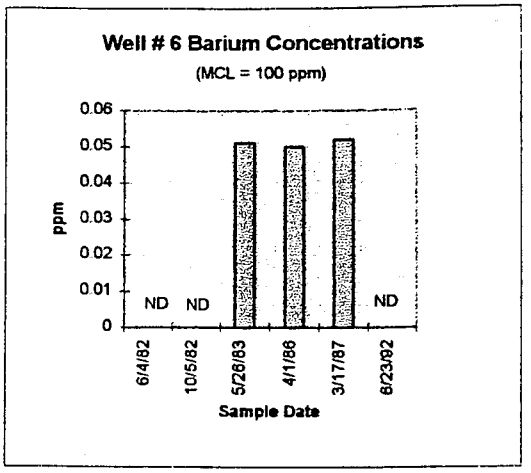
SUMMARY OF IN-HOUSE GROUNDWATER ANALYTICAL DATA

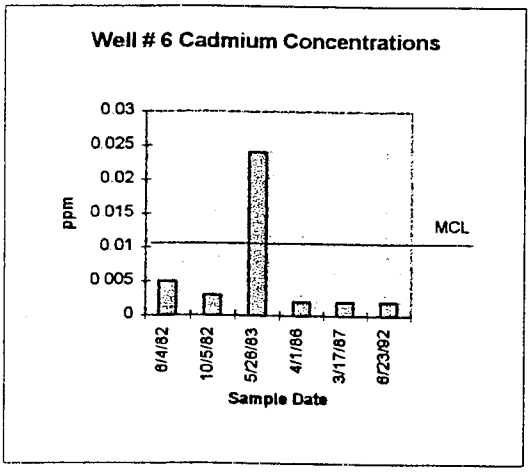
(All values are parts per million)

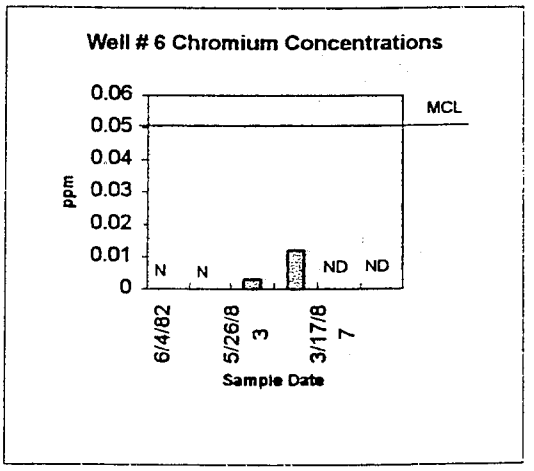
DATE	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	Nitrate
MCL	0.05	100	0.01	0.05	0.05	0.002	0.01		10
Well # 1									
7/23/82	0.003	0.07	ND	ND	ND	ND	0.002	ND	2.36
Well # 4									
6/4/82	0.024	NA	ND	NA	ND	NA	0.007	NA	1.33
8/5/82	0.019	ND	ND	ND	0.017	0.0021	0.055	0.012	1.99
5/26/83	0.023	ND	0.023	ND	ND	0.0016	ND	ND	1.85
Well # 5									
7/23/82	0.003	0.1	ND	ND	ND	ND	0.0024	ND	1.21
Well # 6									
6/4/82	0.044	ND	0.005	ND	ND	ND	0.002	ND	0.038
10/5/82	0.036	ND	0.003	ND	0.01	0.0007	0.002	0.013	1.3
5/26/83	0.043	0.051	0.024	0.003	0.11	0.0002	0.0012	ND	1.6
4/1/86	0.046	0.05	0.002	0.012	0.08	ND	0.001	0.016	0.01
3/17/87	0.08	0.052	0.002	ND	ND	ND	0.005	ND	0.09
6/23/92	0.0014	ND	0.002	ND	ND	ND	ND	ND	ND
Well # 7									
7/23/82	0.006	0.09	0.002	ND	ND	ND	0.002	0.003	2.08
10/1/82	NA	NA	ND	0.002	ND	NA	NA	ND	2.36

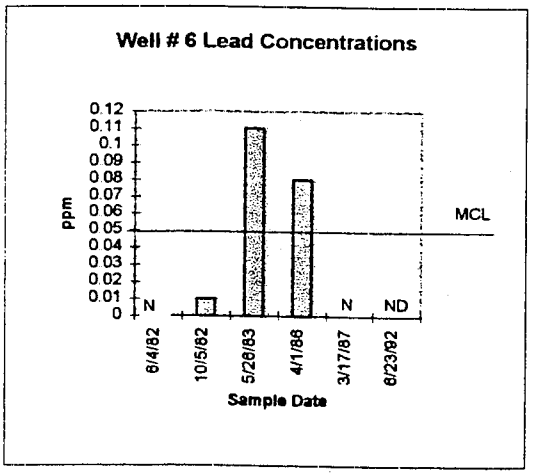
FIGURE 2

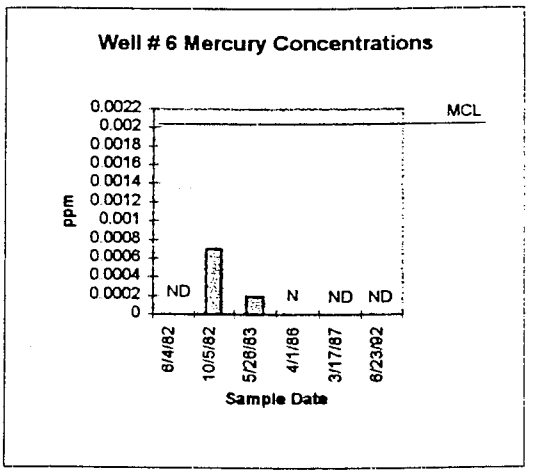

Well # 6 Arsenic Concentrations
ppm
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
MCL
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
6/23/92
Sample Date

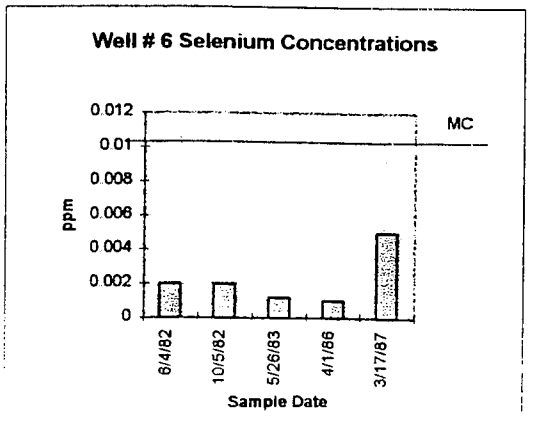

Well # 6 Barium Concentrations
(MCL = 100 ppm)
ppm
0.06
0.05
0.04
0.03
0.02
0.01
0
ND
ND
ND
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
6/23/92
Sample Date

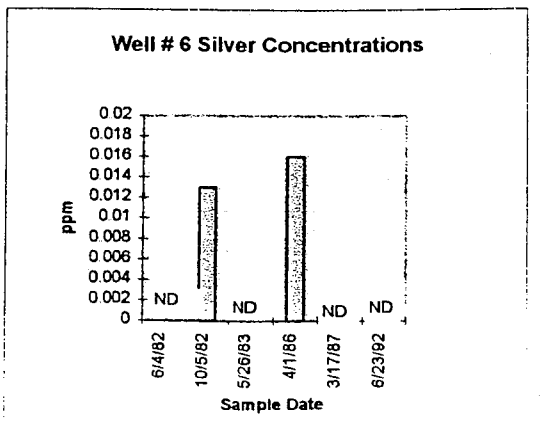

Well # 6 Cadmium Concentrations
ppm
0.03
0.025
0.02
0.015
0.01
0.005
0
MCL
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
6/23/92
Sample Date


Well # 6 Chromium Concentrations
ppm
0.06
0.05
0.04
0.03
0.02
0.01
0
MCL
N
N
ND
ND
6/4/82
5/26/83
3/17/87
Sample Date


Well # 6 Lead Concentrations
ppm
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
MCL
N
N
ND
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
6/23/92
Sample Date


Well # 6 Mercury Concentrations
ppm
0.0022
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
MCL
ND
N
ND
ND
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
6/23/92
Sample Date


Well # 6 Selenium Concentrations
ppm
0.012
0.01
0.008
0.006
0.004
0.002
0
MC
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
Sample Date

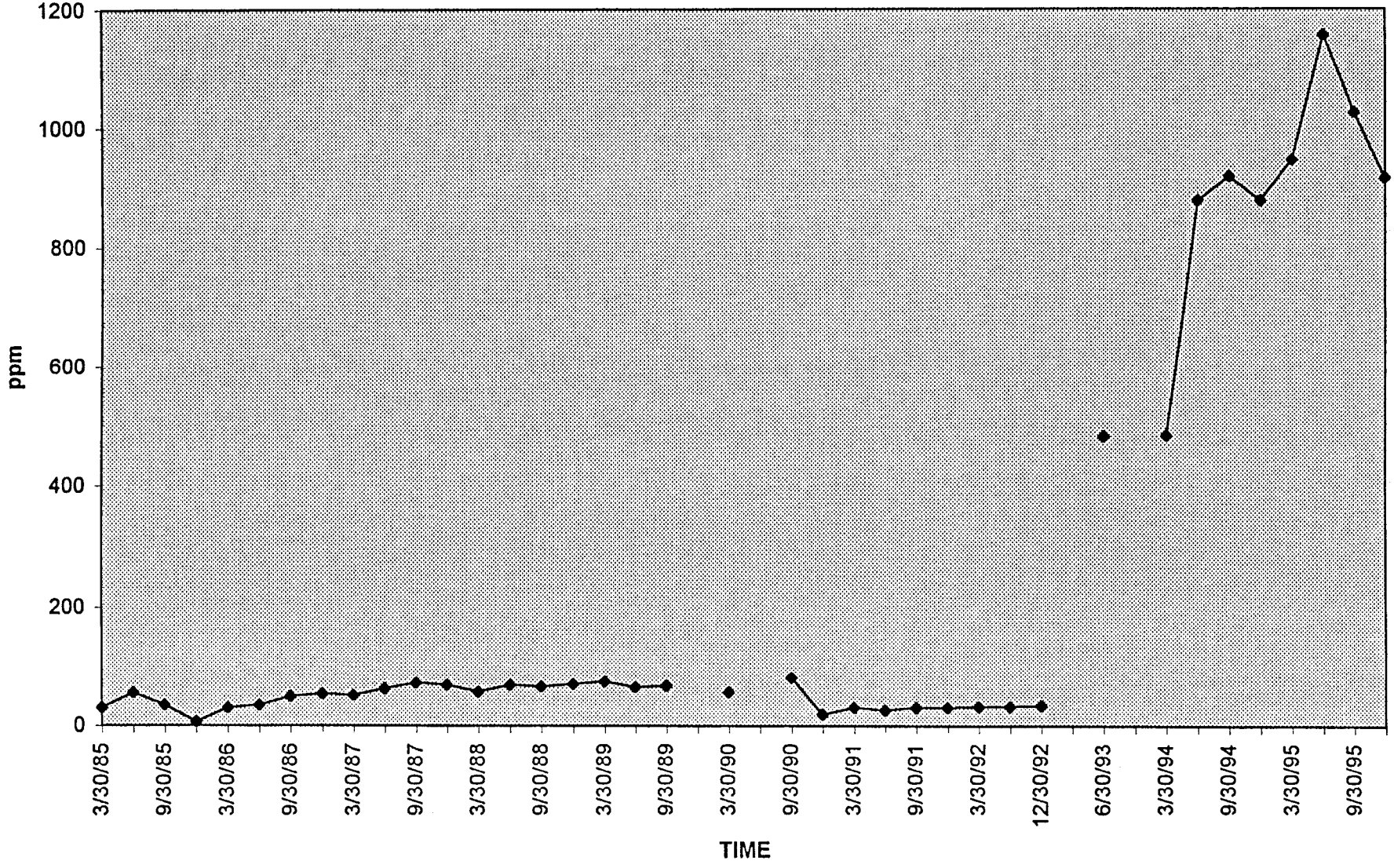

Well # 6 Silver Concentrations
ppm
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
ND
ND
ND
ND
6/4/82
10/5/82
5/26/83
4/1/86
3/17/87
6/23/92
Sample Date

