SWMU 10 -- Coal Stockpile Area

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5.5.10 Coal Stockpile Area

The location of Solid Waste Management Unit (SWMU) 10 is shown on Figure 5.5.10-1a and SWMU 10 monitoring stations and sample locations are provided on Figure 5.5.10-1b. SMWU 10, the Coal Stockpile Area, is where coal was stockpiled near the kilns and served as an auxiliary fuel. The coal stockpile covered approximately 0.25 acres (*see* Figure 5.5.10-1b), but the stockpile is no longer present. Some coal residuals remain at the surface, are mixed with the surface soil, and/or covered by a thin layer of slag. Coal is a relatively homogeneous carbon material that is naturally occurring.

The objectives of the RFI work for SWMU 10 were to evaluate the lateral and vertical extent of hazardous constituents within the Coal Stockpile Area. Specifically, this was accomplished by characterizing the hazardous constituent concentrations in the soils and evaluating the vertical and horizontal extent by laboratory analysis of soil samples coupled with visual soil classification.

5.5.10.1 RFI Activities

Three rounds of investigation activities were conducted at the Coal Stockpile Area. The first round, in 2006, involved sampling at two pre-determined depth intervals at locations randomly selected within the SWMU. The second round, in 2009, was designed to fill analytical data gaps identified based on the 2006 investigation data. The third round, in 2012, was to further define the extent of coal fines in SWMU 10 to the north, east and south of the former coal stockpile.

5.5.10.1.1 2006 Investigation Activities

SWMU 10 was included in the XRF Pilot Test Program implemented in 2006. Section 5.4.2 provides a detailed evaluation of the XRF Pilot Test Program. Soil samples were collected from 6 locations (*see* Figure 5.5.10-1b) from the 0- to 2-inch and 2- to 12-inch depth interval (total of 12 samples). The discrete soil samples were analyzed for metals using EPA Method 6200 Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment. Two confirmatory (i.e., split) samples were collected at CS-2 and analyzed at a commercial analytical laboratory for comparison to the XRF data. The confirmatory samples from SWMU 10 were also analyzed for SVOCs.

For sampling locations CS-1, CS-2, CS-4 and CS-5, the surface soil generally consisted of silty gravel comprised of slag, vermiculite and/or silica rock. Coal fines and coal up to ½ inch diameter were observed starting from a range of 4 to 6-inches below ground surface and 1 to greater than 6 inches in thickness. Sample locations CS-3 and CS-6 did not encounter slag, vermiculite, silica rock, coal or coal fines.

5.5.10.1.2 2009 Investigation Activities

The 2009 investigation program provided specific sample confirmation. Samples were recollected from the 0 to 2-inch interval at CS-1 and the 0-2 inch and 2-12 inch intervals at CS-4. The original samples from these locations exhibited XRF concentrations greater than the threshold limit for lead and/or cadmium. The follow-up samples were analyzed for the specific metal at the commercial analytical laboratory. These samples were also analyzed for SVOCs.

5.5.10.1.3 2012 Investigation Activities

Six test pits were excavated with a rubber tire backhoe to further define the extent of coal fines in SWMU 10. Test pits were dug and surface soil samples were collected to the north, east and south of the former coal stockpile location (*see* Figure 5.5.10-1b). The extent of coal fines has been delineated by visual observation with the exception of Test Pit 2 where a thin lens of coal fines (about 1inch thick) was still present. Underground electrical utility lines impeded additional test pits to the north. The test pit logs are provided in Appendix 5.5.10-A. Soil samples were collected from the 0 to 2-inch depth interval and were analyzed for metals and SVOCs. The laboratory included total phosphorus in their lab report even though it was not on the parameter list for this SWMU. Therefore, the total phosphorus data is not addressed in this report.

5.5.10.2 RFI Results

5.5.10.2.1 Extent of Coal Fines and Hazardous Constituents

This section discusses the extent of coal fines and hazardous constituents present in the coal fines area based on the data set of samples from the SWMU. The SWMU sample data are summarized in Tables 5.5.10-1 and 5.5.10-2 for metals and SVOCs, respectively. The data presentation in Figures 5.5.10-2 through 5.5.10-19, show the locations, sample dates, concentrations and depth intervals for the data included on the figures.

Soil data from SWMU 10 were compared to the background/reference area concentrations. Concentrations above the 95% upper confidence limit of the mean background/reference area concentrations are highlighted on the constituent delineation figures presented in this section. Where a 95% upper limit could not be calculated, the maximum detected concentration or the maximum detection limit was selected.

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).

The locations of two conceptual cross sections through the coal storage area are shown on Figure 5.5.10-20 and are depicted on Figures 5.5.10-21 and 5.5.10-22. The conceptual cross sections are based on the soil descriptions for the sampling stations collected during the 2006 and 2012 sampling events Following the 2012 investigation, the extent of coal fines has been delineated to the south, east and west. A thin lens of coal fines was still present in the northern-most test pits. Additional test pits to the north were prohibited by underground electrical utilities.