APPENDIX A

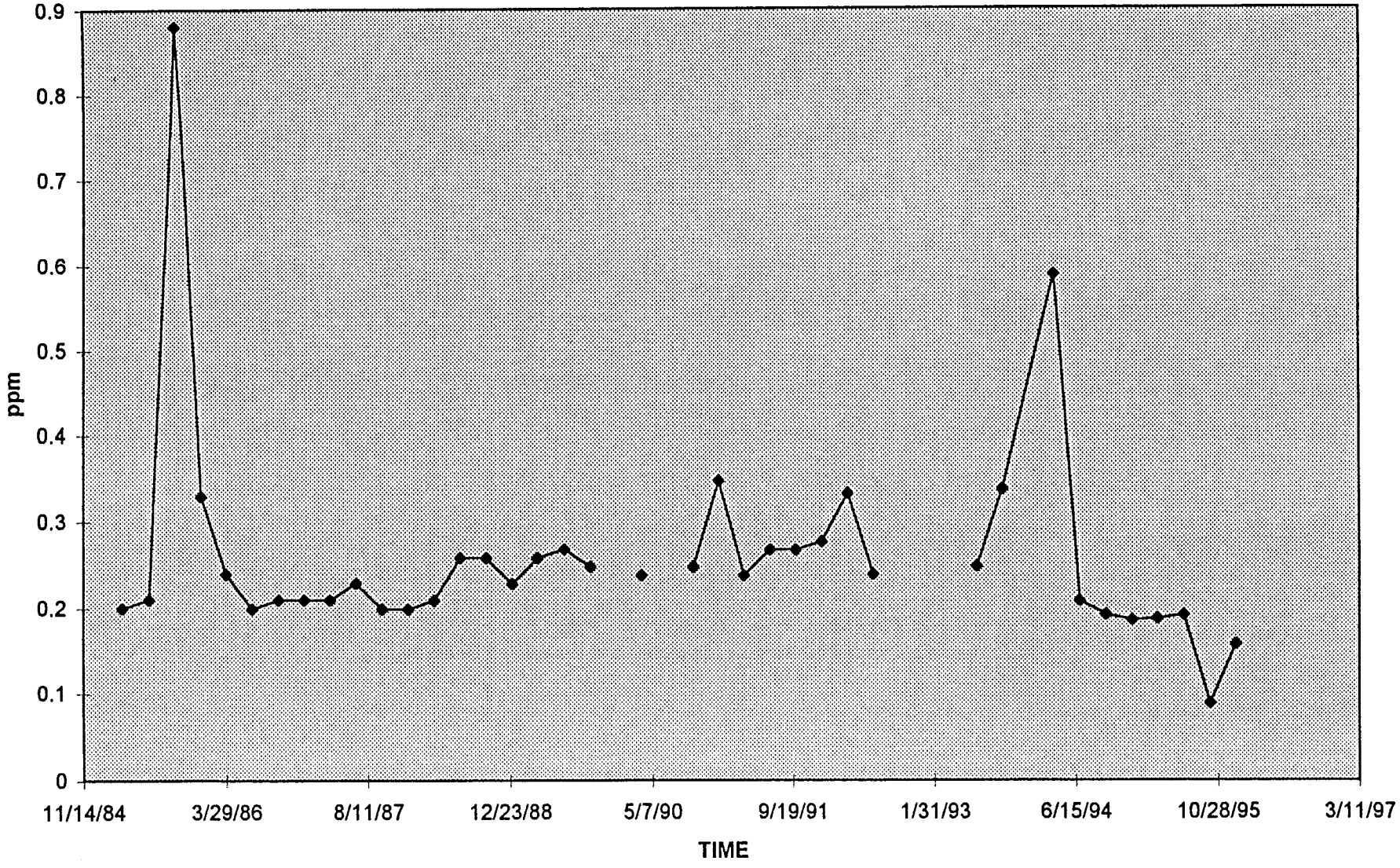
SUMMARY OF QUARTERLY MONITORING RESULTS

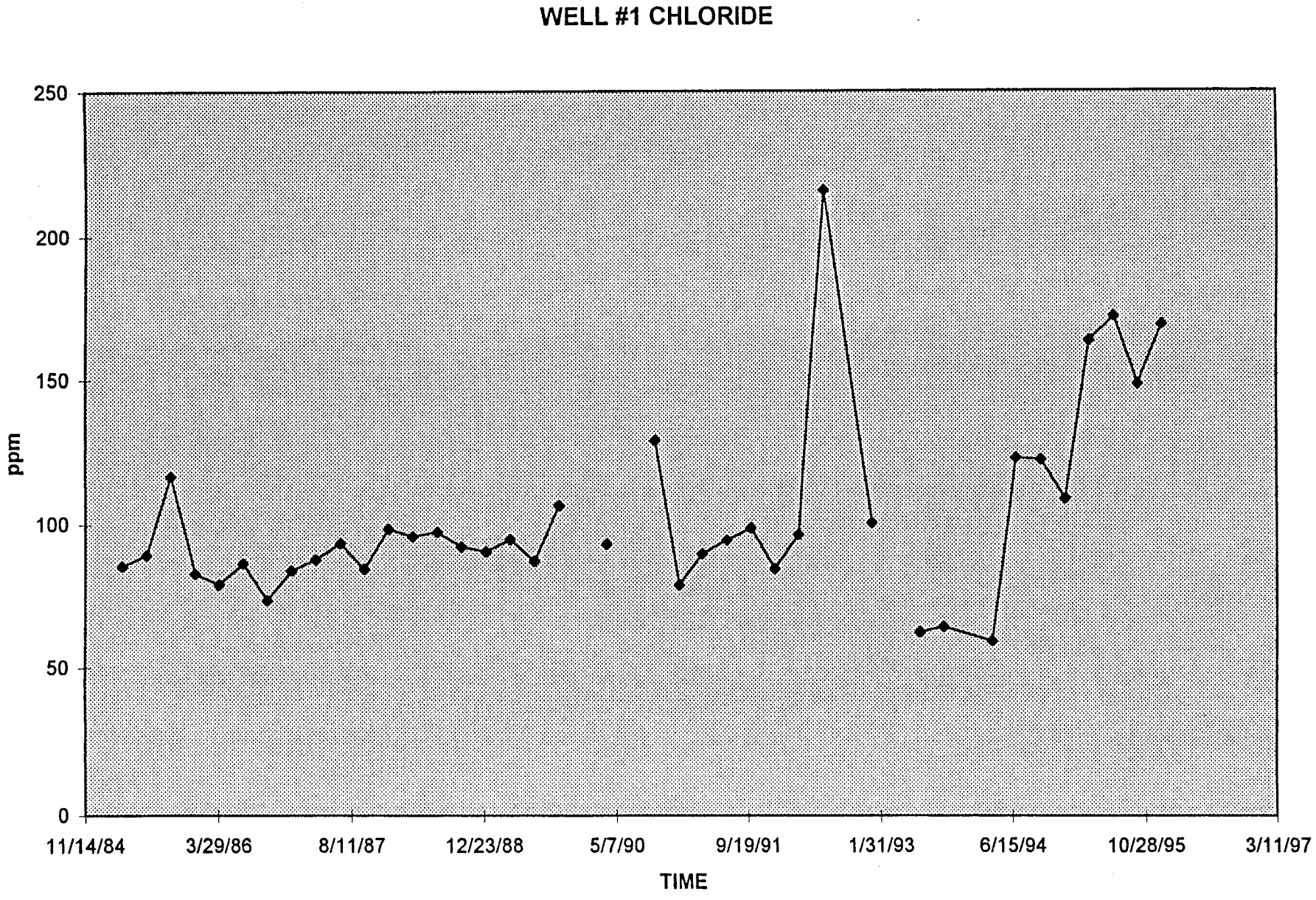
FOR SITE PRODUCTION WELLS

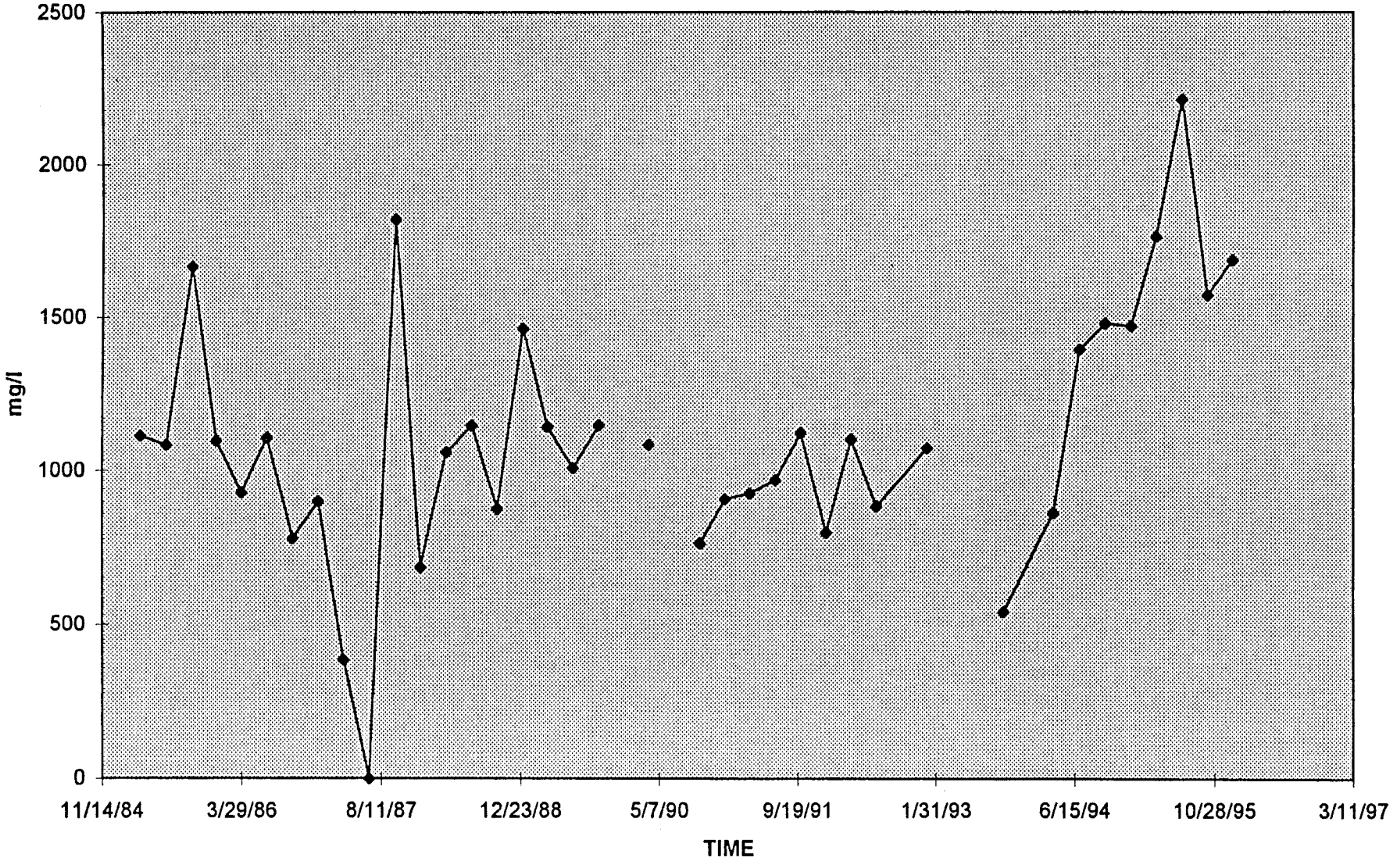
WELL #1 HARDNESS



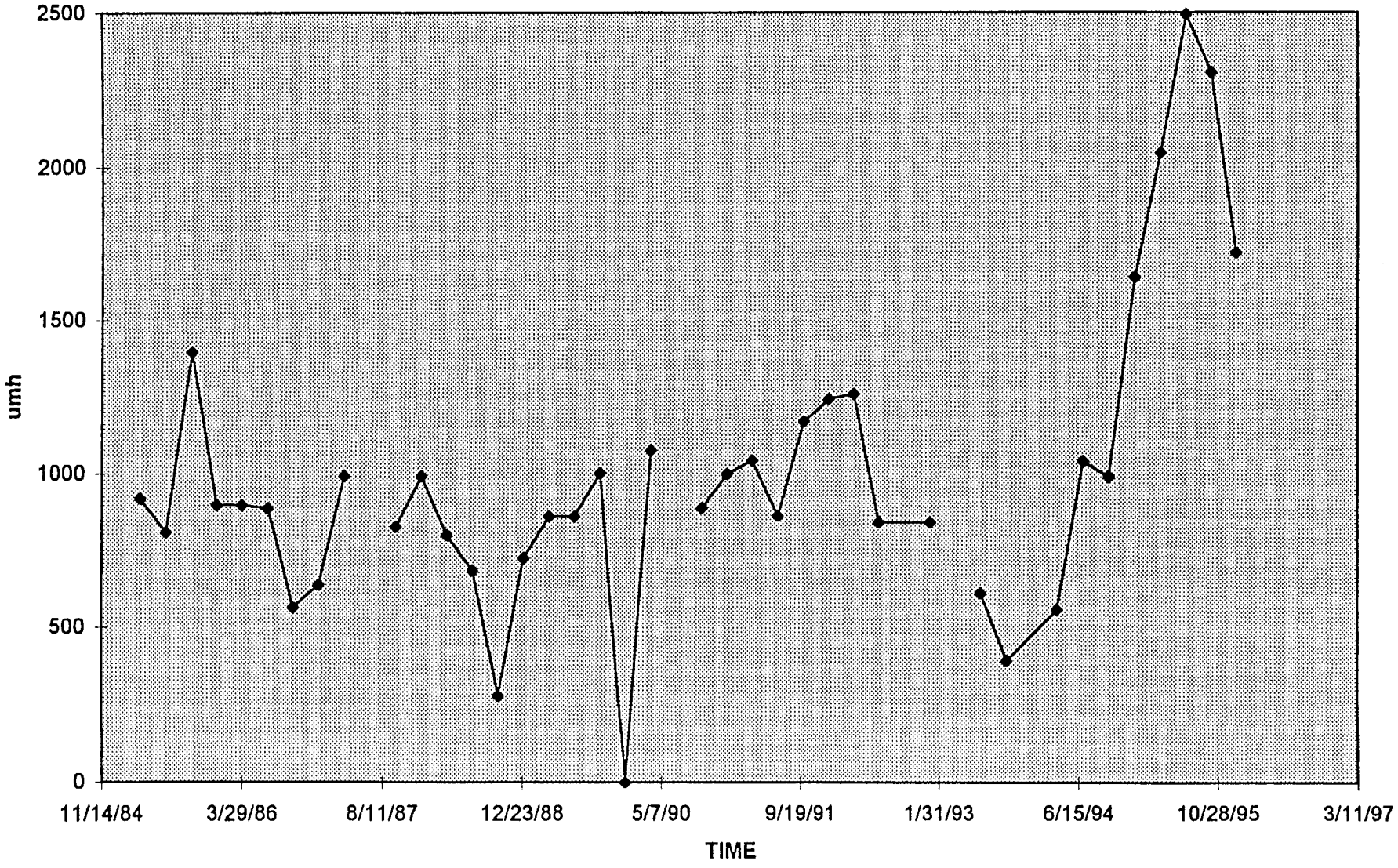
WELL #1 FLUORIDE



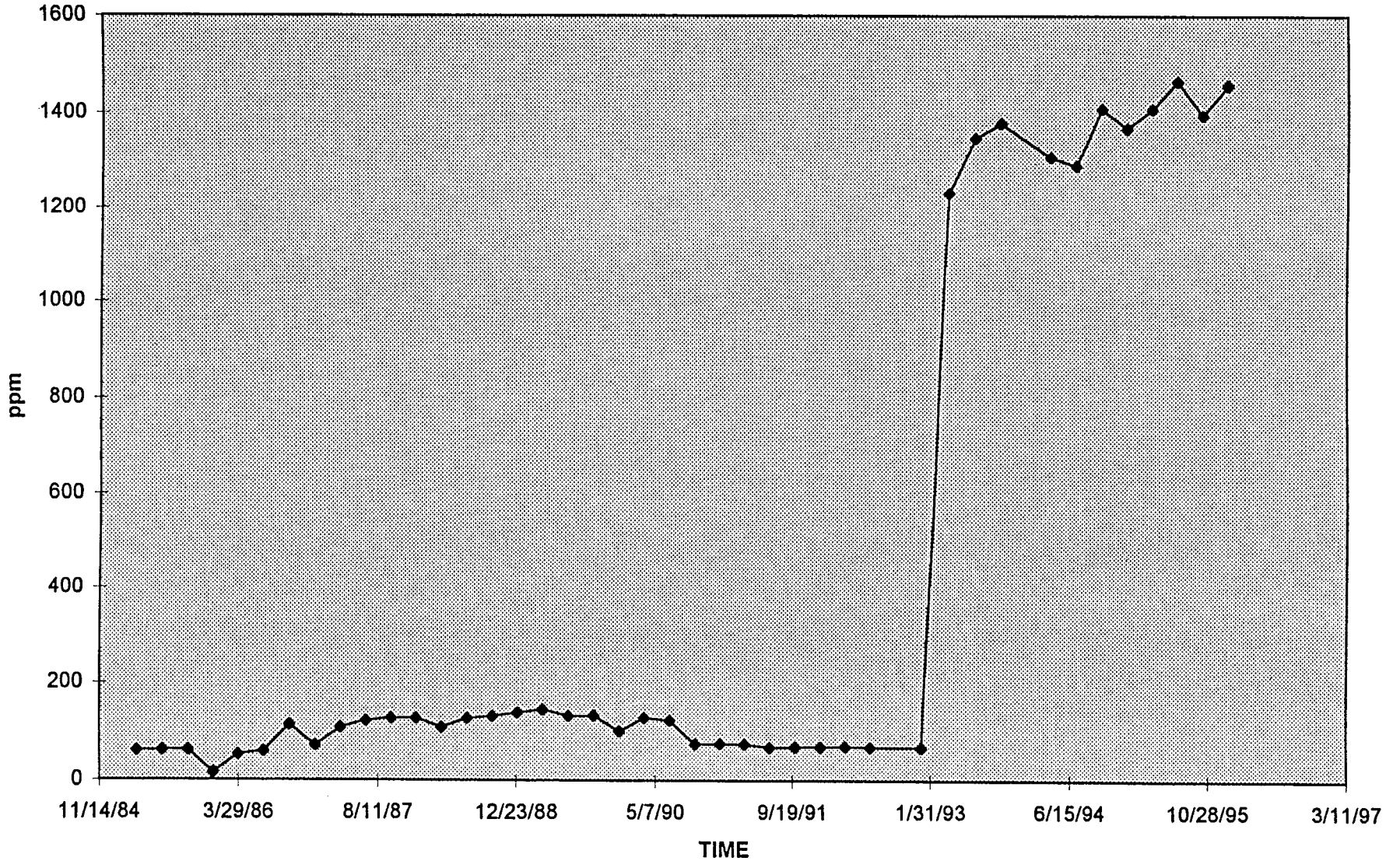

WELL #1 CHLORIDE
250
200
150
100
50
0
ppm
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
TIME


WELL #1 TDS
2500
2000
1500
1000
500
0
mg/l
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
TIME