5.5.10.2.2 Metals

The analytical laboratory and correlated XRF data were combined to assist the delineation of the hazardous constituents in the coal stockpile area. Hazardous constituent concentrations based on the XRF data were estimated using the linear equations presented in Section 5.4.2 for the respective hazardous constituents. The correlation coefficient (R^2) is greater than 0.7 for these hazardous constituents. The metals data are presented in Table 5.5.10-1. The 2006 XRF evaluations provided correlated data for arsenic, cadmium, chromium, copper, iron, lead, nickel, and zinc. The 2009 XRF evaluation provided data for arsenic, cadmium, chromium, lead, manganese, selenium, silver, uranium, vanadium and zinc.

5.5.10.2.2.1 Metals - Group A

The metals included in Group A are arsenic, cadmium, chromium and copper. The distribution of these metal constituents in the 0 to 2-inch; the 2 to 12-inch; are shown on Figures 5.5.10-2 and 5.5.10-3, respectively.

These metals are naturally present in native soils across the United States. The arsenic and copper concentrations for SWMU 10 are consistent with the background/reference area concentrations. Cadmium and chromium are present at concentrations above the background/reference area concentrations. The elevated concentrations are associated with the samples collected from locations where slag was present at the surface (i.e., CS-1, CS-2, CS-4, CS-5, CS-7, CS-8 and CS-9) and the samples from the deeper interval have lower concentrations.

5.5.10.2.2.2 Metals - Group B

The metals included in Group B are iron, lead, manganese and nickel. The distribution of these metal constituents in the 0 to 2-inch and the 2 to 12-inch intervals are shown on Figures 5.5.10-4 and 5.5.10-5, respectively.

These metals are naturally present in native soils across the United States. Iron and manganese are consistent with the background/reference area concentrations. Although manganese was not sufficiently correlated between the XRF and laboratory data to calculate XRF correlated concentrations, the XRF results summarized in Table 1 of Appendix 5.4.2-A, demonstrate that the XRF instrument tends to overestimate the actual concentration. The slope factor for the best-fit linear equation is less than 1 so the actual concentration would be less than XRF instrument concentration. The highest XRF instrument concentration for manganese (i.e., 620 mg/kg) is still less than the maximum concentration in the background/reference area concentrations.

Iron and manganese concentrations for SWMU 10 are consistent with the background/reference area concentrations. Lead and nickel concentrations are present at concentrations above the background/reference area concentrations. The higher concentrations are associated with the samples collected from locations where slag was present at the surface (i.e., CS-1, CS-2, CS-4, CS-5, CS-7, CS-8, and CS-9) and the samples from the deeper interval have lower concentrations that are consistent with background/reference area concentrations.

5.5.10.2.2.3 Metals - Group C

The metals included in Group C are selenium, silver, uranium, vanadium and zinc. The distribution of these metal constituents in the 0 to 2-inch and the 2 to 12-inch intervals are shown on Figures 5.5.10-6 and 5.5.10-7, respectively.

These metals are naturally present in native soils across the United States. The concentrations for these metals are above the background/reference area concentrations. Slag was present in the 0- to 4-inch depth interval at CS-2 so the 0- to 2-inch sample contained slag. The 2- to 12-inch sample contained less slag and was mostly coal. This sample has lower metals concentrations although the selenium, and uranium concentrations remain above the background/reference area concentrations.

5.5.10.2.2.4 Metals - Group D

The metals included in Group D are barium, beryllium, cobalt, mercury and thallium. The distribution of these metal constituents in the 0 to 2-inch and the 2 to 12-inch intervals are shown on Figures 5.5.10-8 and 5.5.10-9, respectively.

These metals are present in native soils across the United States. Cobalt concentrations are consistent with concentrations from the background data set. Mean and maximum barium, beryllium, mercury and thallium concentrations are above their respective background/reference area concentrations and are considered above background.

5.5.10.2.2.5 Metals - Group E

The metals included in Group E are antimony, calcium, magnesium, potassium, and sodium. The distribution of these metal constituents in the 0 to 2-inch and the 2 to 12-inch intervals are shown on Figures 5.5.10-10 and 5.5.10-11, respectively.

Antimony, calcium, magnesium, potassium and sodium are present at concentrations above the background/reference area concentrations. Calcium, magnesium, potassium and sodium are not hazardous constituents.