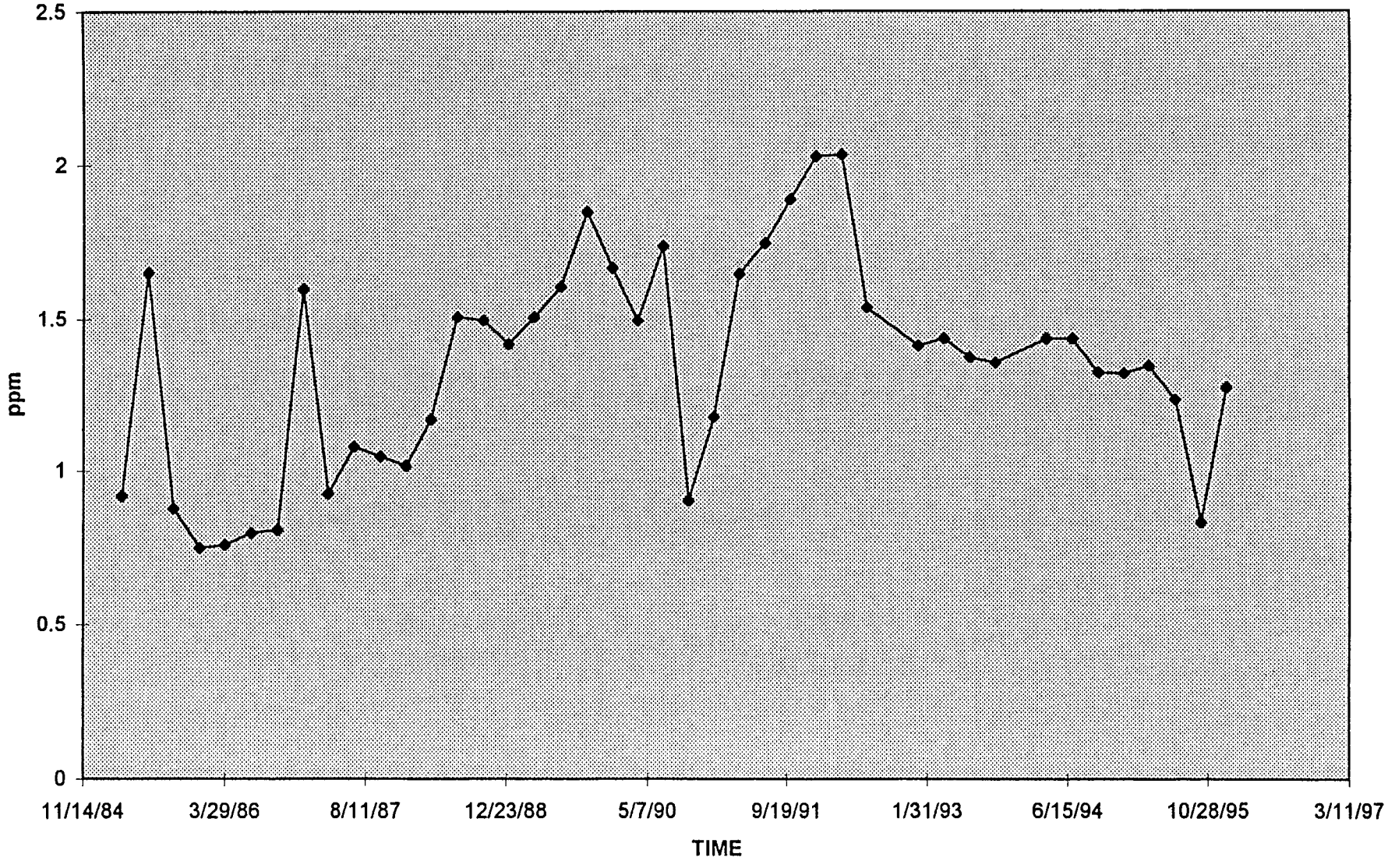
WELL #1 CONDUCTANCE



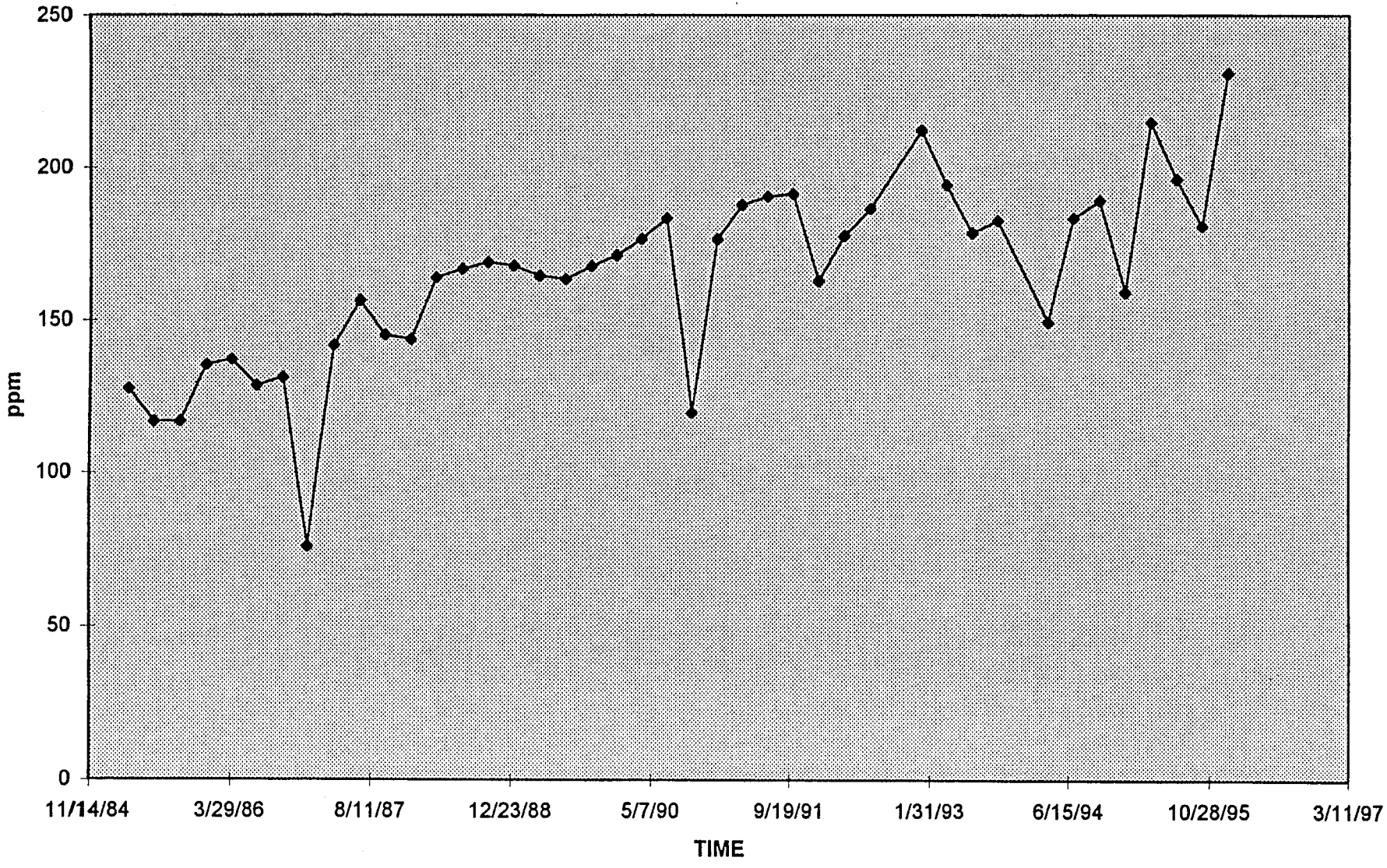
WELL #4 HARDNESS

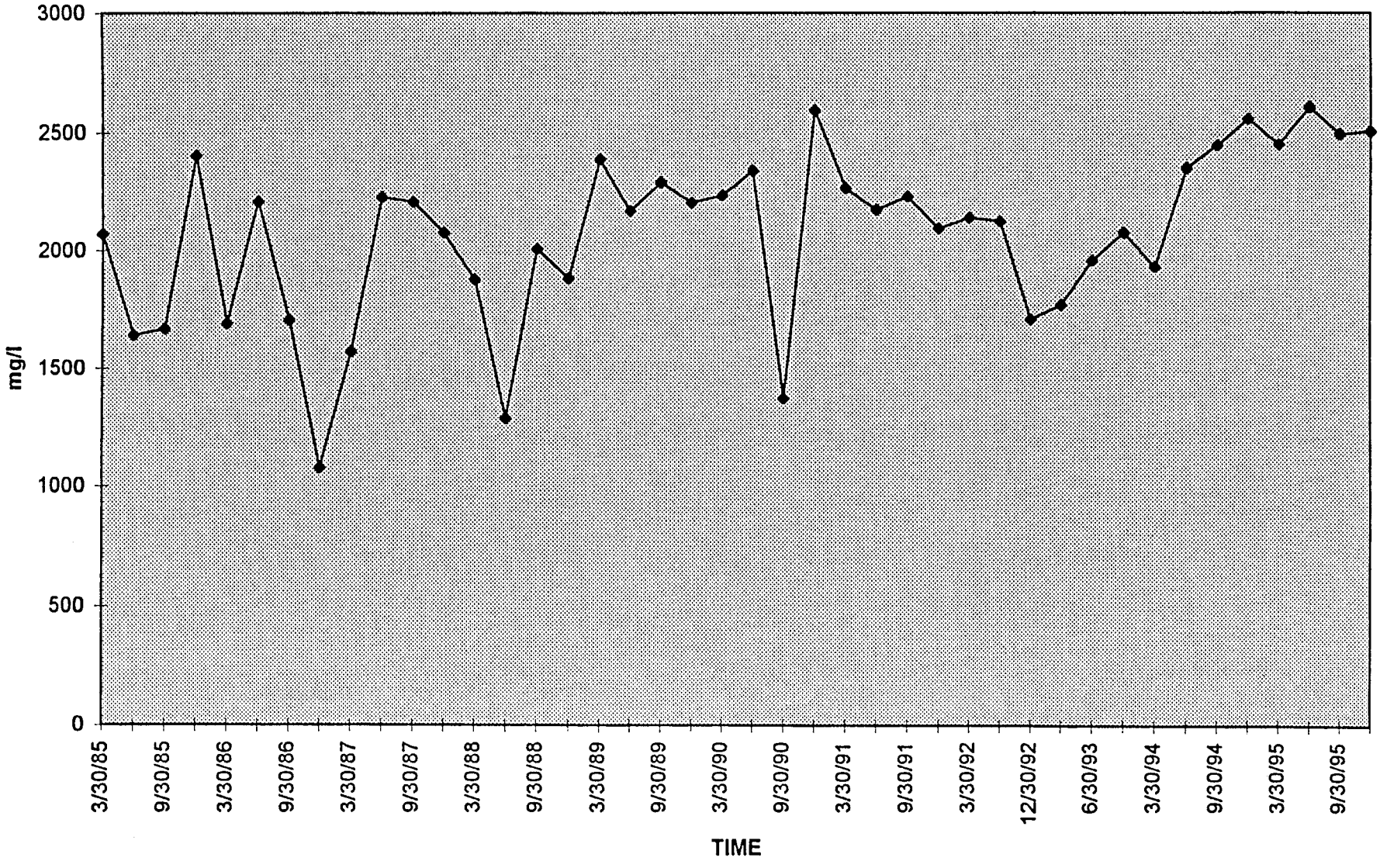


WELL #4 FLUORIDE

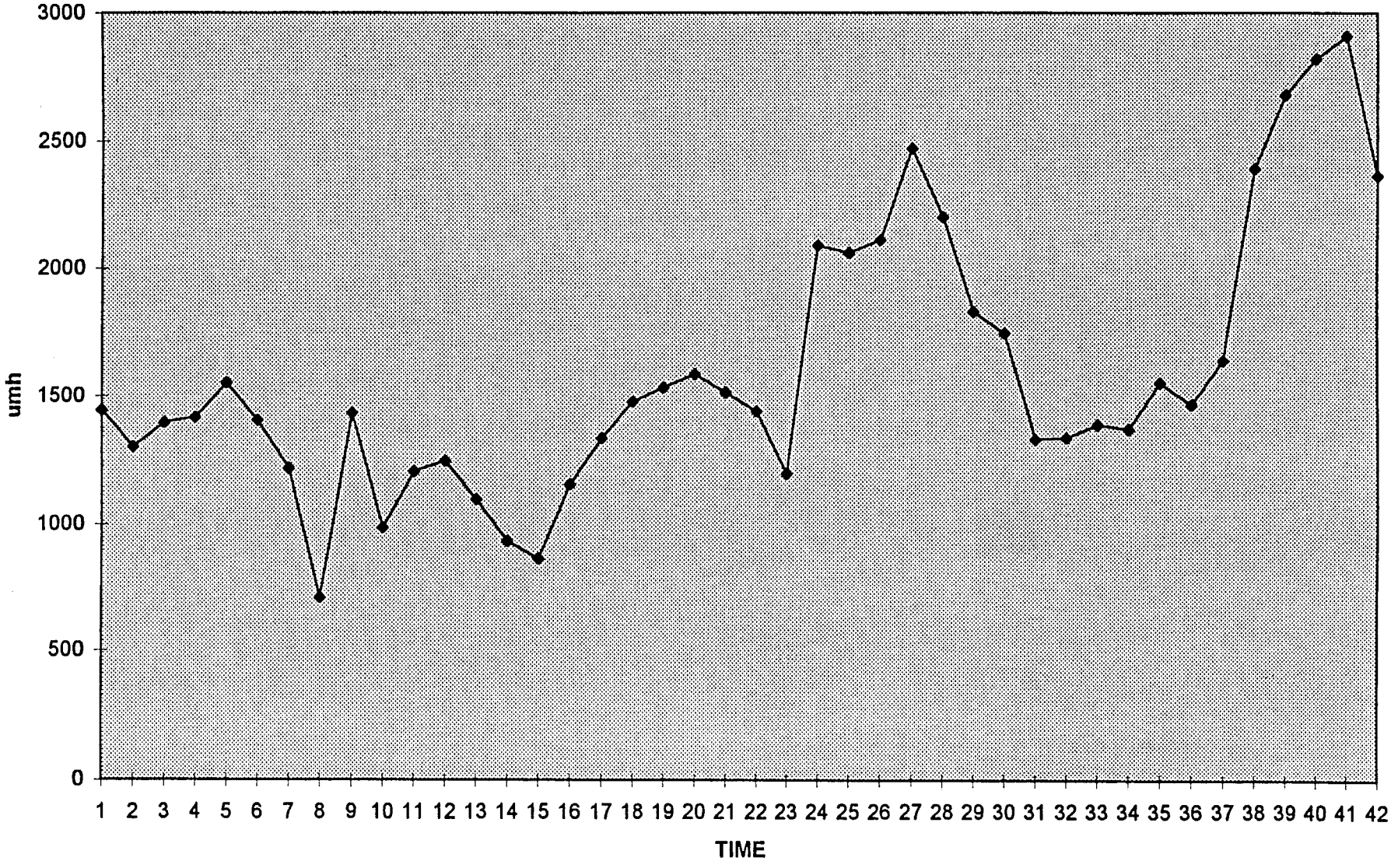


WELL #4 CHLORIDE

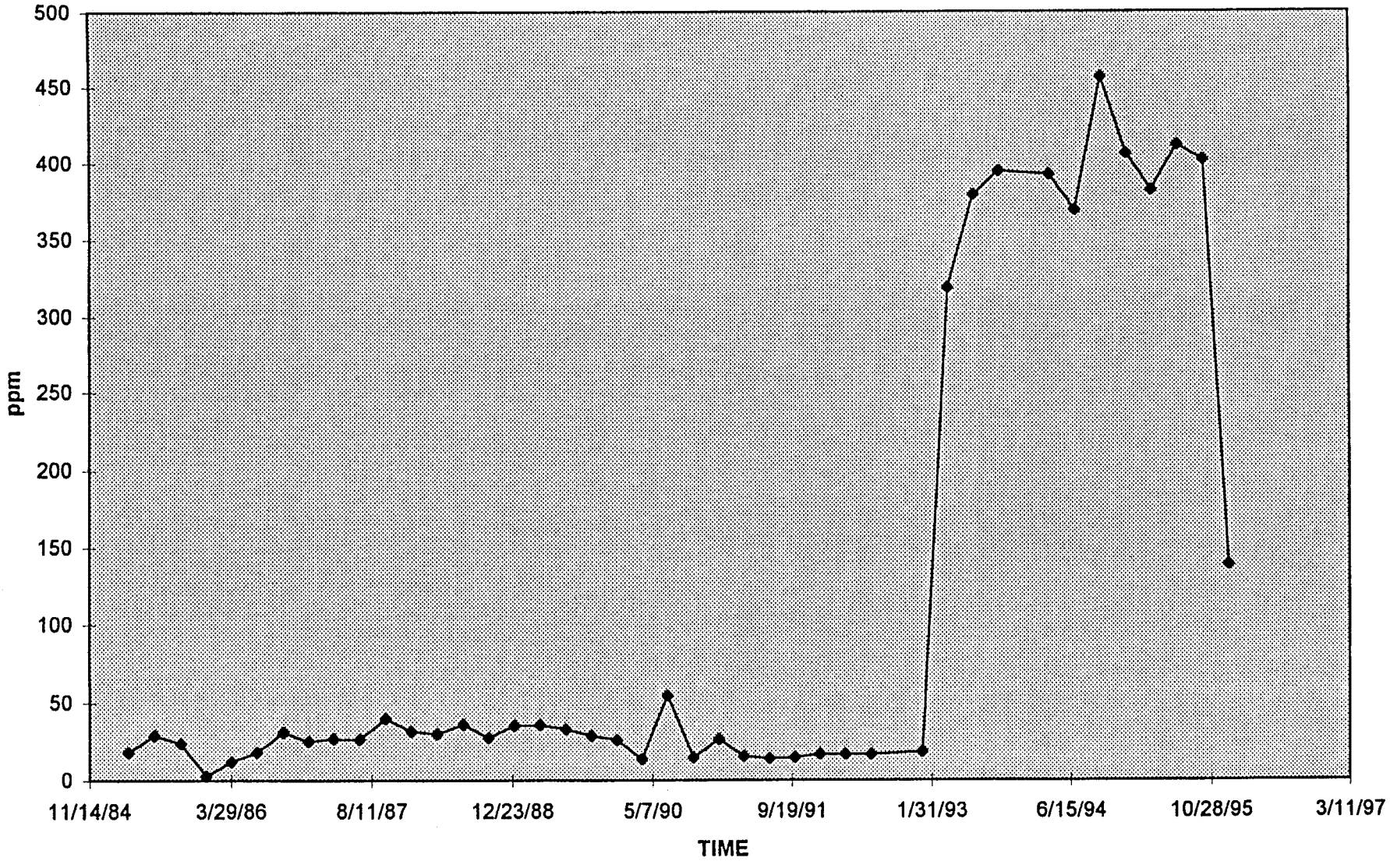



WELL #4 TDS
3000
2500
2000
1500
1000
500
0
mg/l
3/30/85
9/30/85
3/30/86
9/30/86
3/30/87
9/30/87
3/30/88
9/30/88
3/30/89
9/30/89
3/30/90
9/30/90
3/30/91
9/30/91
3/30/92
12/30/92
6/30/93
3/30/94
9/30/94
3/30/95
9/30/95
TIME

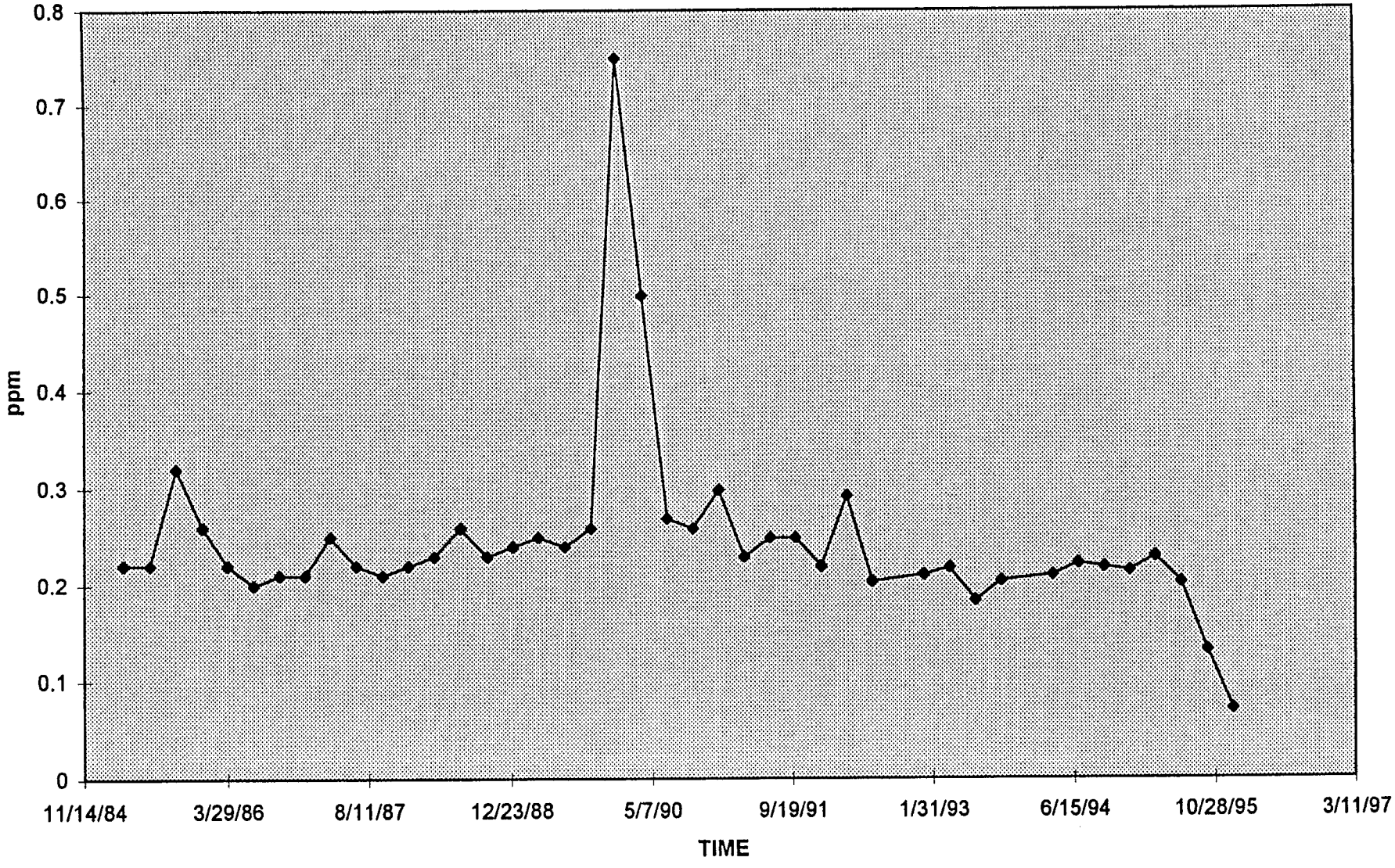
WELL #4 CONDUCTANCE

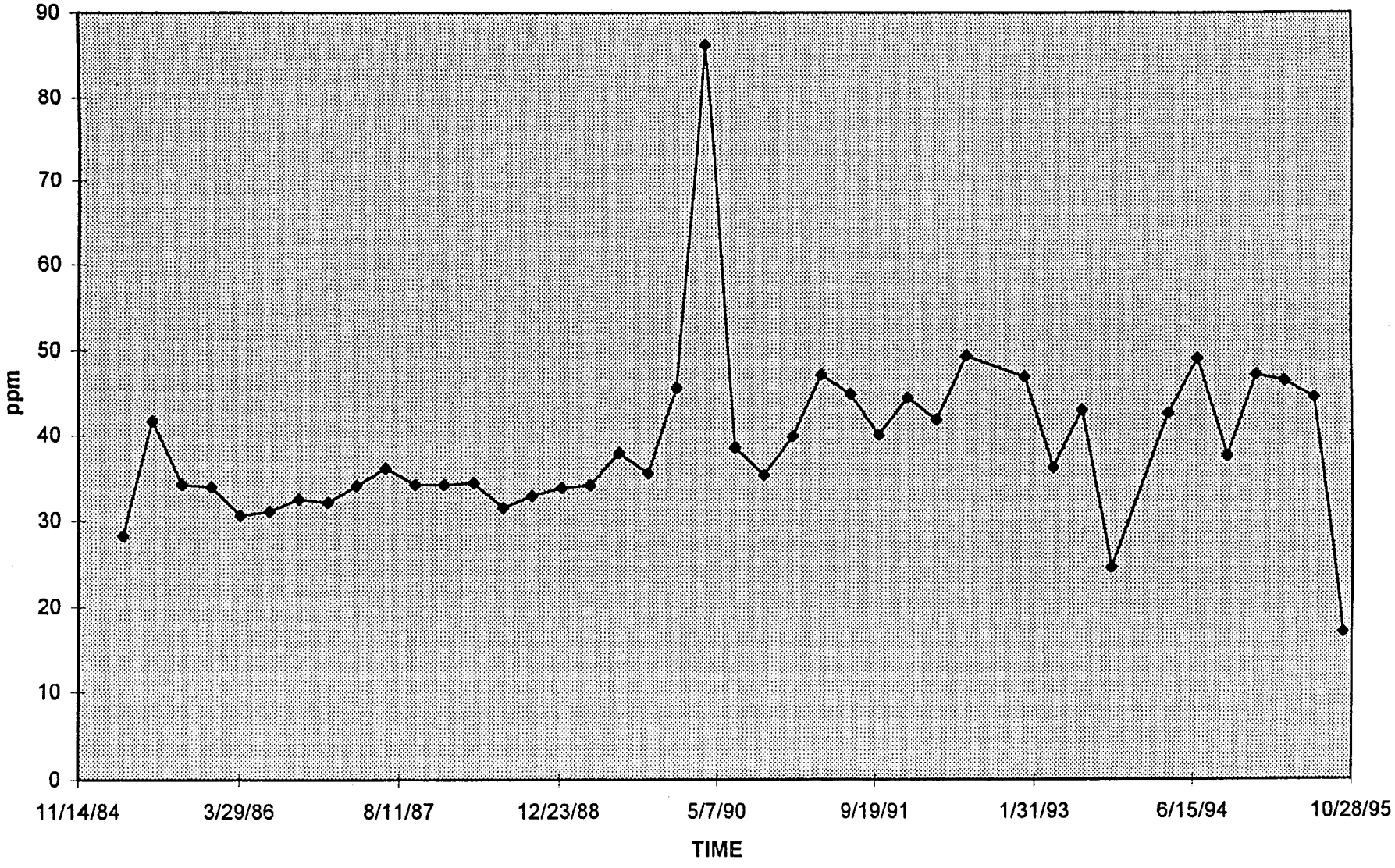


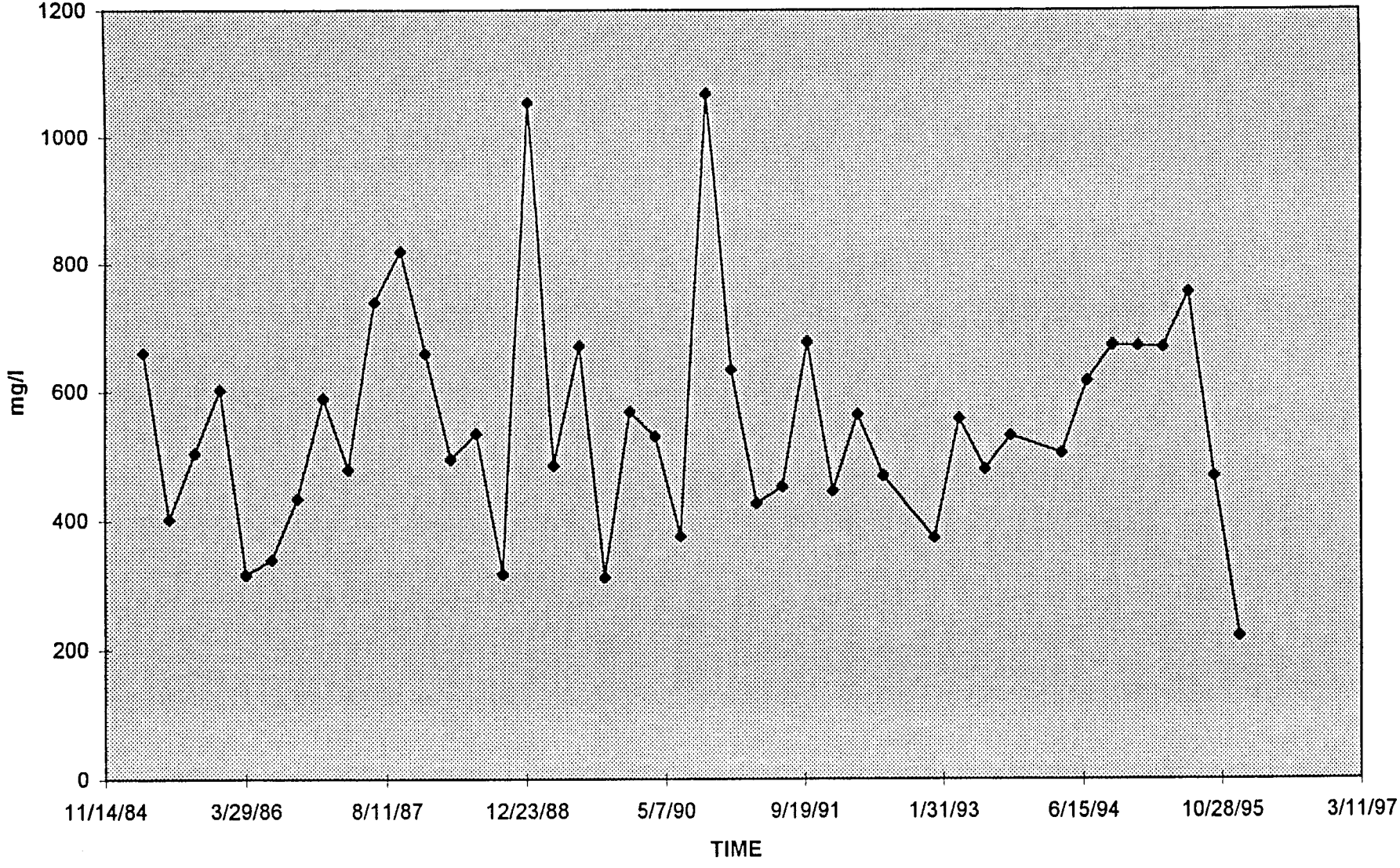
WELL #5 HARDNESS



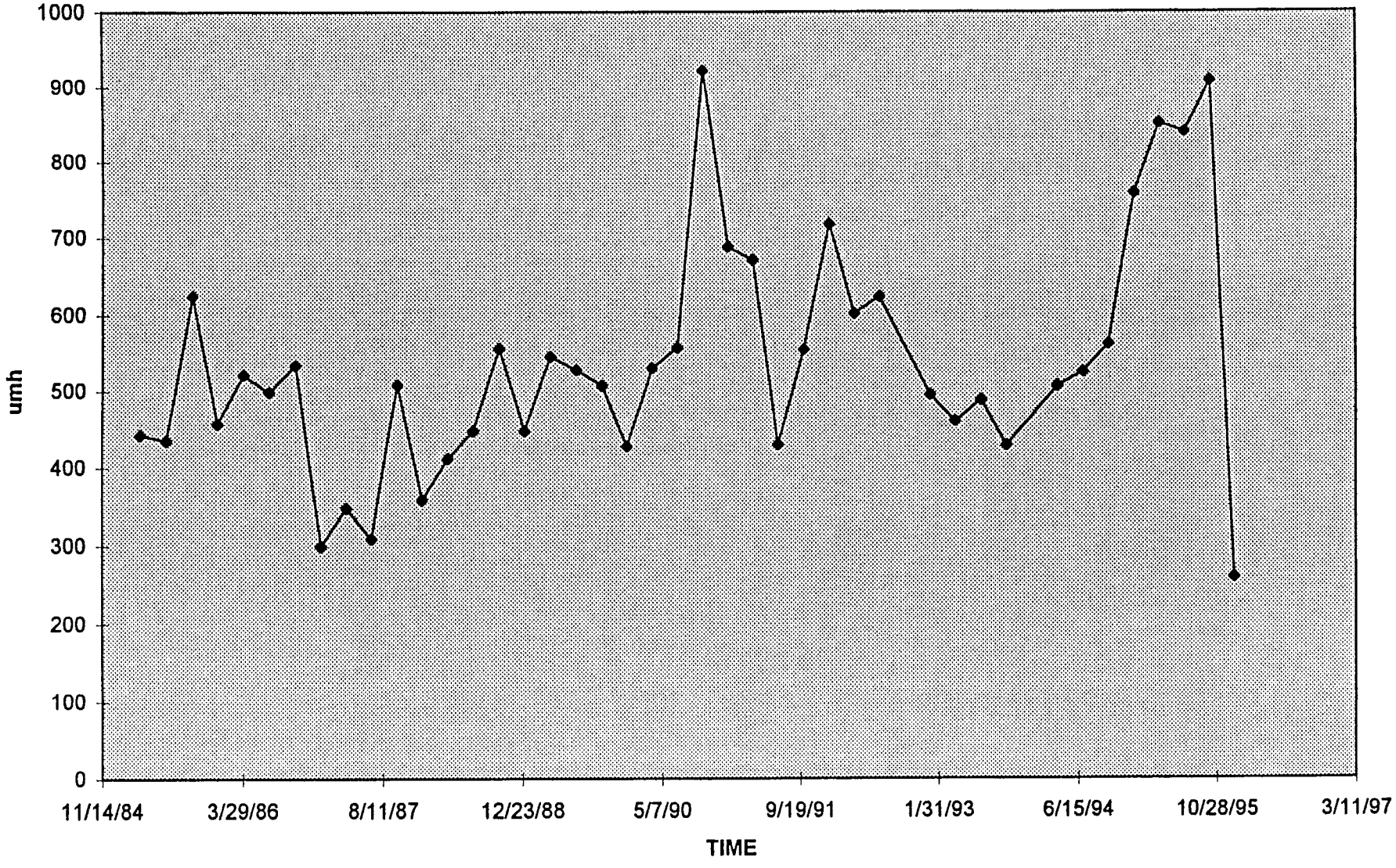
WELL #5 FLUORIDE



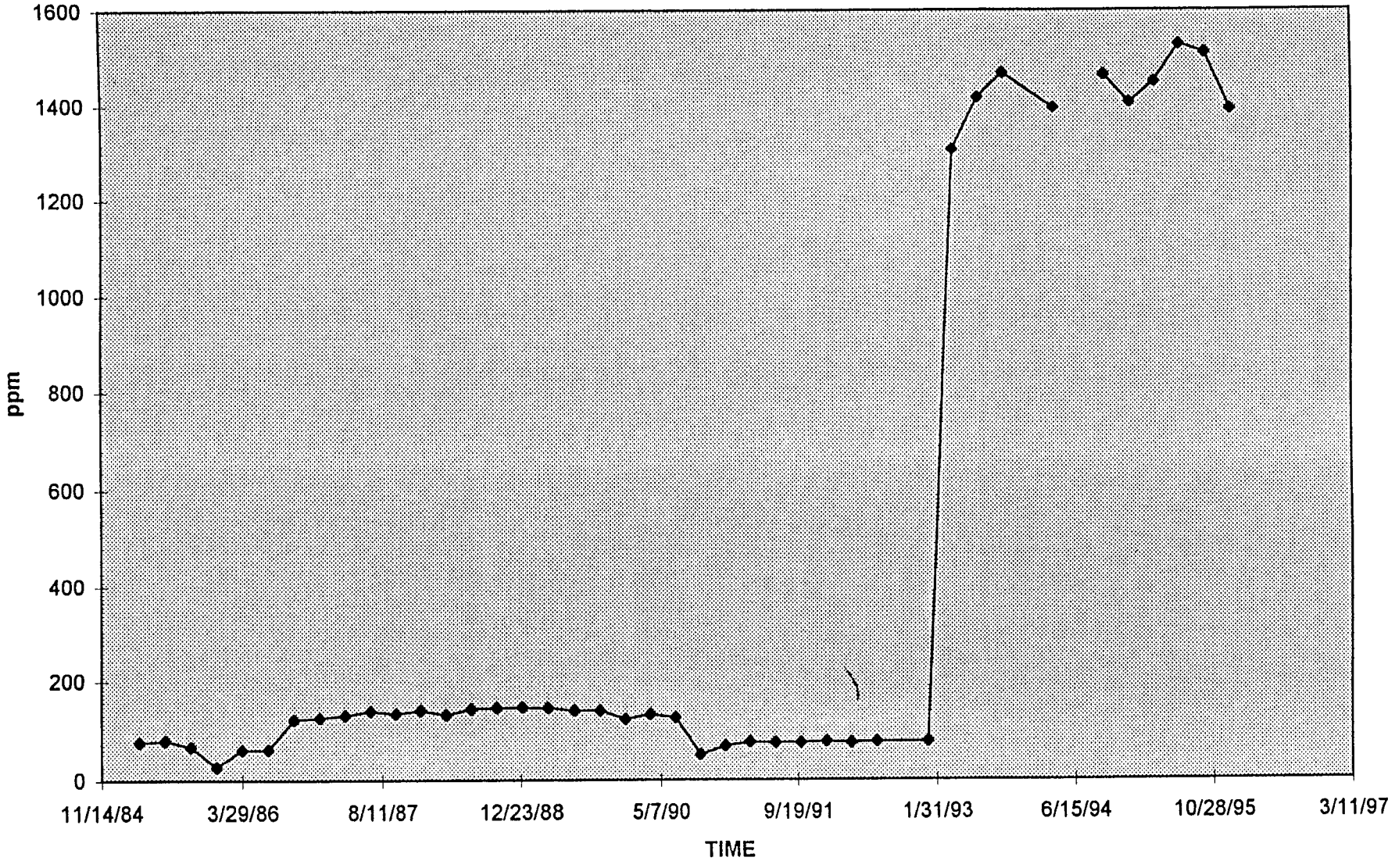

WELL #5 CHLORIDE
90
80
70
60
50
40
30
20
10
0
ppm
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
TIME


WELL #5 TDS
1200
1000
800
600
400
200
0
mg/l
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
TIME

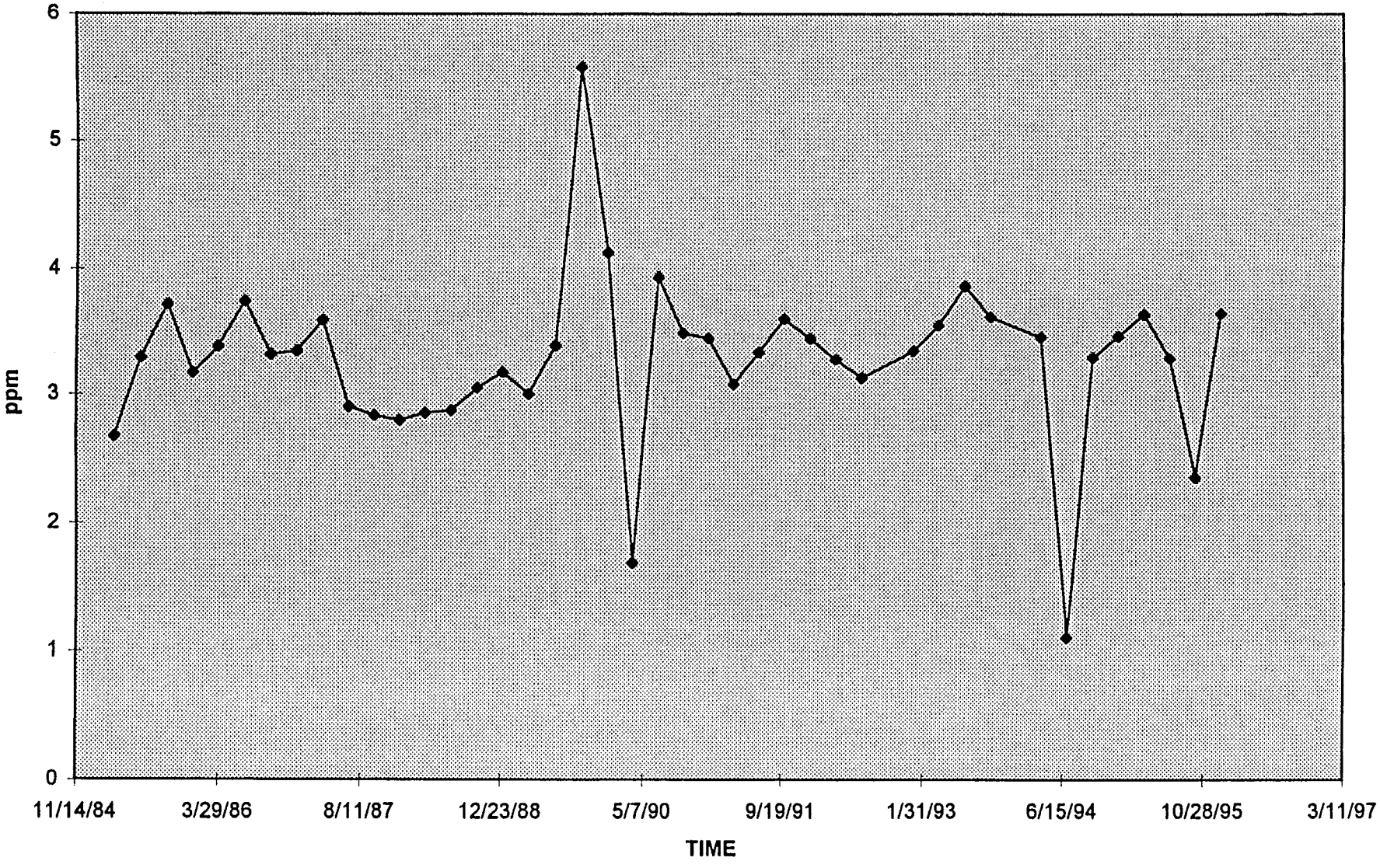
WELL #5 CONDUCTANCE



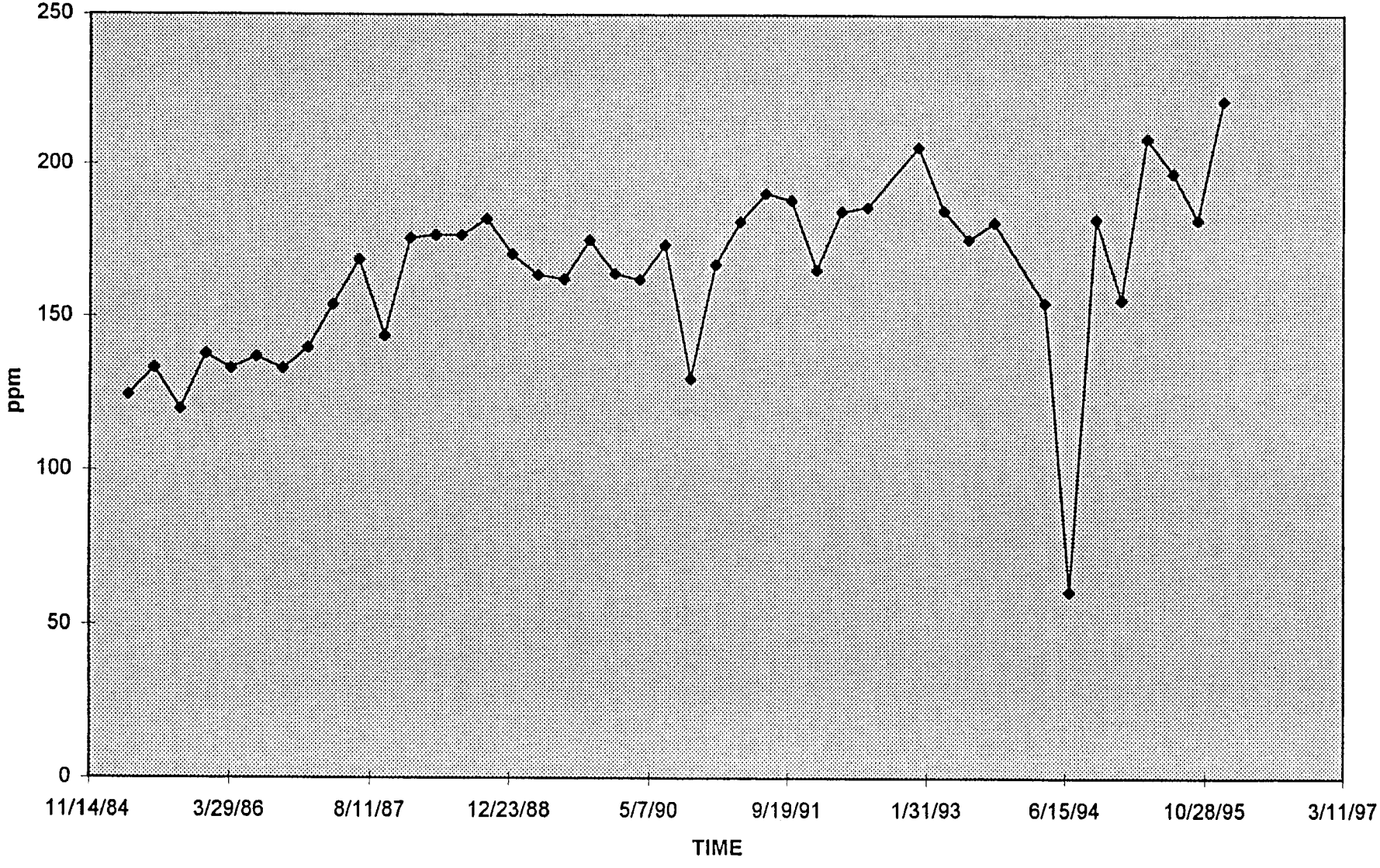
WELL #6 HARDNESS

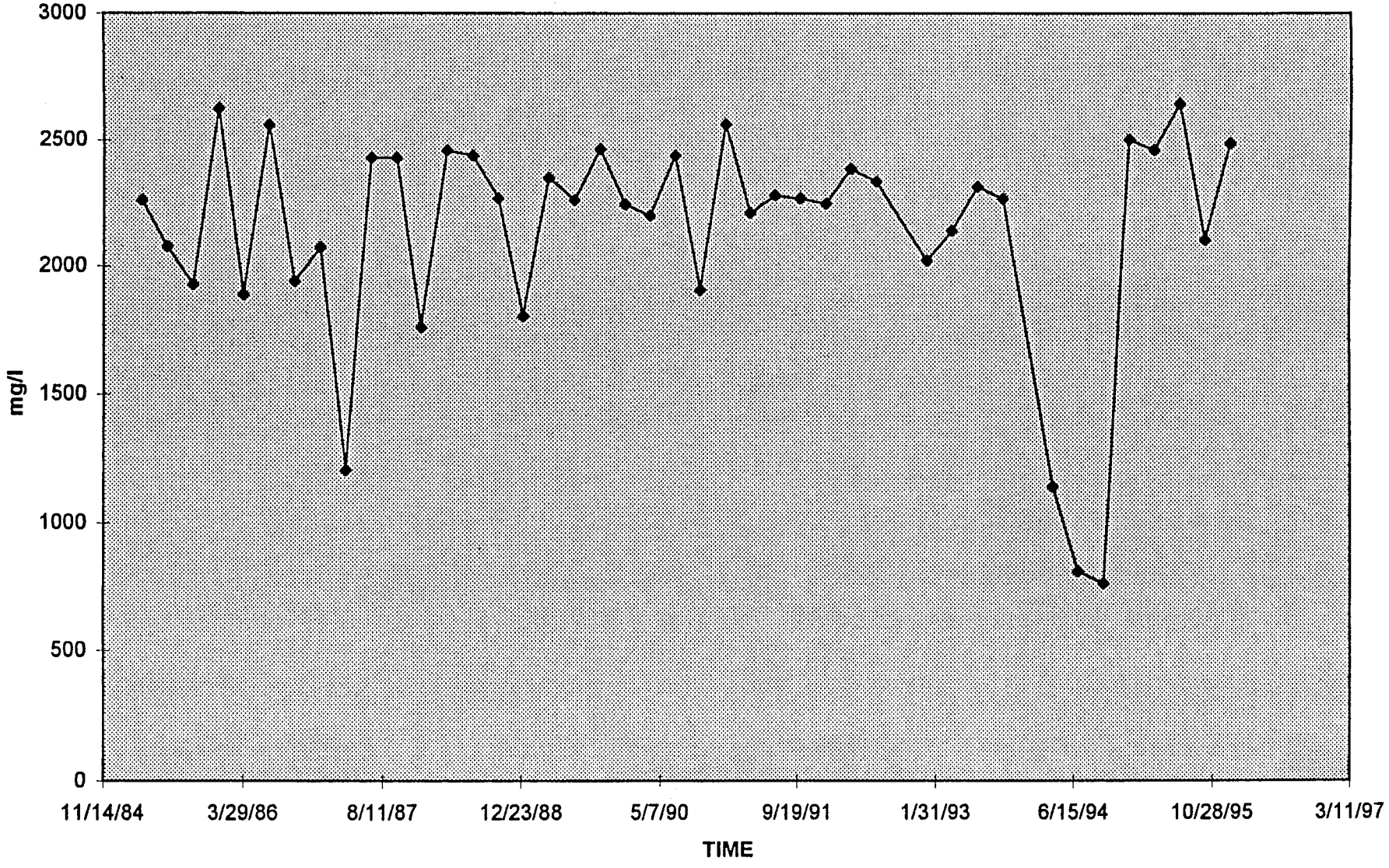


WELL #6 FLUORIDE

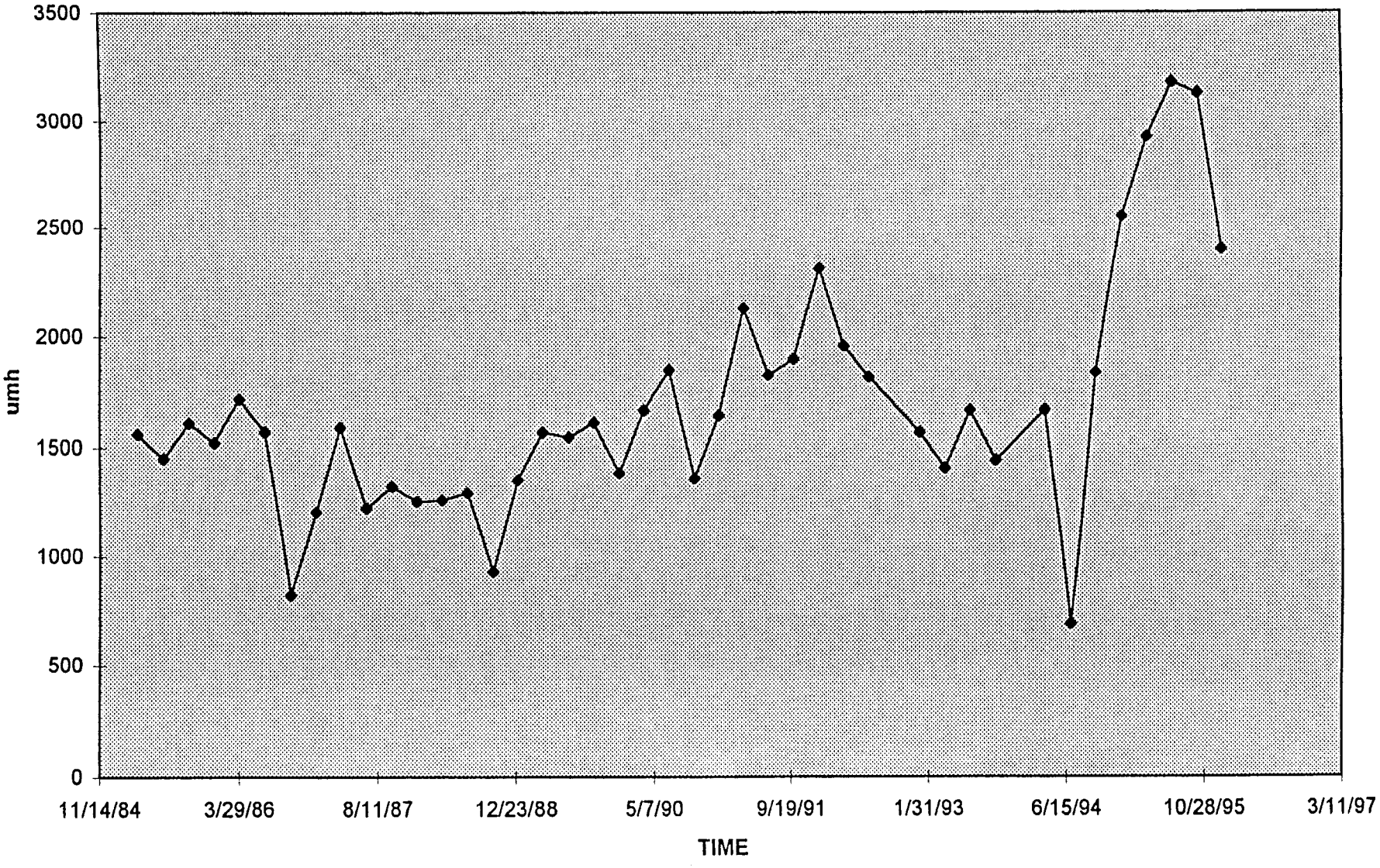


WELL #6 CHLORIDE

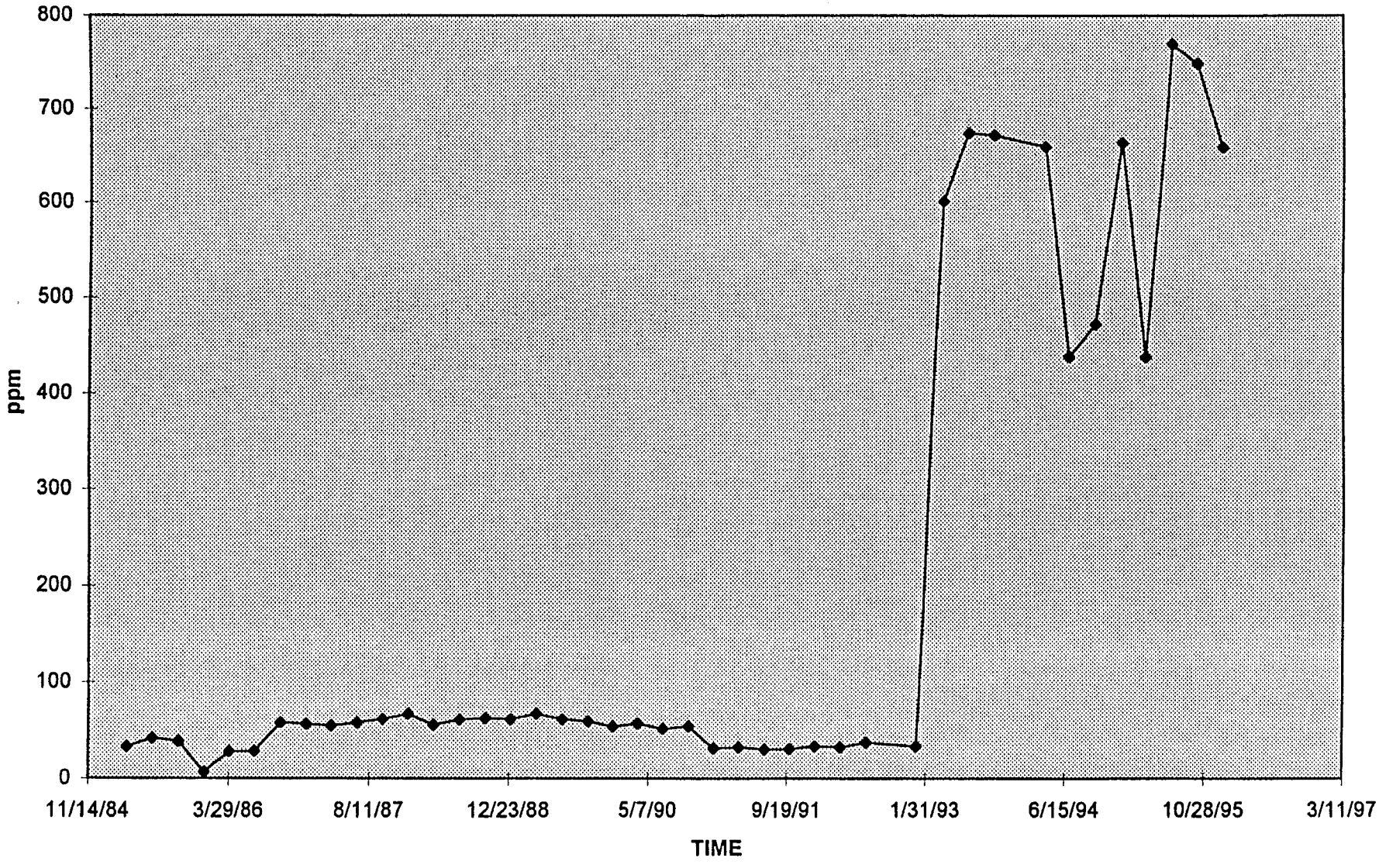



WELL #6 TDS
3000
2500
2000
1500
1000
500
0
mg/l
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
TIME