5.5.10.2.3 Metals Delineation

The following metals were identified as above background based on comparison to the background/reference area values: antimony, barium, beryllium, calcium, cadmium, chromium, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc. The various metals identified as above background were from the 0-2 inch and/or 2-12 samples collected at stations CS-1, CS-2, CS-4, CS-5, CS-7, CS-8 and/or CS-9. These sample locations contained various amounts of slag and/or coal fines as shown on the conceptual cross section A-A' provided as Figure 5.5.10-21. Slag also has elevated concentrations for many of these metals. The detected metals concentrations tend to decrease with depth with the exception of arsenic at CS-1, where the 0-2 inch sample had a concentration of less than 21 mg/kg and 2-12 sample had a concentration of 24 J mg/kg, and barium at CS-2 where the 0-2 inch samples had a concentration of 255 J mg/kg and the 2-12 inch sample was reported as 361 J mg/kg. However, slag and/or coal were present at this sampling location to a depth of 11 inches.

The four samples collected from stations CS-3 and CS-6 were either not detected in these samples or the concentrations are consistent with the background values. Slag and/or coal fines were not observed at sample stations CS-3 and CS-6. The east to west conceptual cross section B-B' through sample stations CS-3 and CS-2 is shown on Figure 5.5.10-21. The analytical results for these samples are consistent with background/reference area concentrations.

5.5.10.2.4 SVOCs

The SVOC data are presented in Table 5.5.10-2. Eight samples were collected and submitted for laboratory analysis from SWMU 10. The majority SVOCs detected in the SWMU 10 samples belong to a subgroup of SVOCs known as polynuclear aromatic hydrocarbons (PAHs). These multi-benzene-ringed compounds are naturally present in coal. EPA has identified seven PAH constituents as potentially carcinogenic to humans. These potential carcinogens are identified as cPAHs. The

other 13 PAH compounds below are considered by the EPA as not cancer-causing constituents and are identified as nPAHs.

Although PAHs are ubiquitous in the environment (e.g. from forest fires), Montana has not published background concentrations. For the purposes of this SWMU evaluation, the PAHs detected in the SWMU samples are discussed.

5.5.10.2.4.1 cPAHs - Group A

The cPAHs included in Group A are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene and benzo(k)fluoranthene. All of these cPAHs were detected in one or more samples from the SWMU and are considered above background. The distribution of these cPAH constituents in the 0 to 2-inch; the 2 to 12-inch intervals are shown on Figures 5.5.10-12 and 5.5.10-13, respectively. A diagram showing the general trend with depth is shown on Figure 5.5.10-23 and depicts the benzo(a)anthracene concentration profile as an example for the trends for the cPAHs – Group A.

Benzo(a)anthracene was detected at concentrations ranging 0.026 J mg/kg for the sample from the 0-2 inch interval collected from station CS-1 in 2006 to 0.14 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4 in 2009. Benzo(a)pyrene was detected at concentrations ranging from 0.027 J mg/kg for the sample from the 0-2 inch interval collected from station CS-1 to 0.15 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4 in 2009. Benzo(b)fluoranthene was detected at concentrations ranging from 0.034 J mg/kg for the sample from the 0-2 inch interval collected from station CS-1 to 0.19 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4. Benzo(k)fluoranthene was reported at concentrations ranging from not detected at 0.020 mg/kg for the sample from the 0-2 inch interval collected from station CS-1 to 0.072 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4 in 2009.

5.5.10.2.4.2 cPAHs - Group B

The cPAHs included in Group B are chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The distribution of these cPAH constituents in the 0 to 2-inch and the 2 to 12-inch intervals are shown on Figures 5.5.10-14 and 5.5.10-15, respectively. A diagram showing the general trend with depth is shown on Figure 5.5.10-23 and depicts the chrysene concentration profile as an example for the trends for the cPAHs – Group B.

Chrysene was detected at concentrations ranging from 0.029 J mg/kg for the sample from the 0-2 inch interval collected from station CS-1 in 2009 to 0.21 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4 in 2009. Dibenz(a,h)anthracene was only detected at a concentration

of 0.013 mg/kg from station CS-7 at the 0-2 inch interval. Indeno(1,2,3-cd)pyrene was reported at concentrations ranging from not detected at 0.032 mg/kg for the sample from the 0-2 inch interval collected from station CS-8 to 0.16 J mg/kg for the sample collected from the 2-12 inch interval of station CS-2.

5.5.10.2.4.3 nPAHs - Group A

The nPAHs included in Group A are acenaphthene, acenaphthylene, anthracene, benzo(g,h,i)perylene, dibenzofuran, di-n-butyl phthalate, and fluoranthene. The distribution of these nPAH constituents in the 0 to 2-inch; the 2 to 12-inch are shown on Figures 5.5.10-16 and 5.5.10-17, respectively. A diagram showing the general trend with depth is shown on Figure 5.5.10-25 and depicts the benzo(g,h,i)perylene concentration profile as an example for the trends for the nPAHs – Group A.

Acenaphthene and acenaphthylene were only detected at station CS-7 from the 0-2 inch interval; the reported concentrations were 0.0099 J mg/kg and 0.014 mg/kg, respectively. Anthracene was detected in CS-4 at a concentration of 0.061 J mg/kg for the sample collected from the 2-12 inch interval and at station CS-7 at a concentration of 0.05 mg/kg for the sample collected from the 0-2 inch interval. Benzo(g,h,i)perylene was detected at concentrations ranging from 0.022 J mg/kg for the 0-2 inch interval collected from station CS-1 to 0.081 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4. Fluoranthene was detected at concentrations ranging from 0.047 J mg/kg for the sample from the 0-2 inch interval collected from CS-8 to 0.43 J mg/kg for the sample collected from the 2-12 inch interval of CS-4.

5.5.10.2.4.4 nPAHs - Group B

The nPAHs included in Group B are 2-methylnaphthalene, carbazole, fluorene, naphthalene, phenanthrene, and pyrene. The distribution of these nPAH constituents in the 0 to 2-inch and the 2 to 12-inch intervals are shown on Figures 5.5.10-18 and 5.5.10-19, respectively. A diagram showing the general trend with depth is shown on Figure 5.5.10-26 and depicts the pyrene concentration profile as an example for the trends for the nPAHs – Group B.

2-Methylnaphthalene was detected at concentrations ranging from 0.012 mg/kg for the sample from the 0-2 inch interval collected from station CS-7 to 0.059 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4. Carbazole and fluorene were only detected from the 0-2 inch interval collected from station CS-7 at concentrations of 0.031 mg/kg and 0.028 mg/kg respectively. Naphthalene was detected at concentrations ranging from 0.017 J mg/kg at the 0-2 inch sample at CS-1 and from the 0-2 inch interval collected from station CS-4 to 0.056 J mg/kg for the sample

collected from the 2-12 inch interval of station CS-4. Phenanthrene was detected at concentrations ranging from 0.034 J mg/kg for the sample from the 0-2 inch interval collected from station CS-1 to 0.26 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4. Pyrene was detected at concentrations ranging from 0.047 J mg/kg for the sample from the 0-2 inch interval collected from station CS-1 to 0.52 J mg/kg for the sample collected from the 2-12 inch interval of station CS-4.

5.5.10.2.4.5 Other SVOCs

Five (5) other SVOCs constituents were detected in at least one sample. Three of the constituents (bis(2-ethylhexyl)phthalate, benzylbutylphthalate, and di-n-butylphthalate) are lab contaminants associated with plastics.

Dibenzofuran was only detected in two samples at a concentration of 0.048 J mg/kg in the 2-12 inch interval at CS-4, and 0.019 mg/kg in the 0-2 inch sample at CS-7. Dibenzofuran was not detected in the field duplicate sample for the 2-12 inch interval at CS-4, collected at the same time, indicating this detection could be a false positive. Phenol was detected in one sample at a concentration of 0.0037 mg/kg for the 0-2 inch sample at CS-7, although this constituent was also detected in the field blank sample collected during the same sampling event.

5.5.10.2.5 SVOC Delineation

PAH compounds were detected in all of the samples analyzed for SVOCs with the exception of the 0-2 inch interval at CS-2. Sources of these constituents are likely not limited to the residual coal fines since PAH constituents were reported in samples that did not contain visible coal fines. The PAHs concentrations may be the result of deposition of fugitive dust from the former coal stockpile or the former coke stockpiles. The PAH constituents could also be from atmospheric deposition from combustion sources. The risk assessment will identify which parameters, if any, are present at concentrations that may warrant corrective measures.

5.5.10.3 Conclusions

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

- The sampling program implemented in SWMU 10 identified shallow coal fines (i.e., black material) remaining in the coal stockpile area. The boundary of this SWMU was defined by plant personnel and the extent of the former coal pile has been delineated by the field investigations. The soil characteristics inside the boundary have been defined.

- A portion of the coal stockpile area has been covered with slag which has contributed metals to the samples collected from SWMU 10. The following metals in SWMU 10 are considered above background because the mean and maximum concentrations are above the mean and maximum concentrations in the background/reference area data set: antimony, barium, beryllium, calcium, cadmium, chromium, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc.

- PAH constituents identified in SWMU 10 are likely from the coal fines present in the soil. Other sources of PAH constituents include fugitive dust from the former coke stockpile and atmospheric deposition from combustion sources.

SWMU 10 has been characterized for constituents related to a coal stockpile (i.e., metals and SVOCs) and 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.

5.5.10.4 References

United States Geological Survey, 2012. Average concentrations of elements in Silver Bow County, Montana. Open-File Report 2004-1001. Accessed December 11, 2012, at http://mrdata.usgs.gov/geochem/county.php?place=f30093&el=P&rf=northwestern.