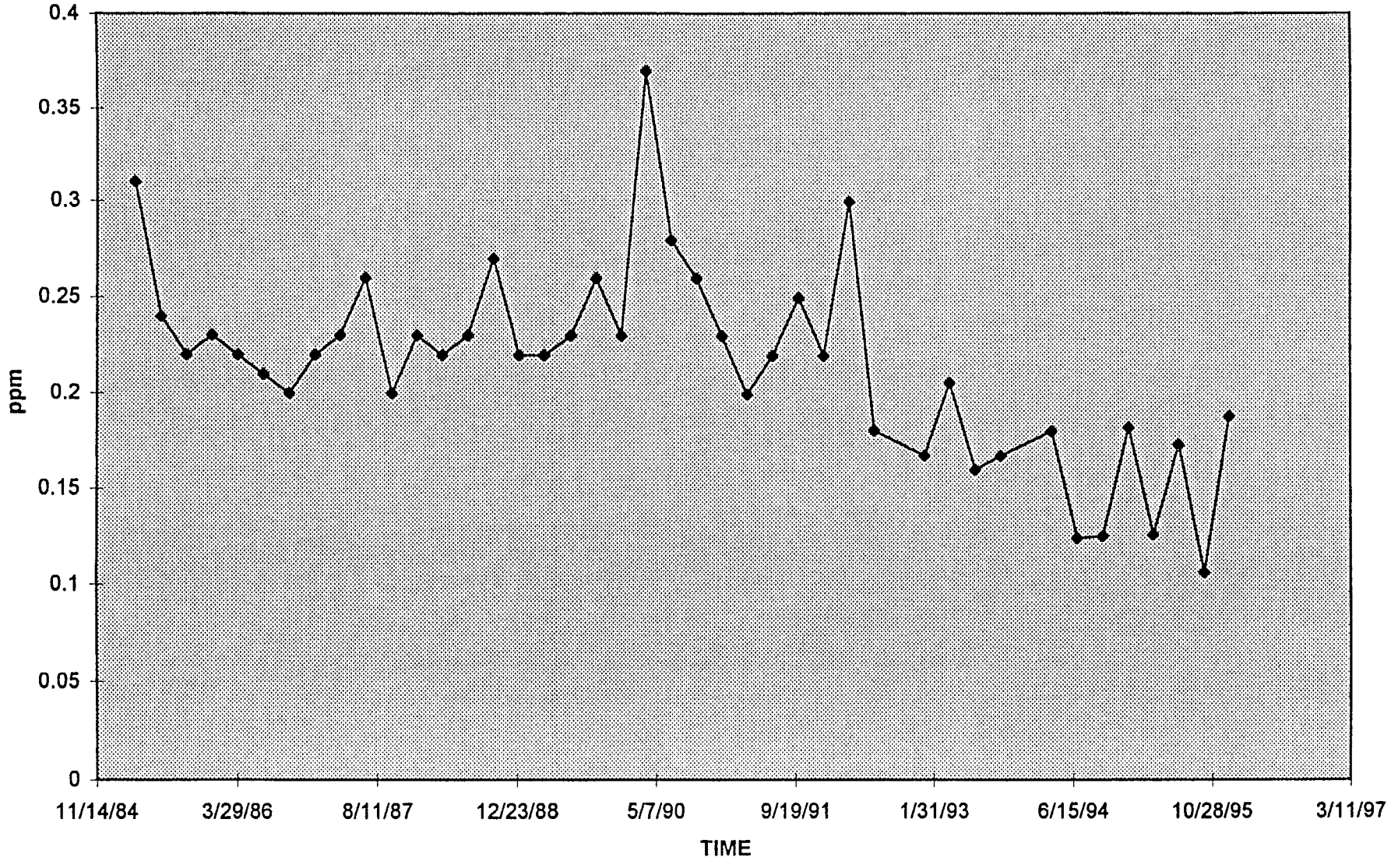
WELL #6 CONDUCTANCE



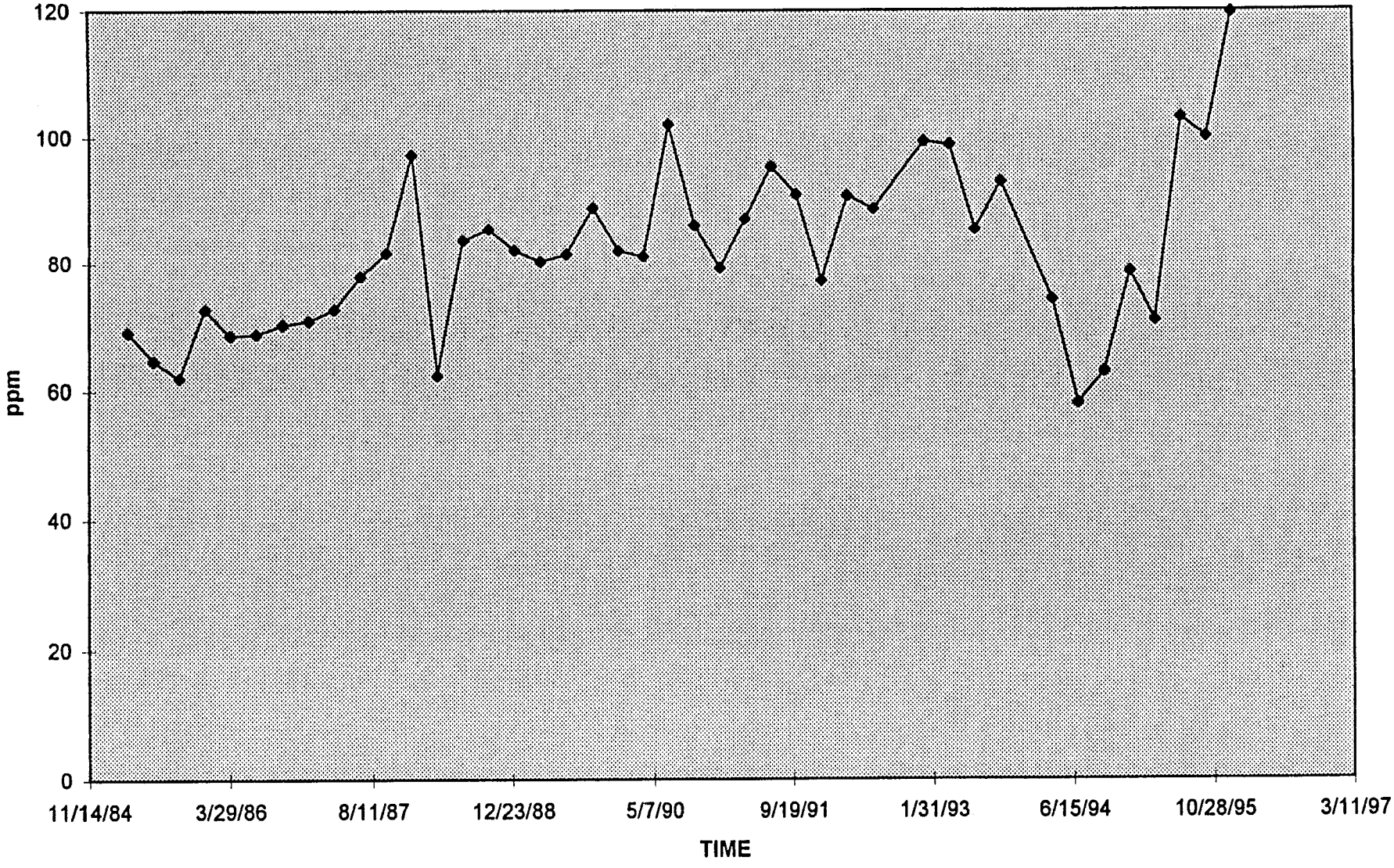
WELL #7 HARDNESS

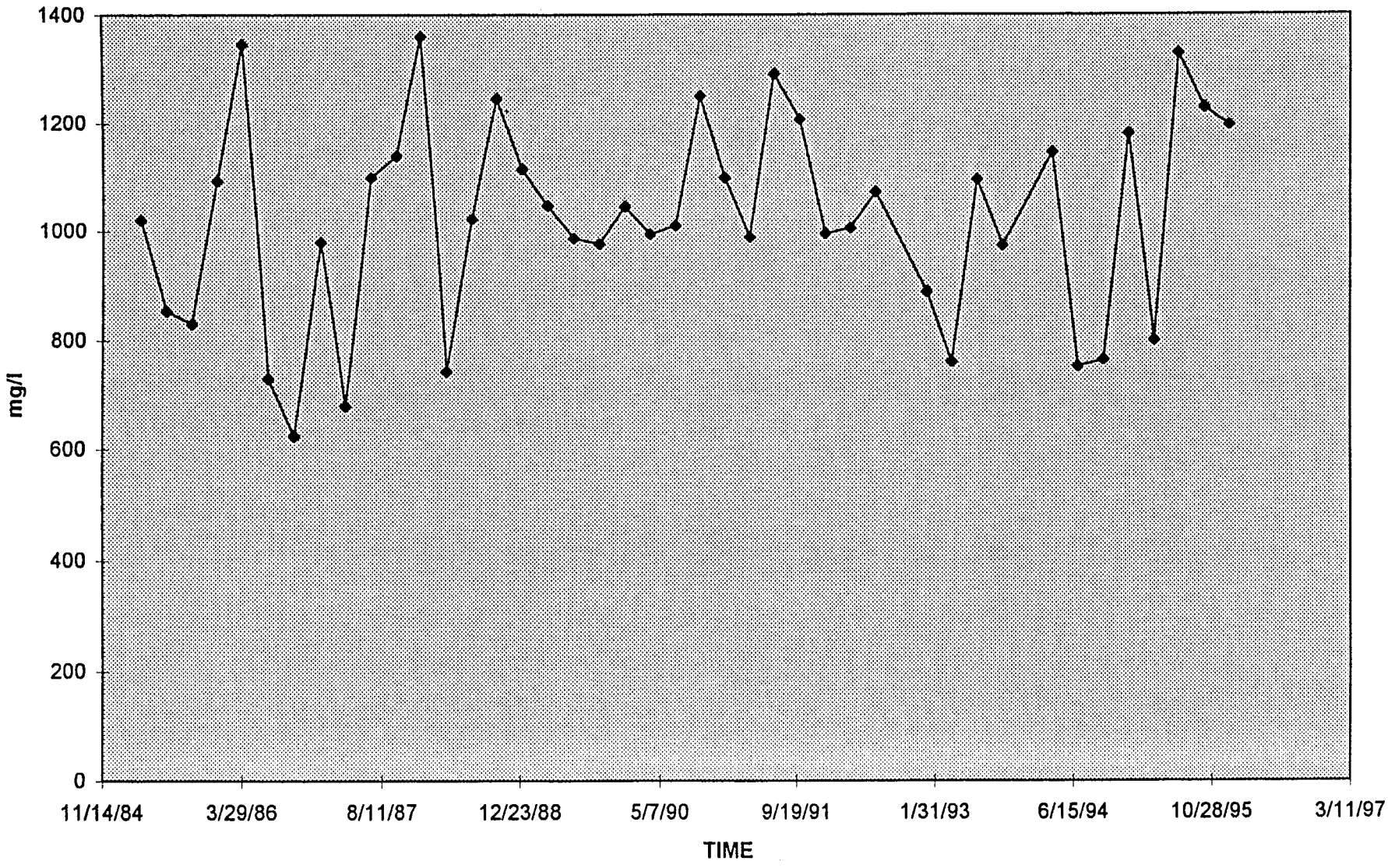


WELL #7 FLUORIDE

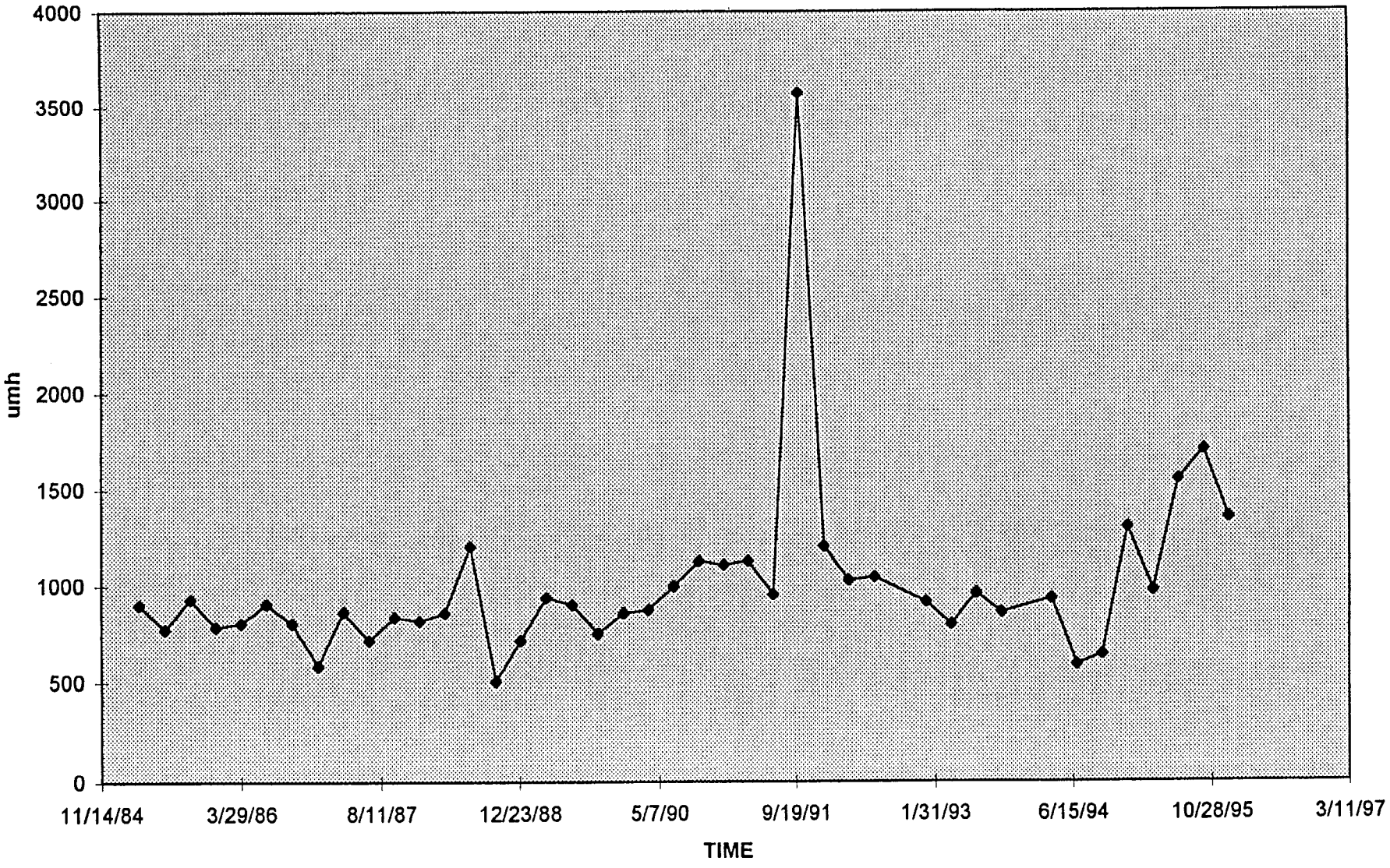


WELL #7 CHLORIDE

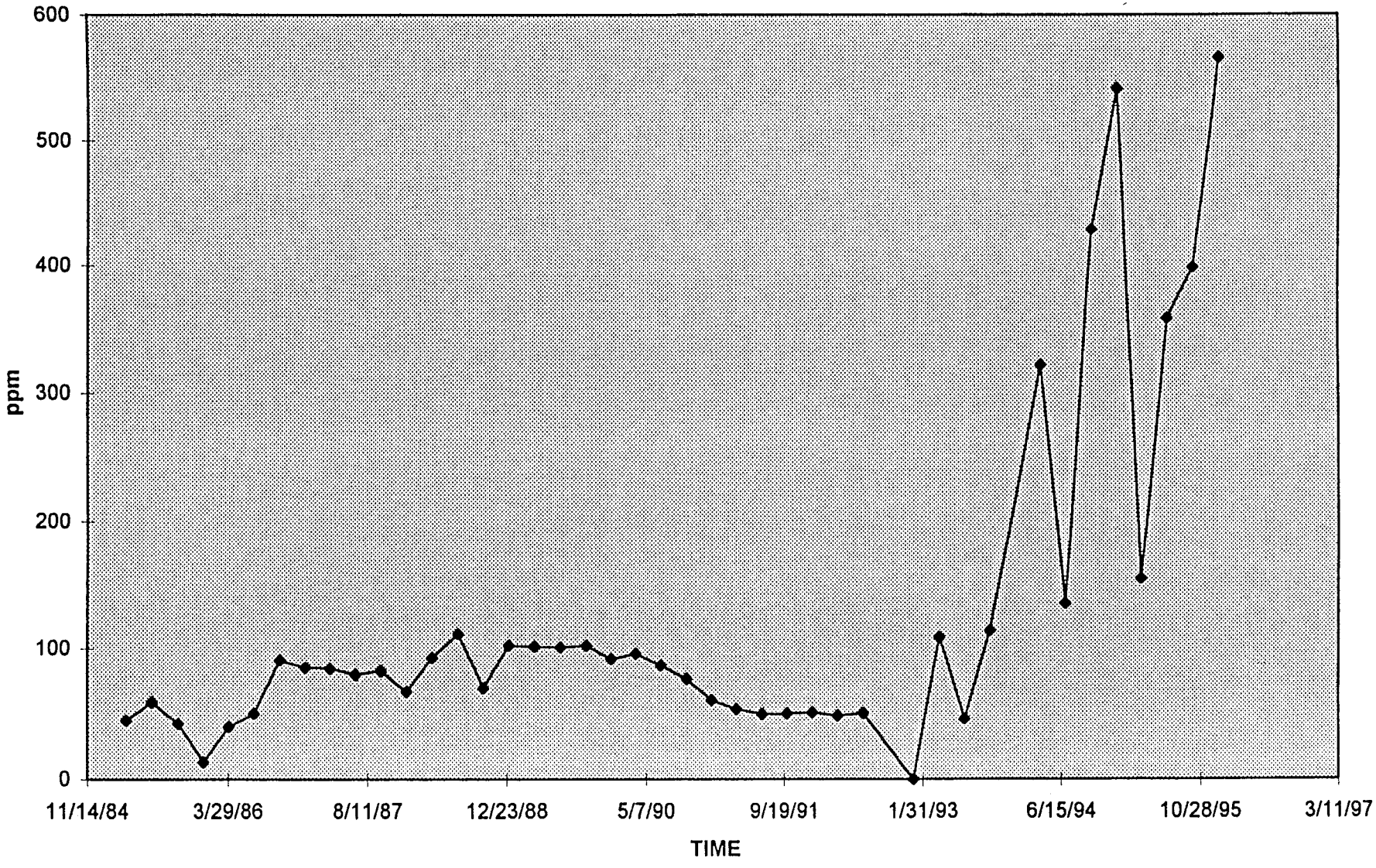



WELL #7 TDS
1400
1200
1000
800
600
400
200
0
mg/l
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
TIME