United States Environmental Protection Agency. 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 5.5.10-1
Soil Data - Metals
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

			Chemical Name	Antimony	Arsenic	Arsenic	Barium	Beryllium	Cadmium	Cadmium	Calcium	Chromium	Chromium	Cobalt	Copper	Copper	Iron	Iron	Lead	Lead	Magnesium	Manganese	Mercury	Nickel	Nickel	Potassium	Selenium
			Analysis Location	Lab	Lab	Field	Lab	Lab	Lab	Field	Lab	Lab	Field	Lab	Lab	Field	Lab	Field	Lab	Field	Lab	Lab	Lab	Lab	Field	Lab	Lab
Background Mean, Exceedances **Bold**				**0.50**	23	**23**	**150**	**0.51**	**1.6**	**1.6**	**3900**	**11**	**11**	**5.9**	**35**	**35**	**19600**	19600	**17**	**17**	**3500**	540	**0.021**	**5.3**	**5.3**	**3000**	**0.41**
Background Maximum, Exceedances Underline				3.9	120	120	290	*1.3*	8.9	8.9	14000	48	48	9.5	301	301	35300	35300	190	190	5700	1100	0.20	21	21	5300	0.70
Background 95% UCL, Exceedances *Italic*				*1.0*	40	40	*170*	*0.55*	*1.1*	*1.1*	*4500*	*12*	*12*	6.1	*64*	*64*	*20600*	20600	*35*	*35*	*3700*	570	*0.038*	*6.0*	*6.0*	*3200*	*0.47*
Location ID	**Sample Date**	**Depth**	**Sample Type**																								
CS-1	09/13/2006	0 - 2 in	N	--	--	< 21	--	--	--	***73 J***	--	--	***330 J***	--	--	***95 J***	--	13600	--	***200***	--	--	--	--	< 65	--	--
CS-1	09/14/2006	2 - 12 in	N	--	--	**24 J**	--	--	--	< 57	--	--	***180 J***	--	--	**61 J**	--	10900	--	**26 J**	--	--	--	--	< 50	--	--
CS-1	05/15/2009	0 - 2 in	N	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***108 J***	--	--	--	--	--	--	--	--
CS-2	09/13/2006	0 - 2 in	N	***3 R***	22 J	**24 J**	***255 J***	< 2 J	***49.1 J***	< 63	130000 J	***174 J***	***250 J***	4 J	***67 J***	***69 J***	17700 J	10900	***140 J***	***93***	***6190 J***	265 J	< 0.1	***28 J***	< 60	***5170 R***	***16 J***
CS-2	09/13/2006	2 - 12 in	N	< 2 R	9 J	10 J	***361 J***	< 2 J	***7.4 J***	< 49	53100 J	***43 J***	< 150	< 2 J	26 J	< 41	6940 J	7000	**21 J**	14 J	1420 J	77 J	***0.2***	***7 J***	< 36	1890 R	***2 J***
CS-3	09/14/2006	0 - 2 in	N	--	--	< 7	--	--	--	< 59	--	--	< 170	--	--	< 49	--	10600	--	14 J	--	--	--	--	< 50	--	--
CS-3	09/14/2006	2 - 12 in	N	--	--	< 6	--	--	--	< 58	--	--	< 170	--	--	< 47	--	10000	--	7 J	--	--	--	--	< 48	--	--
CS-4	09/14/2006	0 - 2 in	N	--	--	< 21	--	--	--	***380***	--	--	***310 J***	--	--	***77 J***	--	12400	--	***240***	--	--	--	--	< 65	--	--
CS-4	09/14/2006	2 - 12 in	N	--	--	< 15	--	--	--	***160***	--	--	***210 J***	--	--	**53 J**	--	9700	--	***190***	--	--	--	--	< 45	--	--
CS-4	05/15/2009	0 - 2 in	N	--	--	--	--	--	***576***	--	--	--	--	--	--	--	--	--	***271***	--	--	--	--	--	--	--	--
CS-4	05/15/2009	2 - 12 in	N	--	--	--	--	--	***49.5***	--	--	--	--	--	--	--	--	--	**25.1 J**	--	--	--	--	--	--	--	--
			FD	--	--	--	--	--	***61.0***	--	--	--	--	--	--	--	--	--	***55.4 J***	--	--	--	--	--	--	--	--
CS-5	09/14/2006	0 - 2 in	N	--	--	14 J	--	--	--	***88 J***	--	--	***310 J***	--	--	***110 J***	--	8800	--	***59 J***	--	--	--	--	***65 J***	--	--
CS-5	09/14/2006	2 - 12 in	N	--	--	11 J	--	--	--	< 59	--	--	< 180	--	--	***79 J***	--	10900	--	**29 J**	--	--	--	--	< 54	--	--
CS-6	09/14/2006	0 - 2 in	N	--	--	10 J	--	--	--	< 59	--	--	< 180	--	--	**50 J**	--	12400	--	**27 J**	--	--	--	--	< 55	--	--
CS-6	09/14/2006	2 - 12 in	N	--	--	8 J	--	--	--	< 59	--	--	< 180	--	--	< 48	--	10000	--	7 J	--	--	--	--	< 52	--	--
CS-7	10/01/2012	0 - 2 in	N	***1.45***	22.5	--	***174***	***1.27 J***	***119***	--	133000	***108***	--	2.48 J	***89.6***	--	12800	--	***38.4 J***	--	***3910***	193	***0.150***	***17.7 J***	--	***4390***	***2.9***
CS-8	10/01/2012	0 - 2 in	N	***2.17***	16.2	--	***256***	***1.15 J***	***91.92***	--	111000	***160***	--	**6.04 J**	***71.9***	--	***24400 J***	--	***238***	--	***5320***	290	***0.192***	***33.1***	--	***4460***	***15.3***
			FD	***2.50***	16.9	--	***303***	***1.47 J***	***75.28***	--	149000	***176***	--	5.16 J	***73.4***	--	***24700 J***	--	***133***	--	***5550***	319	***0.158***	***31.5***	--	***5500***	***16.5***
CS-9	10/01/2012	0 - 2 in	N	***4.13***	21.7	--	***243***	***1.36 J***	***301***	--	146000	***245***	--	5.58 J	***80.0***	--	***25100***	--	***320***	--	***4140***	295	***0.282***	***48.6***	--	***4460***	***26.0***