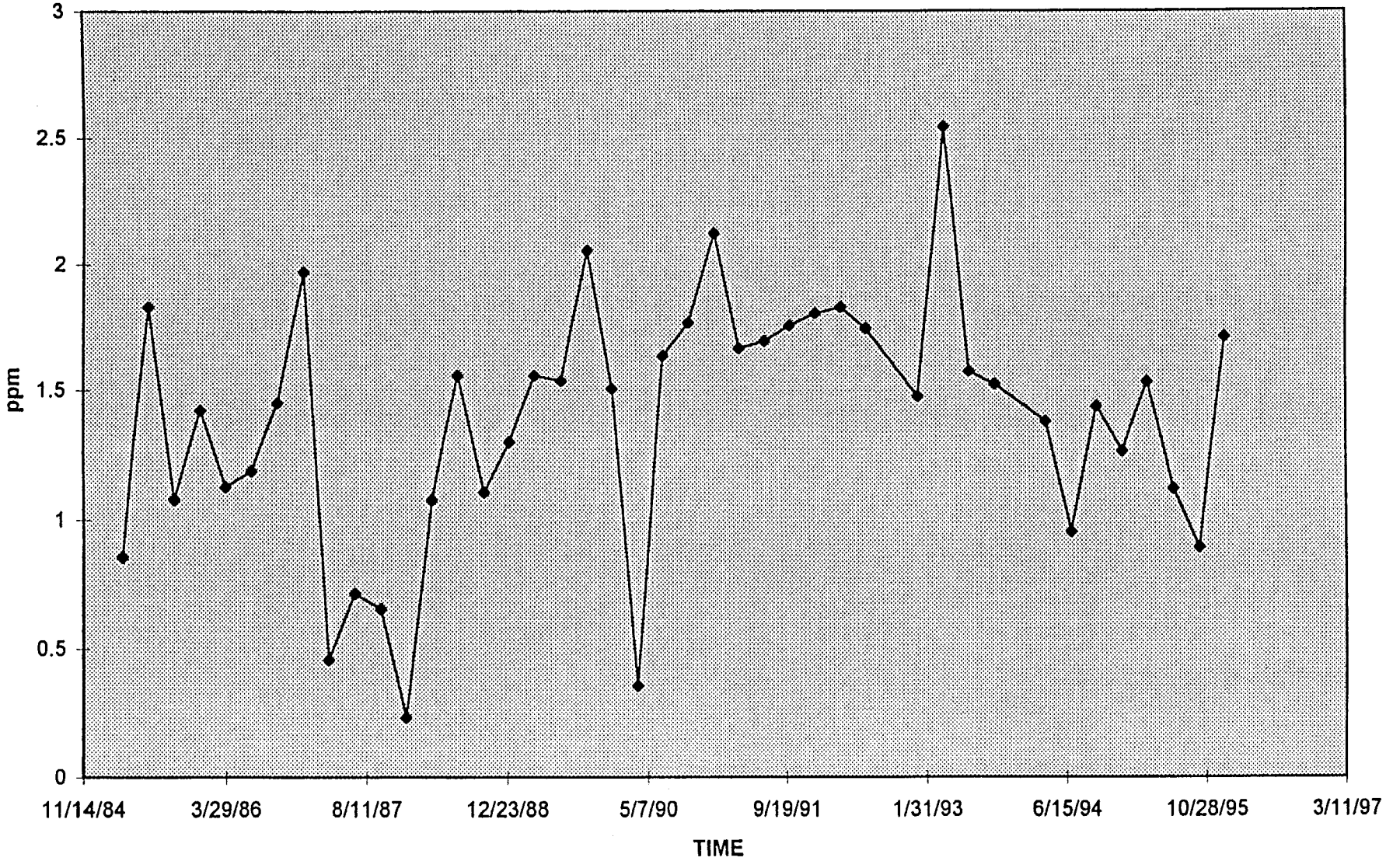
WELL #7 CONDUCTANCE



TAP HARDNESS



TAP FLUORIDE



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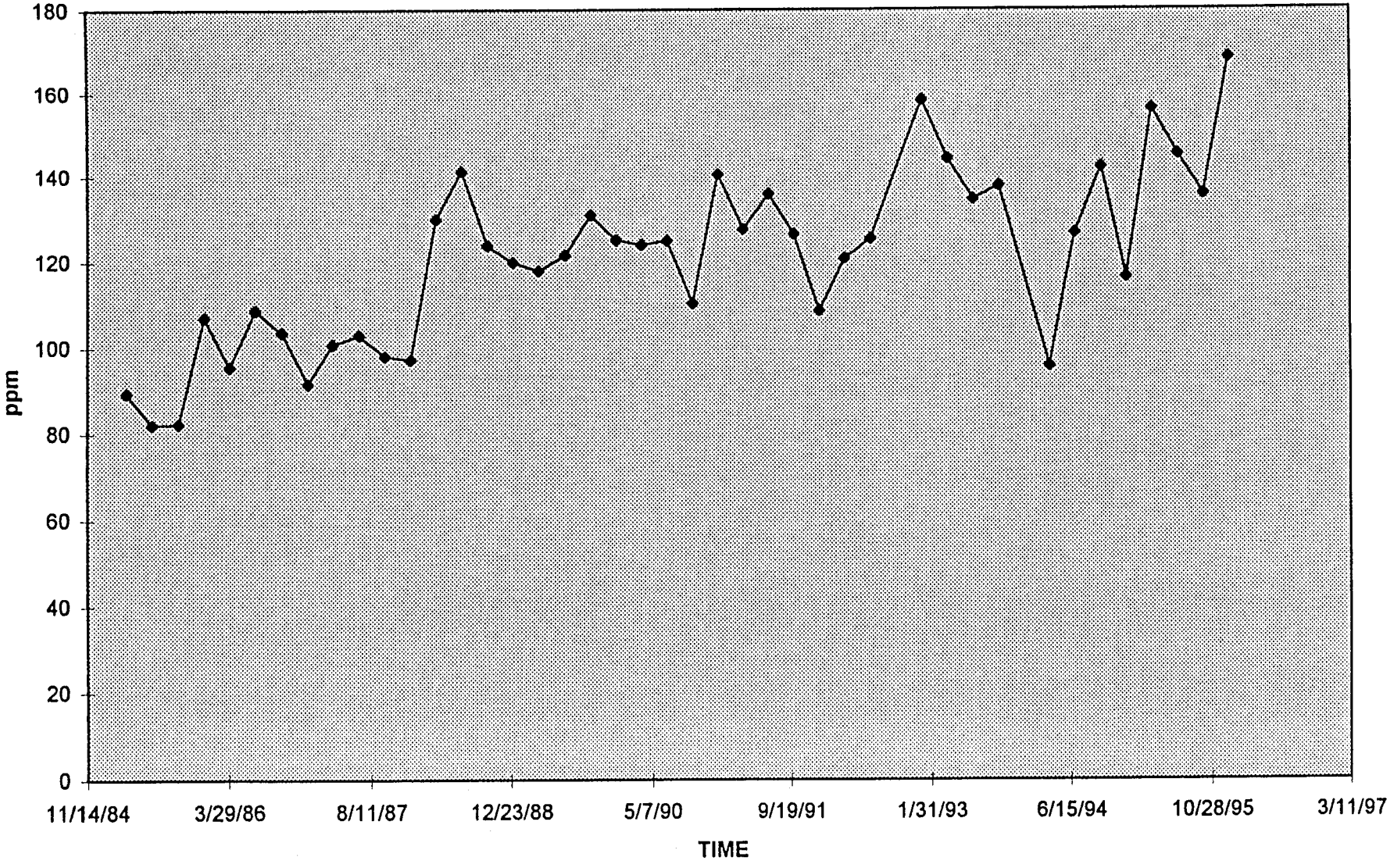

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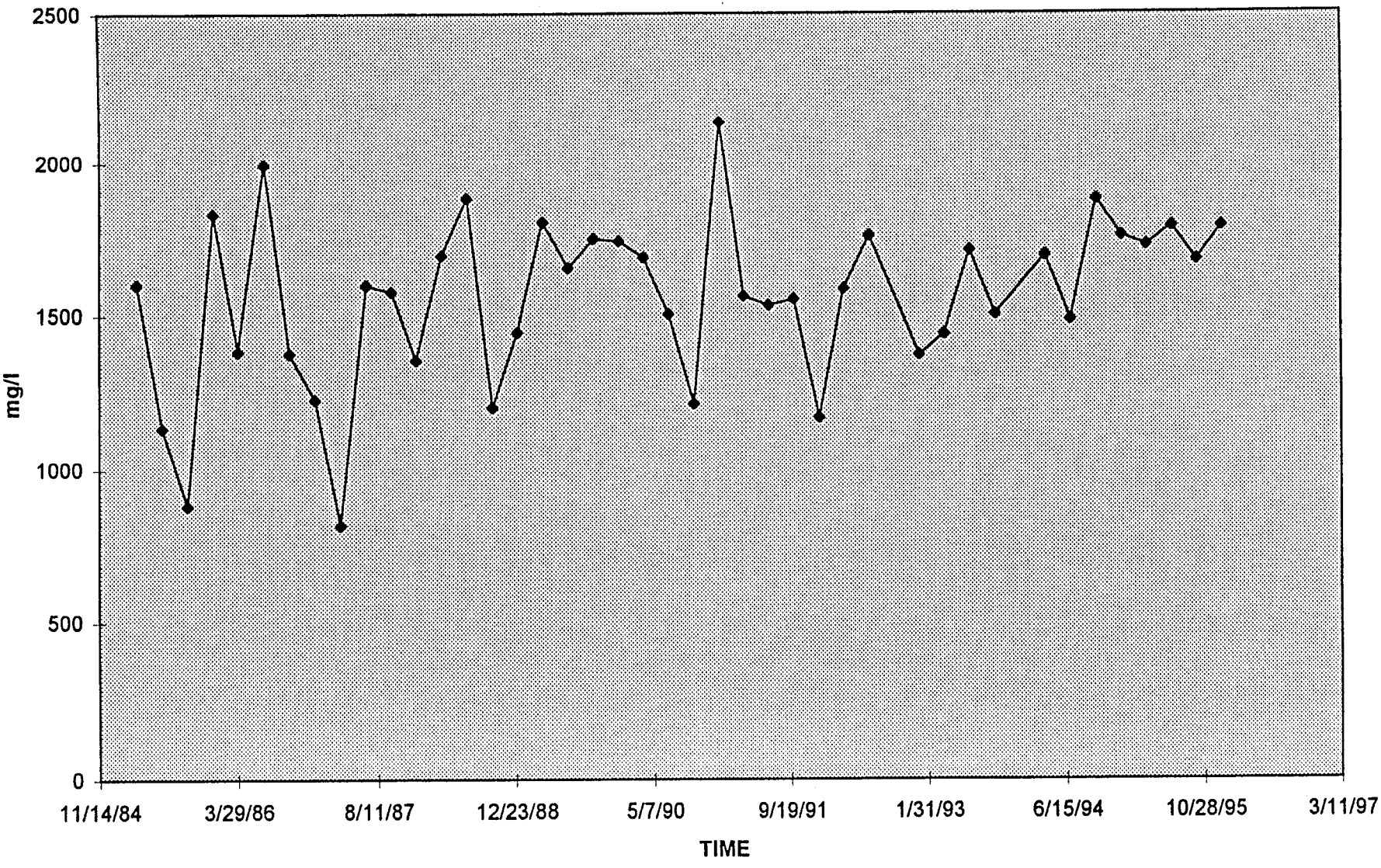
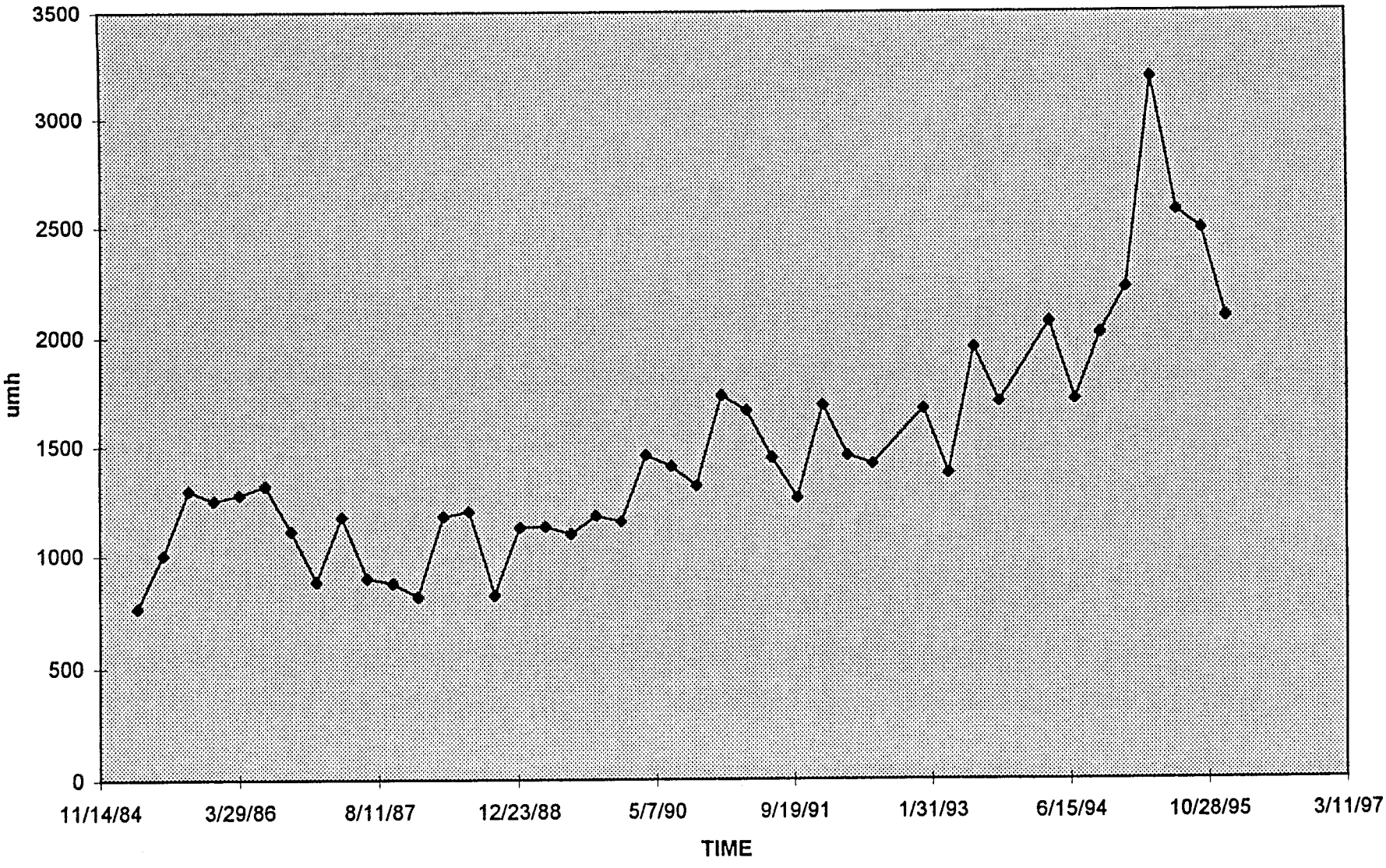

2500
2000
1500
1000
500
0
mg/l
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
TIME

TAP CONDUCTANCE



APPENDIX B

GROUNDWATER DATA SUMMARY TABLES FROM
ECOLOGY AND ENVIRONMENT CERCLA REPORT
DATED JANUARY 10, 1989

TABLE 1
SAMPLE RATIONALE

SAMPLE MATRIX	SAMPLE #	LOCATION	RATIONALE
Ground Water	SCC-MW-1	Upgradient, south of the pond	Background ground wate sample for this site
	SCC-MW-3	North of plant	Downgradient
	SCC-MW-4	North of settlement pond	"
	SCC-IW-4	North of settlement pond	"
	SCC-IW-7	Duplicate of SCC-IW-4	Duplicate
	SCC-IW-5	Rinsate blank	Blank
	SCC-MW-10	North of I-90	Comparison sample

TABLE 2
ORGANIC ANALYTICAL DATA FOR GROUND WATER SAMPLES
AT STAUFFER CHEMICAL COMPANY
SILVER BOW, MONTANA (Values in µg/l)
CASE #10163

SAMPLE LOCATION TRAFFIC REPORT SITE LOCATION	SCC-MW-1 HF-457 DNGRDNT	SCC-MW-3 HF-459 DNGRDNT	SCC-MW-4 HF-458 DNGRDNT	SCC-IW-5 HF-436 BLANK	SCC-MW-10 HF-453 DNGRDNT
Methylene chloride	9ub	11ub	11ub	4ub	4ub
Acetone	36ub	55ub	78ub	7ub	10ub
Toluene					2j
2-butanone				8j	
bis(2-ethylhexyl)-phthalate			3j		

ub - Estimated sample quantitation limit increased. Amount found in sample reported. Compound detected at <5x the amount in blank (<10x for methylene chloride, acetone, toluene and phthalates).

j - The associated numerical value is an estimated quantity because the amount detected is below the required limits or because quality control criteria were not met.

TABLE 2 Cont.
ORGANIC ANALYTICAL DATA FOR GROUND WATER SAMPLES
AT STAUFFER CHEMICAL COMPANY
SILVER BOW, MONTANA (Values in µg/l)
CASE #10163

SAMPLE LOCATION	SCC-IW-6	SCC-IW-7	SCC-IW-4	SCC-TB-1	SCC-TB-
TRAFFIC REPORT	HF-451	HF-452	HF-450	HR-454	HF-455
SITE LOCATION	DNGRDNT	DNGRDNT	DUP IW-7	TRIP BLK	TRIP BL
Methylene chloride	10ub	5ub	9ub	30ub	31ub
Acetone	15ub	4ub	18ub	11ub	8ub
Toluene	5u		3j		

ub - Estimated sample quantitation limit increased. Amount found in sample reported. Compound detected at <5x the amount in blank (<10x for methylene chloride, acetone, toluene and phthalates).

j - The associated numerical value is an estimated quantity because the amount detected is below the required limits or because quality control criteria were not met.

u - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.

TABLE 3
INORGANIC ANALYTICAL DATA FOR GROUND WATER SAMPLES
AT STAUFFER CHEMICAL COMPANY
SILVER BOW, MONTANA (Values in µg/l)
CASE #10163

SAMPLE LOCATION	SCC-MW-1	SCC-MW-3	SCC-MW-4	SCC-MW-5
TRAFFIC REPORT	MHQ-458	MHQ-460	MHQ-459	MHQ-457
SITE LOCATION	UPGRDNT	DNGRDNT	DNGRDNT	BLANK
Aluminum	29.6	28.0	665	28.0
Antimony	29.0	29.0	29.0	29.0
Arsenic	10.0	[3.8]	2.0uj	2.0
Barium	[7.6]	[56.7]	[166]	3.0
Beryllium	1.0	1.0	1.0	1.0
Cadmium	5.0	5.0	5.0	5.0
Calcium	39,100	69,900	85,100	[230]
Chromium	5.0	5.0	12.9	5.0
Cobalt	5.0	[6.0]	5.0	5.0
Copper	[7.7]	[7.7]	[8.2]	[8.1]
Iron	[36.0]	20.0	564	[42.0]
Lead	[4.1]	5.9	[2.1]j	[2.0]
Magnesium	[3810]	14200	16800	72.0
Manganese	5.0	5.0	68.3	5.0
Mercury	0.2	0.2	0.2	0.2
Nickel	9.0	9.0	9.0	9.0
Potassium	5570	10900	10400	151
Selenium	20.0	2.0uj	2.0j	2.0
Silver	4.0	4.0	4.0	4.0
Sodium	35300	29700	30300	1520
Thallium	[2.9]j	[2.9]j	[2.9]j	[2.9]
Vanadium	[9.4]	[8.4]	[6.5]	[4.6]
Zinc	[17.9]	[15.5]	37.1	[18.4]

uj - Detection limit is estimated because quality control criteria were not met.

j - The associated numerical value is an estimated quantity because the amount detected is below the required limits or because quality control criteria were not met.

[] - Compound is present and was detected. However, the quantity is below the contract required detection limit (inorganic data only).

TABLE 3 Cont.
INORGANIC ANALYTICAL DATA FOR GROUND WATER SAMPLES
AT STAUFFER CHEMICAL COMPANY
SILVER BOW, MONTANA (Values in µg/l)
CASE #10163

SAMPLE LOCATION	SCC-MW-10	SCC-IW-6	SCC-IW-7	SCC-IW-4
TRAFFIC REPORT	MHQ-456	MHQ-454	MHQ-455	MHQ-453
SITE LOCATION	RAMSAY		DUP IW-4	DUP-IW-7
Aluminum	28.0	28.0	28.0	28.0
Antimony	29.0	29.0	29.0	29.0
Arsenic	[5.9]	50.0	38.5	43.6
Barium	[70.3]	[43.1]	[36.6]	[38.8]
Beryllium	1.0	1.0	1.0	1.0
Cadmium	5.0	5.0	5.0	5.0
Calcium	48000	419000	379000	390000
Chromium	5.0	5.0	5.0	5.0
Copper	[11.6]	[9.4]	[8.6]	[6.4]
Iron	20.0	20.0	20.0	20.0
Lead	6.0	2.0uj	2.0uj	2.0uj
Magnesium	11600	79900	73300	76300
Manganese	5.0	3116	416	422
Mercury	0.2	0.2	0.2	0.2
Nickel	[13.2]	9.0	9.0	9.0
Potassium	5370	20600	16900	20000
Selenium	20.0	20.0uj	20.0	20.0uj
Silver	4.0	4.0	4.0	4.0
Sodium	30600	77300	67400	71700
Thallium	[2.7]j	[2.8]j	[2.8]j	[2.8]j
Vanadium	[10.6]	[5.8]	[7.0]	[5.3]
Zinc	[32.9]	[17.2]	23.6	47.0

[] - Compound is present and was detected. However, the quantity is below contract required detection limit (inorganic data only).

uj - Detection limit is estimated because quality control criteria were not met.

j - The associated numerical value is an estimated quantity because the amount detected is below the required limits or because quality control criteria were not met.

APPENDIX C

GROUNDWATER ANALYTICAL SUMMARY TABLES FROM
HYDROMETRICS REPORT DATED NOVEMBER, 1994

Hydrometrics, Inc.

SUMMARY OF GROUNDWATER SAMPLING FOR SEPTEMBER 1994

For:

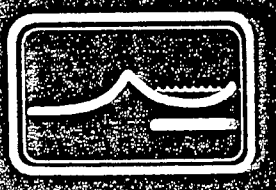
Rhône-Poulenc
Basic Chemicals Company

By:

Hydrometrics, Inc.