Table 5.5.10-1
Soil Data - Metals
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

Chemical Name / Analysis Location				Silver Lab	Sodium Lab	Thallium Lab	Uranium Lab	Vanadium Lab	Zinc Lab	Zinc Field
Background Mean, Exceedances **Bold**				**0.73 (1)**	**140**	**0.35**	**1.8**	**41**	**59**	**59**
Background Maximum, Exceedances Underline				1.7 (1)	620	1.0	4.1	83	380	380
Background 95% UCL, Exceedances *Italic*				*0.35 (1)*	*220*	*0.46*	*2.0*	*43*	*98*	*98*
Location ID	**Sample Date**	**Depth**	**Sample Type**							
CS-1	09/13/2006	0 - 2 in	N	--	--	--	--	--	--	***1200***
CS-1	09/14/2006	2 - 12 in	N	--	--	--	--	--	--	***310***
CS-1	05/15/2009	0 - 2 in	N	--	--	--	--	--	--	--
CS-2	09/13/2006	0 - 2 in	N	***3.7 J***	***1470 J***	< 2 J	***46 J***	***162 J***	***588 J***	***840***
CS-2	09/13/2006	2 - 12 in	N	***0.8 J***	***499 J***	< 2 J	***21 J***	***53 J***	**90 J**	***200***
CS-3	09/14/2006	0 - 2 in	N	--	--	--	--	--	--	***140 J***
CS-3	09/14/2006	2 - 12 in	N	--	--	--	--	--	--	**70 J**
CS-4	09/14/2006	0 - 2 in	N	--	--	--	--	--	--	***1800***
CS-4	09/14/2006	2 - 12 in	N	--	--	--	--	--	--	***730***
CS-4	05/15/2009	0 - 2 in	N	--	--	--	--	--	--	--
CS-4	05/15/2009	2 - 12 in	N	--	--	--	--	--	--	--
			FD	--	--	--	--	--	--	--
CS-5	09/14/2006	0 - 2 in	N	--	--	--	--	--	--	***1500***
CS-5	09/14/2006	2 - 12 in	N	--	--	--	--	--	--	***300***
CS-6	09/14/2006	0 - 2 in	N	--	--	--	--	--	--	***240***
CS-6	09/14/2006	2 - 12 in	N	--	--	--	--	--	--	**80 J**
CS-7	10/01/2012	0 - 2 in	N	***3.3 J***	***1210***	***0.652***	***40.2***	***133***	***342***	--
CS-8	10/01/2012	0 - 2 in	N	***3.7 J***	***1260***	***3.650 J***	***33.9***	***168***	***754***	--
			FD	***4.5 J***	***1830***	***1.940 J***	***40.7***	***184***	***832***	--
CS-9	10/01/2012	0 - 2 in	N	***6.9 J***	***1900***	***3.570***	***52.6***	***267***	***1640***	--

Table 5.5.10-2
Soil Data - SVOCs
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