November 1994

Consulting Scientists & Engineers



RPBC-P\1-RP.DOC\102594\WSA.dke

Sample Type: Groundwater (Wells)

SITE CODE	SCC-MW-1	SCC-MW-1	SCC-MW-1
SAMPLE DATE	09/13/94	09/13/94	09/20/94
SAMPLE TIME	10:30	11:30	10:20
LAB	EL	HYDRO	EL
LAB NUMBER	94-46609		94-46613
REMARKS		NO SAMPLE	
OTHER INFO	STAGNATE WATE		
SAMPLE NUMBER	RPS-9409-101	RPS-9409-102	RPS-9409-110
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LVL (FEET)	28.12	28.12	28.13
PH (FLD)	6.82	7.75	7.73
SC (UMHOS/CM AT 25 C) (FLD)	436.0	414.0	405.0
TURBIDITY (NTU) FLD			4.1
WATER TEMPERATURE (C) (FLD)	9.3	8.8	8.5
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	39.0		39.0
MAGNESIUM (MG) DIS	4.0		4.0
SODIUM (NA) DIS	33.0		31.0
POTASSIUM (K) DIS	5.0		5.0
-- METALS & MINOR CONSTITUENTS --			
ALUMINUM (AL) DIS	<0.1		<0.1
ANTIMONY (SB) DIS	<0.05		<0.05
ARSENIC (AS) DIS	0.013		0.012
BARIUM (BA) DIS	<0.1		<0.1
BERYLLIUM (BE) DIS	<0.001		<0.001
CADMIUM (CD) DIS	<0.001		<0.001
CHROMIUM (CR) DIS	<0.01		<0.01
COBALT (CO) DIS	<0.01		<0.01
COPPER (CU) DIS	<0.01		<0.01
IRON (FE) DIS	<0.03		<0.03
LEAD (PB) DIS	<0.01		<0.01
MANGANESE (MN) DIS	<0.01		<0.01
MERCURY (HG) DIS	<0.001		<0.001
NICKEL (NI) DIS	<0.01		<0.01
SELENIUM (SE) DIS	<0.005		<0.005
SILVER (AG) DIS	<0.005		<0.005
THALLIUM (TL) DIS	<0.1		<0.1
VANADIUM (V) DIS	<0.1		<0.1
ZINC (ZN) DIS	<0.01		<0.01
-- VOLATILE ORGANICS --			
BENZENE	<0.0005		<0.0005
ETHYLBENZENE	<0.0005		<0.0005
XYLENE	<0.001		<0.001
TOLUENE	<0.0005		<0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tes
Validation Flags: WJ1-Blank, J2-Standard, J3-Hold Time, J4-Dup./Split/other, J5-QC omission, T-QC Frequency Violation; R-Rejected

Sample Type: Groundwater (Wells)

SITE CODE	SCC-MW-3	SCC-MW-3	SCC-MW-3	SCC-MW-3
SAMPLE DATE	09/13/94	09/13/94	09/20/94	09/20/94
SAMPLE TIME	13:10	13:30	11:15	14:00
LAB	EL	HYDRO	EL	EL
LAB NUMBER	94-46610		94-46614	94-46616
REMARKS		NO SAMPLE		DUPLICATE
OTHER INFO	STAGNATE WATE			
SAMPLE NUMBER	RPS-9409-103	RPS-9409-104	RPS-9409-111	RPS-9409-113
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LVL (FEET)	17.28	17.28	17.54	17.54
PH (FLD)	6.65	7.24	7.19	7.19
SC (UMHOS/CM AT 25 C) (FLD)	516.0	665.0	607.0	607.0
TURBIDITY (NTU) FLD			8.1	8.1
WATER TEMPERATURE (C) (FLD)	9.7	8.3	8.6	8.6
-- MAJOR CONSTITUENTS --				
CALCIUM (CA) DIS	50.0		56.0	59.0
MAGNESIUM (MG) DIS	9.0		11.0	11.0
SODIUM (NA) DIS	25.0		29.0	31.0
POTASSIUM (K) DIS	9.0		9.0	10.0
-- METALS & MINOR CONSTITUENTS --				
ALUMINUM (AL) DIS	<0.1		<0.1	<0.1
ANTIMONY (SB) DIS	<0.05		<0.05	<0.05
ARSENIC (AS) DIS	0.007		0.007	0.007
BARIUM (BA) DIS	<0.1		<0.1	<0.1
BERYLLIUM (BE) DIS	<0.001		<0.001	<0.001
CADMIUM (CD) DIS	<0.001		<0.001	<0.001
CHROMIUM (CR) DIS	<0.01		<0.01	<0.01
COBALT (CO) DIS	<0.01		<0.01	<0.01
COPPER (CU) DIS	<0.01		<0.01	<0.01
IRON (FE) DIS	<0.03		<0.03	<0.03
LEAD (PB) DIS	<0.01		<0.01	<0.01
MANGANESE (MN) DIS	<0.01		<0.01	<0.01
MERCURY (HG) DIS	<0.001		<0.001	<0.001
NICKEL (NI) DIS	<0.01		<0.01	<0.01
SELENIUM (SE) DIS	<0.005		<0.005	<0.005
SILVER (AG) DIS	<0.005		<0.005	<0.005
THALLIUM (TL) DIS	<0.1		<0.1	<0.1
VANADIUM (V) DIS	<0.1		<0.1	<0.1
ZINC (ZN) DIS	0.14		<0.01	0.02
-- VOLATILE ORGANICS --				
BENZENE	<0.0005		<0.0005	<0.0005
ETHYLBENZENE	<0.0005		<0.0005	<0.0005
XYLENE	<0.001		<0.001	<0.001
TOLUENE	<0.0005		<0.0005	<0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tes
Validation Flags: LW1-Blank, J2-Standard, J3-Hold Time, J4-Dup./Split/other, J5-QC omission, T-QC Frequency Violation; R-Rejected

Sample Type: Groundwater (Wells)

SITE CODE	SCC-MW-4	SCC-MW-4	SCC-MW-4
SAMPLE DATE	09/13/94	09/13/94	09/20/94
SAMPLE TIME	14:30	15:00	13:00
LAB	EL	HYDRO	EL
LAB NUMBER	94-46611		94-46615
REMARKS		NO SAMPLE	
OTHER INFO	STAGNATE WATE		
SAMPLE NUMBER	RPS-9409-106	RPS-9409-107	RPS-9409-112
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LVL (FEET)	31.43	31.43	31.47
PH (FLD)	6.7	7.23	7.09
SC (UMHOS/CM AT 25 C) (FLD)	1076.0	1214.0	1168.0
TURBIDITY (NTU) FLD			890.0
WATER TEMPERATURE (C) (FLD)	9.6	8.1	9.3
-- MAJOR CONSTITUENTS --			
CALCIUM (CA) DIS	136.0		171.0
MAGNESIUM (MG) DIS	25.0		31.0
SODIUM (NA) DIS	28.0		31.0
POTASSIUM (K) DIS	10.0		11.0
-- METALS & MINOR CONSTITUENTS --			
ALUMINUM (AL) DIS	<0.1		<0.1
ANTIMONY (SB) DIS	<0.05		<0.05
ARSENIC (AS) DIS	0.006		<0.005
BARIUM (BA) DIS	<0.1		<0.1
BERYLLIUM (BE) DIS	<0.001		<0.005
CADMIUM (CD) DIS	<0.001		<0.001
CHROMIUM (CR) DIS	<0.01		<0.01
COBALT (CO) DIS	<0.01		<0.01
COPPER (CU) DIS	<0.01		<0.01
IRON (FE) DIS	<0.03		<0.03
LEAD (PB) DIS	<0.01		<0.01
MANGANESE (MN) DIS	<0.01		<0.01
MERCURY (HG) DIS	<0.001		<0.001
NICKEL (NI) DIS	<0.01		<0.01
SELENIUM (SE) DIS	<0.005		<0.005
SILVER (AG) DIS	<0.005		<0.005
THALLIUM (TL) DIS	<0.1		<0.1
VANADIUM (V) DIS	<0.1		<0.1
ZINC (ZN) DIS	<0.01		<0.01
-- VOLATILE ORGANICS --			
BENZENE	<0.0005		<0.0005
ETHYLBENZENE	<0.0005		<0.0005
XYLENE	<0.001		<0.001
TOLUENE	<0.0005		<0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not teste
Validation Flags: UJ1-Blank, J2-Standard, J3-Hold Time, J4-Dup./Split/other, J5-QC omission, T-QC Frequency Violation; R-Rejected

APPENDIX D

LABORATORY ANALYTICAL REPORT FOR SDWA SAMPLING
PERFORMED NOVEMBER, 1995

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Rachel Keele
ADDRESS: Rhone-Poulenc Basic Chemicals Co.
P. O. Box 3146
Butte, MT 59702

LAB NO.: 95-69975
DATE: 01/10/96 cdt

WATER ANALYSIS

Well #3
Sampled 11/30/95 @ 0730
Submitted 12/01/95

Constituent	Drinking Water Quality Standard Max, mg/l	Found in Sample, mg/l		Date Analyzed
Sodium		70		12/04/95
Calcium		335		12/04/95
Magnesium		61		12/04/95
Sulfate	250	908		12/04/95
Total Alkalinity as $CaCO_3$		72		12/04/95
Specific Conductance @ 25°C		2100	µmhos/cm	12/01/95
pH	6.5-8.5	6.8	s.u.	12/01/95
Fluoride	4.0	1.78		12/11/95
Nitrate plus Nitrite as N	10	0.55		12/01/95
Nitrite as N		<0.05		12/01/95
Total Metals				
Arsenic	0.05	0.031		12/07/95
Barium	1.0	<0.1		12/05/95
Cadmium	0.010	0.002		12/05/95
Chromium	0.05	<0.01		12/05/95
Copper	1.3	<0.01		12/05/95
Iron	0.3	3.34		12/05/95
Lead	0.05	0.009		12/06/95
Manganese	0.05	0.40		12/05/95
Mercury	0.002	<0.0002		12/04/95
Selenium	0.01	<0.005		12/06/9

REMARKS: Very hard water. The Sulfate, Total Iron and Total Manganese exceed the maxim recommended for drinking water.

Lab Nos. 95-69974-75

QUALITY ASSURANCE DATA PACKAGE

This report includes the results of quality assurance tests performed with the sample analyses. They are performed to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate and precise results.

Constituent	Duplicate Analysis -------mg/l (ppm)------- Original	Duplicate	Spiked Analysis, % Recovery	Blank Analysis, mg/l (ppm)	-----Calibration Verification----- Sample Analysis, mg/l (ppm)	Acceptance Range, mg/l (ppm)	Da Anal
Sodium	2	2	98	<1	48	45-55	12/0
Calcium	123	125	93	<1	49	45-55	12/0
Magnesium	44	45	99	<1	49	45-55	12/0
Sulfate	228	223	102	<1	323	286-350	12/0
Total Alkalinity as $CaCO_3$	165	166	100	1	105	85-115	12/0
Specific Conductance @ 25°C, µmhos/cm	1580	1580	N/A	1	N/A	N/A	12/0
pH, s.u.	7.1	7.1	N/A	N/A	N/A	N/A	12/0
Fluoride	0.59	0.59	100	<0.10	2.35	2.11-2.43	12/1
Nitrate plus Nitrite as N	3.39	3.36	94	<0.05	2.56	2.05-3.10	12/0
Nitrite as N	<0.05	<0.05	96	<0.05	N/A	N/A	12/0
Total Metals							
Arsenic	<0.005	<0.005	90	<0.005	0.025	0.023-0.028	12/0
Barium	<0.1	<0.1	94	<0.1	1.0	0.9-1.2	12/0
Cadmium	<0.001	0.001	99	<0.001	1.03	0.85-1.15	12/0
Chromium	<0.01	<0.01	97	<0.01	1.03	0.85-1.15	12/0
Copper	<0.01	<0.01	94	<0.01	1.00	0.85-1.15	12/0
Iron	0.06	0.07	94	<0.03	1.01	0.85-1.15	12/0
Lead	0.009	0.009	97	<0.005	0.014	0.013-0.017	12/0
Manganese	0.04	0.04	95	<0.01	1.02	0.85-1.15	12/0
Mercury	<0.0002	<0.0002	109	<0.0002	0.0013	0.0012-0.0016	12/0
Selenium	<0.005	<0.005	111	<0.005	0.112	0.081-0.128	12/0

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-632
FAX (406) 252-6069 • 1-800-735-448

LABORATORY REPORT

TO: Rachel Keele
ADDRESS: Rhone-Poulenc Basic Chemicals Co.
P. O. Box 3146
Butte, MT 59702

LAB NO.: 95-69975
DATE: 01/10/96 cdt

DRINKING WATER ANALYSIS

Well #3
Sampled 11/30/95 @ 0730
Submitted 12/01/95
Analyzed 12/13/95

PHASE II, V RULES
QUALITY ASSURANCE DATA
SURROGATE RECOVERY

Surrogate Compound	EPA Method	Surrogate Added, µg/l	Surrogate % Recovery	QC Lir % Rec
4-Bromo-3,5-Dimethylphenyl N-methylcarbamate	531.1	20	108	70-1

Quality Control Sample: Laboratory Reagent Blank 01-DEC-95 11:04
Report Date: 12/01/95
Extraction Method: EPA 505
Extraction Date: 01-DEC-95
Sample Matrix: WATER
File: /chem/DECD.i/D112795.b/d1127102.d
Remarks: This Laboratory Reagent Blank Quality Control Sample was extracted and analyz with your set of samples to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

EPA METHOD 505
ORGANOCHLORINE PESTICIDES & PCB'S ANALYSIS REPORT

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	EPA MCL	RESULT	QUALIFIER
Alachlor	5972-60-8	2	<0.10	U
Aldrin	309-00-2	NR	<0.010	U
Aroclor-1016	12674-11-2	PCB	<0.50	U
Aroclor-1221	11104-28-2	PCB	<0.50	U
Aroclor-1232	11141-16-5	PCB	<0.50	U
Aroclor-1242	53469-21-9	PCB	<0.50	U
Aroclor-1248	12672-29-6	PCB	<0.50	U
Aroclor-1254	11097-69-1	PCB	<0.50	U
Aroclor-1260	11096-82-5	PCB	<0.50	U
Aroclor-1262	37324-23-5	PCB	<0.50	U
Aroclor-1268	11100-14-4	PCB	<0.50	U
Atrazine	1912-24-9	3	<1.0	U
gamma-BHC (Lindane)	58-89-9	0.2	<0.010	U
Chlordane (technical)	57-74-9	2	<0.50	U
alpha-Chlordane	5103-71-9	IO	<0.010	U
gamma-Chlordane	5103-74-2	IO	<0.010	U
Dieldrin	60-57-1	NR	<0.010	U
Endrin	72-20-8	2	<0.010	U
Heptachlor	76-44-8	0.4	<0.010	U
Heptachlor epoxide	1024-57-3	0.2	<0.010	U
Hexachlorobenzene	118-74-1	1	<0.010	U
Hexachlorocyclopentadiene	77-74-4	50	<0.020	U
Methoxychlor	72-43-5	40	<0.050	U
cis-Nonachlor	5103-73-1	IO	<0.010	U
trans-Nonachlor	39765-80-5	IO	<0.010	U
Simazine	122-34-9	4	<1.0	U
Toxaphene	8001-35-2	3	<1.0	U
Trifluralin	1582-09-8	IO	<0.010	U

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Tetrachloro-m-xylene	0.100	0.124	124	50--150
Decachlorobiphenyl	0.100	0.130	130	50--150

QUALIFIER CODES EXPLANATION: U= Indicates compound was analyzed for but not detected.
PCB= PCB MCL is 0.5ug/L for all Aroclor PCB's detected. NR= No currently regulated amount.
IO= Information only. Compound not required for regulatory monitoring.

REPORT COMMENTS: None

Analyst: JER Reviewing Supervisor: MKB

EPA METHOD 505 BLANK SPIKE REPORT

Quality Control Sample: Certified Reference Sample Analysis 01-DEC-95 09:55
Report Date: 12/01/95
Extraction Method: EPA 505
Extraction Date: 01-DEC-95
Sample Matrix: WATER
File: /chem/DECD.i/D112795.b/d1127100.d
Remarks: This certified reference sample was spiked into a blank sample matrix then extracted and analyzed with your set of samples to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate results.

CONCENTRATION UNITS = ug/L (ppb)

Spike Compound	Added	Measured	%Rec	QC Limits
Alachlor	1.00	0.968	97	60--140
Aldrin	0.100	0.104	104	60--140
Atrazine	25.0	25.1	100	60--140
gamma-BHC (Lindane)	0.100	0.104	104	60--140
alpha-Chlordane	0.100	0.108	108	60--140
gamma-Chlordane	0.100	0.108	108	60--140
Dieldrin	0.100	0.104	104	60--140
Endrin	0.100	0.0990	99	60--140
Heptachlor	0.100	0.0944	94	60--140
Heptachlor epoxide	0.100	0.103	103	60--140
Hexachlorobenzene	0.100	0.102	102	60--140
Hexachlorocyclopentadiene	0.100	0.0824	82	60--140
Methoxychlor	0.500	0.494	99	60--140
cis-Nonachlor	0.100	0.107	107	60--140
trans-Nonachlor	0.100	0.108	108	60--140
Simazine	25.0	28.6	114	60--140
Trifluralin	0.100	0.0987	99	60--140

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Tetrachloro-m-xylene	0.100	0.104	104	50--150
Decachlorobiphenyl	0.100	0.108	108	50--150

REPORT COMMENTS: None

Analyst: JEK Reviewing Supervisor: MB

Quality Control Sample: Laboratory Reagent Blank 08-DEC-1995 15:19
Report Date: 12/11/95
Extraction Method: EPA 515.1
Extraction Date: 06-DEC-95
Sample Matrix: WATER
File: /chem/DECD.i/D120695.b/d1206070.d
Remarks: This Laboratory Reagent Blank Quality Control Sample was extracted and analy: with your set of samples to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

EPA METHOD 515.1
CHLORINATED ACIDS ANALYSIS REPORT

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	EPA MCL	RESULT	QUALIFIER
2,4-D	94-75-7	70	<1.0	U
Dalapon	75-99-0	200	<10	U
Dicamba	1918-00-9	NR	<0.25	U
Dinoseb	88-85-7	7.0	<1.0	U
Pentachlorophenol	87-86-5	1.0	<0.10	U
Picloram	1918-02-1	500	<0.50	U
2,4,5-TP (Silvex)	93-72-1	50	<0.20	U

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Dichlorophenyl acetic acid	10.0	8.11	81	70--130

QUALIFIER CODES EXPLANATION:
U= Indicates compound was analyzed for but not detected.
NR= No currently regulated amount.

REPORT COMMENTS: None

Analyst: JER Reviewing Supervisor: MTB

EPA METHOD 515.1 BLANK SPIKE REPORT

Quality Control Sample: Certified Reference Sample Analysis 08-DEC-1995 16:29
Report Date: 12/11/95
Extraction Method: EPA 515.1
Extraction Date: 06-DEC-95
Sample Matrix: WATER
File: /chem/DECD.i/D120695.b/d1206072.d
Remarks: This certified reference sample was spiked into a blank sample matrix then extracted and analyzed with your set of samples to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate results.

CONCENTRATION UNITS = ug/L (ppb)

Spike Compound	Added	Measured	%Rec	QC Limits
2,4-D	5.00	3.26	65	30--130
Dalapon	32.5	24.6	76	30--130
Dicamba	2.50	1.77	71	30--130
Dinoseb	5.00	2.11	42	30--130
Pentachlorophenol	2.50	1.39	56	30--130
Picloram	2.50	2.07	83	30--130
2,4,5-TP (Silvex)	2.50	1.79	72	30--130

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Dichlorophenyl acetic acid	10.0	8.02	80	70--130

REPORT COMMENTS: None

Analyst: JER Reviewing Supervisor: RTB

Quality Control Sample: Laboratory Reagent Blank 13-DEC-1995 12:02
Report Date: 12/15/95
Extraction Method: EPA 5030
Sample Matrix: WATER
File: /chem/IONTRAP2.i/vc121395.b/blk1213b.d
Remarks: This Laboratory Reagent Blank Quality Control Sample was extracted and analyz
with your set of samples to determine if method analytes or other interferences are
present in the laboratory environment, the reagents, or the apparatus.

EPA METHOD 524.2
VOLATILE ORGANICS ANALYSIS REPORT

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	EPA MCL	RESULT	QUALIFIER
REGULATED VOLATILE ORGANIC CHEMICALS (VOC'S)				
Benzene	71-43-2	5	<0.50	U
Carbon Tetrachloride	56-23-5	5	<0.50	U
Chlorobenzene	108-90-7	100	<0.50	U
1,2-Dichlorobenzene	95-50-1	600	<0.50	U
1,4-Dichlorobenzene	106-46-7	75	<0.50	U
1,2-Dichloroethane	107-06-2	5	<0.50	U
1,1-Dichloroethene	75-35-4	7	<0.50	U
cis-1,2-Dichloroethene	156-59-2	70	<0.50	U
trans-1,2-Dichloroethene	156-60-5	100	<0.50	U
1,2-Dichloropropane	78-87-5	5	<0.50	U
Ethylbenzene	100-41-4	700	<0.50	U
Methylene Chloride	75-09-2	5	<0.50	U
Styrene	100-42-5	100	<0.50	U
Tetrachloroethene	127-18-4	5	<0.50	U
Toluene	108-88-3	1000	<0.50	U
1,2,4-Trichlorobenzene	120-82-1	70	<0.50	U
1,1,1-Trichloroethane	71-55-6	200	<0.50	U
1,1,2-Trichloroethane	79-00-5	5	<0.50	U
Trichloroethene	79-01-6	5	<0.50	U
Vinyl Chloride	75-01-4	2	<0.50	U
m+p-Xylenes	108383/106423		<0.50	U
o-Xylene	95-47-6		<0.50	U
Total Xylenes		10000	<0.50	U
REGULATED VOC'S: TRIHALOMETHANES				
Bromodichloromethane	75-27-4	Total	<0.50	U
Bromoform	75-25-2	of all	<0.50	U
Chlorodibromomethane	124-48-1	four	<0.50	U
Chloroform	67-66-3	100	<0.50	U
OTHER EPA LISTED VOC'S				
Bromobenzene	108-86-1	NR	<0.50	U
Bromochloromethane	74-97-5	NR	<0.50	U
Bromomethane	74-83-9	NR	<0.50	U
n-Butylbenzene	104-51-8	NR	<0.50	U
sec-Butylbenzene	135-98-8	NR	<0.50	U
tert-Butylbenzene	98-06-6	NR	<0.50	U
Chloroethane	75-00-3	NR	<0.50	U
Chloromethane	74-87-3	NR	<0.50	U
2-Chlorotoluene	95-49-8	NR	<0.50	U
4-Chlorotoluene	106-43-4	NR	<0.50	U
1,2-Dibromo-3-chloropropane	96-12-8	NA	<0.50	U

(report continued on page 2)

EPA METHOD 524.2
VOLATILE ORGANICS ANALYSIS REPORT (continued)

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	EPA MCL	RESULT	QUALIFIER
1,2-Dibromoethane	106-93-4	NA	<0.50	U
Dibromomethane	74-95-3	NR	<0.50	U
1,3-Dichlorobenzene	541-73-1	NR	<0.50	U
Dichlorodifluoromethane	75-71-8	NR	<0.50	U
1,1-Dichloroethane	75-34-3	NR	<0.50	U
1,1-Dichloropropene	563-58-6	NR	<0.50	U
1,3-Dichloropropane	142-28-9	NR	<0.50	U
cis-1,3-Dichloropropene	10061-01-5	NR	<0.50	U
trans-1,3-Dichloropropene	10061-02-6	NR	<0.50	U
2,2-Dichloropropane	594-20-7	NR	<0.50	U
Fluorotrichloromethane	75-69-4	NR	<0.50	U
Hexachlorobutadiene	87-68-3	NR	<0.50	U
Isopropylbenzene	98-82-8	NR	<0.50	U
p-Isopropyltoluene	99-87-6	NR	<0.50	U
Naphthalene	91-20-3	NR	<0.50	U
n-Propylbenzene	103-65-1	NR	<0.50	U
1,1,1,2-Tetrachloroethane	630-20-6	NR	<0.50	U
1,1,2,2-Tetrachloroethane	79-34-5	NR	<0.50	U
1,2,3-Trichlorobenzene	87-61-6	NR	<0.50	U
1,2,3-Trichloropropane	96-18-4	NR	<0.50	U
1,2,4-Trimethylbenzene	95-63-6	NR	<0.50	U
1,3,5-Trimethylbenzene	108-67-8	NR	<0.50	U

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
1,2-Dichloroethane d4	10.0	10.3	103	80--120
Toluene d8	10.0	10.1	101	80--120
p-Bromofluorobenzene	10.0	10.2	102	80--120

QUALIFIER CODES EXPLANATION:

U= Indicates compound was analyzed for but not detected.