			Chemical Name	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,2-Diphenylhydrazine	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
Location ID	Sample Date	Depth	Sample Type													
CS-1	05/15/2009	0 - 2 in	N	< 0.011	< 0.018	< 0.015	< 0.019	< 0.018	--	< 0.018	< 0.015	< 0.017 R	< 0.016	< 0.12 J	< 0.015	< 0.016
CS-2	09/13/2006	0 - 2 in	N	< 0.34	< 0.34	--	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 1.7	< 0.34	< 0.34
CS-2	09/13/2006	2 - 12 in	N	< 0.38	< 0.38	--	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 1.9	< 0.38	< 0.38
CS-4	05/15/2009	0 - 2 in	N	< 0.011	< 0.018	< 0.015	< 0.019	< 0.018	--	< 0.018	< 0.015	< 0.017	< 0.016 R	< 0.12 R	< 0.015	< 0.016
CS-4	05/15/2009	2 - 12 in	N	< 0.041	< 0.066	< 0.054	< 0.068	< 0.065	--	< 0.063	< 0.053	< 0.061	< 0.056	< 0.42 J	< 0.055	< 0.058
			FD	< 0.021	< 0.034	< 0.028	< 0.035	< 0.033	--	< 0.032 R	< 0.027 R	< 0.031 R	< 0.029 R	< 0.21 R	< 0.028	< 0.030
CS-7	10/01/2012	0 - 2 in	N	< 0.0026	< 0.0024	--	< 0.0023	< 0.0025	--	< 0.0030 R	< 0.0030 R	< 0.0026 R	< 0.0063	< 0.029 J	< 0.0025 R	< 0.0029
CS-8	10/01/2012	0 - 2 in	N	< 0.026	< 0.024	--	< 0.023	< 0.025	--	< 0.03	< 0.03	< 0.026	< 0.063	< 0.29 J	< 0.025	< 0.029
CS-8	10/01/2012	0 - 2 in	FD	< 0.026	< 0.024	--	< 0.023	< 0.025	--	< 0.03	< 0.03	< 0.026	< 0.063	< 0.29 J	< 0.025	< 0.029
CS-9	10/01/2012	0 - 2 in	N	< 0.026	< 0.024	--	< 0.023	< 0.025	--	< 0.03	< 0.03	< 0.026	< 0.063	< 0.29 J	< 0.025	< 0.029

Table 5.5.10-2
Soil Data - SVOCs
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

			Chemical Name	2-Chloronaphthalene	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-Chloroaniline	4-Chlorophenol	4-Chlorophenyl phenyl ether	4-Nitroaniline
Location ID	Sample Date	Depth	Sample Type														
CS-1	05/15/2009	0 - 2 in	N	< 0.010 R	< 0.0099 R	< 0.15 J	**0.017 J**	< 0.017	< 0.014	< 0.027	< 0.18	< 0.013	< 0.017 R	< 0.015	--	< 0.016	< 0.18
CS-2	09/13/2006	0 - 2 in	N	< 0.34	< 0.34	< 1.7	< 0.34	--	< 0.34	< 0.68	--	< 0.34	< 0.34	--	< 0.34	< 0.34	--
CS-2	09/13/2006	2 - 12 in	N	< 0.38	< 0.38	< 1.9	< 0.38	--	< 0.38	< 0.76	--	< 0.38	< 0.38	--	< 0.38	< 0.38	--
CS-4	05/15/2009	0 - 2 in	N	< 0.010	< 0.0099	< 0.15	**0.014 J**	< 0.017	< 0.014	< 0.027 R	< 0.18	< 0.013	< 0.017	< 0.015 R	--	< 0.016	< 0.18
CS-4	05/15/2009	2 - 12 in	N	< 0.037	< 0.037	< 0.53 J	**0.059 J**	< 0.063	< 0.052	< 0.10	< 0.65	< 0.045	< 0.062	< 0.054	--	< 0.059	< 0.66
			FD	< 0.019	< 0.019 R	< 0.27 R	**0.028 J**	< 0.032	< 0.026 R	< 0.051 R	< 0.33	< 0.023	< 0.032 R	< 0.027 R	--	< 0.030	< 0.34
CS-7	10/01/2012	0 - 2 in	N	< 0.0032	< 0.0030 R	< 0.039 R	**0.012**	< 0.0033	< 0.0040	< 0.0041	< 0.0044	< 0.0031	< 0.0029 R	< 0.0026	--	< 0.0032	< 0.0038
CS-8	10/01/2012	0 - 2 in	N	< 0.032	< 0.03	< 0.39 J	< 0.028	< 0.033	< 0.04	< 0.041	< 0.044	< 0.031	< 0.029	< 0.026	--	< 0.032	< 0.038
CS-8	10/01/2012	0 - 2 in	FD	< 0.032	< 0.03	< 0.39 J	< 0.028	< 0.033	< 0.04	< 0.041	< 0.044	< 0.031	< 0.029	< 0.026	--	< 0.032	< 0.038
CS-9	10/01/2012	0 - 2 in	N	< 0.032	< 0.03	< 0.39 J	< 0.028	< 0.033	< 0.04	< 0.041	< 0.044	< 0.031	< 0.029	< 0.026	--	< 0.032	< 0.038

Table 5.5.10-2
Soil Data - SVOCs
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