NR= No currently regulated amount.

NA= Not applicable to this method. Concentrations are presented for screening purposes. For regulatory compliance, analyze using EPA method 504 which has lower detection limits.

REPORT COMMENTS: None

Analyst: JJC Reviewing Supervisor: MTB

Quality Control Sample: Laboratory Reagent Blank 26-DEC-1995 18:20
Report Date: 12/27/95
Extraction Method: EPA 525.2
Extraction Date: 04-DEC-1995 00:00
Sample Matrix: WATER
File: /disk3/svdata2/sa122695.b/26DEC0101001.d
Remarks: This Laboratory Reagent Blank Quality Control Sample was extracted and analyze with your set of samples to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

EPA METHOD 525.2
SEMI-VOLATILE ORGANICS ANALYSIS REPORT

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	EPA MCL	RESULT	QUALIFIER
Atrazine	1912-24-9	3	<0.10	U
Benzo(a)pyrene	50-32-8	0.2	<0.10	U
Butachlor	23184-66-9	NR	<0.10	U
bis(2-ethylhexyl)Phthalate	117-81-7	6	<2.0	U
di(2-ethylhexyl)adipate	103-23-1	400	<0.50	U
Metolachlor	51218-45-2	NR	<0.10	U
Metribuzin	21087-64-9	NR	<0.10	U
Propachlor	1918-16-7	NR	<0.10	U
Simazine	122-34-9	4	<0.10	U

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Perylene-d12	5.00	3.61	72	60--140

QUALIFIER CODES EXPLANATION:

U= Indicates compound was analyzed for but not detected or in the case of phthlate and adipate esters the compound was not detected above laboratory background.

NR= No currently regulated amount.

REPORT COMMENTS: None

Analyst: _____ Reviewing Supervisor: _____

EPA METHOD 525.2 BLANK SPIKE REPORT

Quality Control Sample: Certified Reference Sample Analysis 26-DEC-95 18:56
Report Date: 12/27/95
Extraction Method: EPA 525.2
Extraction Date: 04-DEC-1995 00:00
Sample Matrix: WATER
File: /disk3/svdata2/sa122695.b/26DEC0201002.d
Remarks: This certified reference sample was spiked into a blank sample matrix then extracted and analyzed with your set of samples to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate results.

CONCENTRATION UNITS = ug/L (ppb)

Spike Compound	Added	Measured	%Rec	QC Limits
Atrazine	2.00	2.07	103	60--140
Benzo(a)pyrene	2.00	1.43	72	60--140
Butachlor	2.00	2.02	101	60--140
bis(2-ethylhexyl)Phthalate	2.00	2.46	123	60--140
di(2-ethylhexyl)adipate	2.00	2.52	126	60--140
Metolachlor	2.00	2.26	113	60--140
Metribuzin	2.00	1.85	93	60--140
Propachlor	2.00	2.61	131	60--140
Simazine	2.00	2.40	120	60--140

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Perylene-d12	5.00	3.97	79	60--140

REPORT COMMENTS: None

Analyst: _____ Reviewing Supervisor: _____

EPA METHOD 525.2 BLANK SPIKE REPORT

Quality Control Sample: Certified Reference Sample Analysis 26-DEC-95 18:56
Report Date: 12/27/95
Extraction Method: EPA 525.2
Extraction Date: 04-DEC-1995 00:00
Sample Matrix: WATER
File: /disk3/svdata2/sal22695.b/26DEC0201002.d
Remarks: This certified reference sample was spiked into a blank sample matrix then extracted and analyzed with your set of samples to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate results.

CONCENTRATION UNITS = ug/L (ppb)

Spike Compound	Added	Measured	%Rec	QC Limits
Atrazine	2.00	2.07	103	60--140
Benzo(a)pyrene	2.00	1.43	72	60--140
Butachlor	2.00	2.02	101	60--140
bis(2-ethylhexyl)Phthalate	2.00	2.46	123	60--140
di(2-ethylhexyl)adipate	2.00	2.52	126	60--140
Metolachlor	2.00	2.26	113	60--140
Metribuzin	2.00	1.85	93	60--140
Propachlor	2.00	2.61	131	60--140
Simazine	2.00	2.40	120	60--140

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
Perylene-d12	5.00	3.97	79	60--140

REPORT COMMENTS: None

Analyst: _____ Reviewing Supervisor: _____

Appendix 5.5.1-C

2008 Tailing Basin Boring Logs

LOG OF Boring SB-08-1

SHEET 1 OF 1

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/11/08 Ended 12/11/08
Logged By MMB

Elevation 5362.7
Total Depth 22.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		1	50-3"--					SLAG: Fused light gray slag. Hole advanced with auger. Cuttings are silty gravel slag.	
		2	21-20-11-9	None None	Dry			SLAG: Gray silty sand with gravel.	5360
5		3	7-7-6-7	None None	Moist				
		4	10-3-3-2	None None				TAILINGS: Very dark gray to black silt with up to 20% sand.	5355
		5	5-2-4-17	None None	Wet				
10								Sand with silt, twigs, and grass from 9.5 to 10'.	
		6	6-9-10-12	None None	Dry			SILT: Light olive brown (2.5Y 5/3) to pale yellow (2.5Y 7/3) silt, non-plastic, low toughness.	
					Moist			Contains 15% sand, mica flakes, and grass in matrix from 11 to 12'.	
		7	10-14-14-25	None None				Laminated with low to no plasticity, moderate toughness from 12 to 18'.	5350
15		8	16-18-20-20	None None		ML			
		9	14-12-28-36	None None					5345
		10	12-24-40-54	None None				SILT: Light olive brown silt with fine-grained sand.	
20					Moist	ML		One 3" very pale yellow horizon.	
		11	12-24-40-54	None None					
								End of Boring - 22 feet	5340
25									5335

Barr Engineering Co.
4700 West 77th Street, Suite 200
Minneapolis, MN 55435-4803
Telephone: (952) 832-2600
Fax: (952) 832-2601

Remarks: Analytical samples: SB-08-1 8-11', SB-08-1 11-12' and SB-08-1 19-21'

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-2

SHEET 1 OF 1

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/11/08 Ended 12/11/08
Logged By MMB

Elevation 5364.0
Total Depth 28.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		1	39-42-19-17	None None	Dry			SLAG: Gray slag, 40% gravel, 50-55% sand.	
		2	14-18-11-7	None None					5360
5		3	7-6-5-6	None None					
		4	5-3-3-3	None None	Moist				
		5	4-4-5-1	None None					5355
10		6	1-1-2-4	None None	Wet			TAILINGS: Very dark gray (2.5Y 3/1), fine-grained tailings, silt with some sand, both bedded and homogenous, occassionally whitish, irregular shaped blebs that have a jelly-like texture.	
		7	1-2-1-2	None None					5350
15		8	1-2-5-8	None None				Light yellowish brown (2.5Y 6/3) silty sand with rootlets from 15.5 to 16'.	
		9	2-2-6-7	None None	Moist			Light yellowish brown soil from 17.5 to 18'.	
		10	4-6-12-13	None None	Moist -Wet			Light yellowish brown soil from 19 to 19.5'.	5345
20		11	4-9-17-15	None None		CL		CLAY: Light yellowish brown clay with some fine-grained sand, occasional white precipitate in irregular lenses.	
		12	4-6-7-9	None None	Moist				5340
25		13	3-4-10-14	None None	Moist	SM		SILTY SAND: Light yellowish brown, homogenous, low plasticity, some clay possible.	
		14	9-16-18-29	None None	Moist -Wet	SC/SP		SAND with CLAY: Light yellowish brown, bedded sandy clay and silty sand. Beds are 1 to 3" thick.	
								End of Boring - 28 feet	5335

Barr Engineering Co.
4700 West 77th Street, Suite 200
Minneapolis, MN 55435-4803
Telephone: (952) 832-2600
Fax: (952) 832-2601

Remarks: Analytical samples: SB-08-2 26-28', SB-08-2 17.5-18.5' and SB-08-2 10-14'

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-3

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/11/08 Ended 12/13/08
Logged By MMB

Elevation 5363.6
Total Depth 52.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		1	28-49-78-40	None None	Dry			SLAG: Gray slag, 40% gravel, 50% sand.	
		2	18-17-17-14	None None				TAILINGS: Black (2.5Y 2.5/1), homogenous silty tailings, less than 1% white flecks.	5360
5		3	9-9-50 for 3"-	None None	Moist				
		4	32-50 for 2"--	None None	Dry			SLAG: Gray slag, 70% gravel, 20% sand.	
		5	6-4-2-4	None Pungent	Moist -Wet			TAILINGS: Black to very dark gray (2.5Y 2.5/1), homogenous, silty tailings with 10 to 20% sand, fine-grained, some white flecks, smoking, garlic or onion odor.	5355
10		6	6-9-10-12	None Pungent					
		7	6-5-5-6	None Pungent					5350
15		8	5-2-2-6	None Pungent					
		9	1-1-2-2	None Pungent					
		10	2-2-2-1	None Pungent	Moist			TAILINGS: Grayish brown (2.5Y 5/2), clayey, laminated tailings, lightly smoking.	5345
20		11	2-2-2-1	None Pungent	Moist -Wet			TAILINGS: Very dark gray, homogenous silty tailings, not smoking.	
		12	2-2-4-3	None Faint	Moist			TAILINGS: Very dark gray and light brown (7.5YR 6/4) laminated, clayey tailings, not smoking.	5340
25		13	2-3-2-7	None Faint					
		14	2-4-4-6	None None	Moist -Wet				
		15	4-4-5-2	None None					5335
								(continued)	

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Remarks: Analytical samples: SB-08-3 2-6', SB-08-3 13-20', SB-08-3 28-32', SB-08-3 36-40', SB-08-3 42-43' and SB-08-3 50-52'

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-3

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/11/08 Ended 12/13/08
Logged By MMB

Elevation 5363.6
Total Depth 52.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		16	4-4-12-19	None None	Moist -Wet			TAILINGS: Very dark gray and light brown (7.5YR 6/4) laminated, clayey tailings, not smoking.*(continued)*	
					Moist				
		17	4-4-7-6	None None					5330
35		18	3-3-6-9	None None					
		19	4-6-10-16	None None					
		20	3-8-10-17	None None					5325
40		21	4-6-9-14	None None					
		22	9-14-24-32	None Earthy Odor		SM		SILTY SAND: Greenish gray (Gley1 6/GY) silty sand with rootlets, fine-grained, moderate toughness, low plasticity.	5320
45		23	4-7-26-34	None None		ML		SANDY SILT: Greenish gray and light brownish gray silt with fine-grained sand, low plasticity, high toughness.	
		24	14-24-26-40	None None				Abundant red mottles from 46 to 48'.	
		25	17-23-22-31	None None				Thinly bedded (beds 2 to 6" thick) from 48 to 50'.	5315
50		26	14-21-26-44	None None	Moist -Wet	ML/CL		CLAYEY SILT: Light olive gray (5Y 6/2) clayey silt, dense, low plasticity, moderate toughness, abundant green, yellow and red, irregular shaped mottles.	
								End of Boring - 52 feet	5310
55									5305

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Remarks: Analytical samples: SB-08-3 2-6', SB-08-3 13-20', SB-08-3 28-32', SB-08-3 36-40', SB-08-3 42-43' and SB-08-3 50-52'

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-4

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/17/08 Ended 12/18/08
Logged By MMB

Elevation 5360.7
Total Depth 52.0

DEPTH FEET	SAMP. NUMBER	SAMP. LENGTH & RECOVERY	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
	1		46-25-18-9	None None	Dry			SLAG: Blueish gray slag, 90% gravel, 10% sand.	5360
	2		8-5-4-4	None None	Moist			TAILINGS: Very dark gray to light gray silty (10YR 3/1), homogenous tailings. Abundant white flecks and precipitate from 2 to 6' and 8 to 10'.	
5	3		6-6-12-22	None None					5355
	4		4-5-4-3	None None					
	5		9-6-7-5	None None					
10	6		1-1-1-1	None None	Wet			TAILINGS: Very dark gray and brown (10YR 5/3) clayey tailings, very soft. Tailings soft and homogeneous from 10 to 16'.	5350
	7		1-1 for 24"--	None None					
15	8		1-1-2-2	None Faint				Possible faint smoke (or steam in cold air) from 14 to 16'.	5345
	9		2-2-3-4	None None				Tailings laminated from 16 to 40'. Laminae 0.1 to 1.0" thick.	
	10		2-2-3-4	None None					
20	11		4-4-6-7	None None					5340
	12		2-3-3-6	None None					
25	13		2-2-2-5	None None					5335
	14		2-2-5-6	None None					
	15		2-2-2-3	None None	Wet				

(continued)

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Remarks: Analytical samples: SB-08-4 6-12', SB-08-4 18-24', SB-08-4 32-38', SB-08-4 40.5-41.5' and SB-08-4 50-52'

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-4

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/17/08 Ended 12/18/08
Logged By MMB

Elevation 5360.7
Total Depth 52.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		16	2-2-2-2	None None	Wet			TAILINGS: Very dark gray and brown (10YR 5/3) clayey tailings, very soft.*(continued)*	5330
		17	2-2-3-3	None None				Tailing is very sticky, tough, and dense below 32'.	
35		18	2-1-2-4	None None					5325
		19	2-2-2-4	None None					
		20	2-2-2-4	None None					
40		21	2-9-11-17	None None	Wet	SM		SILTY SAND: Light yellowish brown (2.5Y 6/3) to olive gray (5Y 5/2), fine to medium-grained silty sand, moderately dense. Several fine to coarse-grained sand seams.	5320
		22	9-14-19-29	None None	Moist				
45		23	8-10-14-22	None None	Dry -Moist	SP		SAND: Light yellowish brown (10YR 6/4), fine to coarse-grained sand, sand is angular and poorly sorted.	5315
		24	9-9-11-12	None None				SILT: Pale brown (10YR 6/3), homogenous silt, some cemented silt, non-plastic, low to moderate toughness, dense.	
		25	5-7-10-9	None None	Moist -Wet	ML			
50		26	8-11-14-20	None None	Wet				5310
								End of Boring - 52 feet	
55									5305

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Remarks: Analytical samples: SB-08-4 6-12', SB-08-4 18-24', SB-08-4 32-38', SB-08-4 40.5-41.5' and SB-08-4 50-52'

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-5

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/16/08 Ended 12/17/08
Logged By MMB

Elevation 5371.9
Total Depth 56.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
			50 for 2"---		Dry			SLAG: Gray slag, 40% gravel, 55% sand.	5370
		1	7-4-5-5	None None				TAILINGS: Very dark gray (2.5Y 3/1), fine-grained tailings with white flecks, silty, smoking.	
					Moist			Silty tailings from 3 to 11'.	
5		2	10-11-9-14	None None					
		3	21-21-23-?	None Pungent					5365
		4	7-14-14-14	None Pungent					
10		5	6-6-5-5	None Pungent					
		6	3-2-2-4	None Pungent				TAILINGS: Very dark gray and light brownish gray, laminated, clayey, smoking.	5360
		7	5-50 for 3"--	None None		CL		Silty tailings from 14 to 20', somewhat granular, very dark gray with white flecks, smoking.	
15		8	20-20-22-23	None Faint	Dry -Moist				5355
		9	8-4-3-4	None Faint	Moist - Wet				
20					Wet				
		10	2-1-3-4	None None				TAILINGS: Clayey, laminated, very dark gray and grayish brown, faintly smoking (or steam in cold air).	5350
		11	2-2-3-3	None None					
25		12	2-2-2-4	None None		CL			
		13	2-2-2-4	None None					5345
		14		None Faint					

(continued)

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Remarks: Analytical samples: SB-08-5 4-10', SB-08-5 16-22', SB-08-5 28-36', SB-08-5 42-44', SB-08-5 46-47' and SB-08-05 54-56'; Water in augers at 40.9' bgs after 12 hours.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-5

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/16/08 Ended 12/17/08
Logged By MMB

Elevation 5371.9
Total Depth 56.0

DEPTH FEET	SAMP. NUMBER	SAMP. LENGTH & RECOVERY	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
	15		12-11-12-18	None None	Wet	CL		TAILINGS: Clayey, laminated, very dark gray and grayish brown, faintly smoking (or steam in cold air).*(continued)* Silty tailings, homogenous, faint smoking from 30 to 32'.	
	16		4-4-5-9	None Faint					5340
35	17		6-6-10-12	None Faint	Moist -Wet			TAILINGS: Laminated, clayey, very dark gray and brownish gray, faintly smoking (or steam in cold air).	
	18		6-9-12-21	None None					5335
	19		6-8-6-10	None None		CL			
40	20		4-4-4-5	None None					
	21		4-4-5-7	None None					5330
	22		5-5-6-12	None None					
45	23		17-20-27-31	None None	Dry			CLAYEY SILT: Light yellowish brown (10YR 6/4), low plasticity, moderate toughness, 20% fine-grained sand.	5325
	24		8-9-17-21	None None	Moist -Dry	ML/CL			
50	25		12-13-22-39	None None				white precipitate in thin soil partings.	
	26		21-22-20-19		Moist	SM		SILTY SAND: Light yellowish brown, fine-grained silty sand.	5320
55	27		14-11-24-46	None None		ML		SILT with SAND: Light olive brown (2.5Y 5/3), homogenous, dense, mica flakes, non-plastic, low toughness.	
								End of Boring - 56 feet	5315

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Remarks: Analytical samples: SB-08-5 4-10', SB-08-5 16-22', SB-08-5 28-36', SB-08-5 42-44', SB-08-5 46-47' and SB-08-05 54-56'; Water in augers at 40.9' bgs after 12 hours.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11

LOG OF Boring SB-08-6

SHEET 1 OF 1

Client Rhodia
Project Name Rhodia RFI
Number 26/46-006
Location Silver Bow, Montana

Drill Contractor O'Keefe
Drill Method HSA
Drilling Started 12/13/08 Ended 12/13/08
Logged By MMB

Elevation 5363.5
Total Depth 22.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Blows/6 in.	Discoloration-Odor	Moisture	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		1	50 for 3"---	None None	Dry			SLAG: Gray, dense, compacted slag, 65% gravel, 25% sand. Contains some very dark grayish brown sand and silt.	
		2	41-50 for 4"--	None None					5360
5		3	41-37-30-26	None None				FILL: Sand with silt and gravel, clasts are fine-grained to coarse-grained. Reddish yellow (7.5YR 7/6) from 5 to 6'. (SILICA) Very dark gray (2.5Y 3/1) from 6 to 8'.	
		4	50 for 3"---	None None	Moist				
					Dry			Light blueish gray and light greenish gray from 8 to 9'.	5355
		5	47-23-11-4	None None	Moist			TAILINGS: Very dark gray, fine-grained tailings with white flecks, not smoking.	
10		6	8-6-2-2	None Faint				TAILINGS: Very dark to medium grayish brown, clayey, laminated, not smoking.	
		7	8-14-16-16	None None	Moist	SP-SM		SILTY SAND: Brown (10YR 4/3), fine to medium-grained, mica flakes.	5350
15		8	12-14-12-8	None None		ML/SM		BEDDED SILT and SILTY SAND: Yellowish brown (10YR 5/6), non-plastic, low toughness. Beds 2 to 6" thick.	
		9	17-27-30-39	None None					
		10	18-22-26-29	None None	Moist			SILT: Light yellowish brown (10YR 6/4), low plasticity, moderate toughness, with possible clay.	5345
20		11	14-20-36-37	None None		ML			
								End of Boring - 22 feet	5340
25									5335

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Remarks: Analytical samples: SB-08-6 9-12', SB-08-6 12-13' and SB-08-6 20-22';
Thin fiberglass in sampler at 5'.

BGS = "below ground surface"
Additional data may have been collected in the field which is not included on this log.

ENVIRO LOG 5 (5/27/04) 2646006.GPJ BARR JAN06.GDT 3/18/11