			Chemical Name	4-Nitrophenol	Acenaphthene	Acenaphthylene	Anthracene	Azobenzene	Benz(a) anthracene	Benzidine	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
Location ID	Sample Date	Depth	Sample Type															
CS-1	05/15/2009	0 - 2 in	N	< 0.15 J	< 0.014	< 0.016	< 0.014	--	**0.026 J**	< 0.42 R	**0.027 J**	**0.034 J**	**0.022 J**	< 0.020	< 0.14	< 0.017	< 0.011	< 0.012
CS-2	09/13/2006	0 - 2 in	N	< 1.7	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.68	< 0.34	< 0.34	< 0.34	< 0.34	--	--	< 0.34	< 0.34
CS-2	09/13/2006	2 - 12 in	N	< 1.9	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.76	< 0.38	**0.21 J**	< 0.38	< 0.38	--	--	< 0.38	< 0.38
CS-4	05/15/2009	0 - 2 in	N	< 0.15	< 0.014	< 0.016	< 0.014	--	**0.030 J**	< 0.42 R	**0.036 J**	**0.048 J**	**0.036 J**	**0.021 J**	< 0.14 R	< 0.017	< 0.011	< 0.012
CS-4	05/15/2009	2 - 12 in	N	< 0.54 J	< 0.050	< 0.059	**0.061 J**	--	**0.14 J**	< 1.6 R	**0.15 J**	**0.19 J**	**0.081 J**	**0.072 J**	< 0.52	< 0.062	< 0.041	< 0.044
			FD	< 0.28 R	< 0.026	< 0.030	< 0.026	--	**0.095 J**	< 0.79 R	**0.073 J**	**0.13 J**	< 0.038	**0.042 J**	< 0.26 R	< 0.032	< 0.021	< 0.022
CS-7	10/01/2012	0 - 2 in	N	< 0.0077	**0.0099 J**	**0.014**	**0.05**	< 0.0035	**0.097**	--	**0.1**	**0.11**	**0.054**	**0.043**	< 0.096 R	< 0.0049	< 0.0028	< 0.0031
CS-8	10/01/2012	0 - 2 in	N	< 0.077	< 0.032	< 0.026	< 0.032	< 0.035	< 0.036	--	**0.039 J**	**0.043 J**	< 0.037	< 0.04	< 0.96 R	< 0.049	< 0.028	< 0.031
CS-8	10/01/2012	0 - 2 in	FD	< 0.077	< 0.032	< 0.026	< 0.032	< 0.035	**0.055 J**	--	**0.057 J**	**0.072 J**	**0.052 J**	< 0.04	< 0.96 R	< 0.049	< 0.028	< 0.031
CS-9	10/01/2012	0 - 2 in	N	< 0.077	< 0.032	< 0.026	< 0.032	< 0.035	**0.051 J**	--	**0.068 J**	**0.082 J**	**0.06 J**	< 0.04	< 0.96 R	< 0.049	< 0.028	< 0.031

Table 5.5.10-2
Soil Data - SVOCs
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

			Chemical Name	Bis(2-chloroisopropyl) ether	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Carbazole	Chrysene	Dibenz(a,h) anthracene	Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate	Fluoranthene	Fluorene	Hexachlorobenzene	Hexachlorobutadiene
Location ID	Sample Date	Depth	Sample Type															
CS-1	05/15/2009	0 - 2 in	N	< 0.015	**0.021 J**	< 0.017	< 0.012	**0.029 J**	< 0.028	< 0.012	< 0.015	< 0.017	**0.031 J**	< 0.024	**0.048 J**	< 0.013	< 0.015	< 0.015
CS-2	09/13/2006	0 - 2 in	N	< 0.34	< 0.34	< 0.34	--	< 0.34	< 0.34	--	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
CS-2	09/13/2006	2 - 12 in	N	< 0.38	< 0.38	< 0.38	--	**0.12 J**	< 0.38	--	< 0.38	< 0.38	< 0.38	< 0.38	**0.15 J**	< 0.38	< 0.38	< 0.38
CS-4	05/15/2009	0 - 2 in	N	< 0.015	< 0.019	**0.061 J**	< 0.012	**0.029 J**	< 0.028	< 0.012	< 0.015	< 0.017	< 0.013	< 0.024	**0.063 J**	< 0.013	< 0.015	< 0.015
CS-4	05/15/2009	2 - 12 in	N	< 0.052	< 0.069	< 0.061	< 0.042	**0.21 J**	< 0.11	**0.048 J**	< 0.052	< 0.061	< 0.045	< 0.089	**0.43 J**	< 0.048	< 0.055	< 0.052
			FD	< 0.027	< 0.035	< 0.031	< 0.021	**0.11 J**	< 0.052	< 0.023	< 0.027	< 0.031	**0.067 J**	< 0.045	**0.25 J**	< 0.025	< 0.028	< 0.027
CS-7	10/01/2012	0 - 2 in	N	< 0.0028	< 0.0089	< 0.0037	**0.031**	**0.096**	**0.013**	**0.019**	< 0.0037	< 0.0040	< 0.0048	< 0.0032	**0.23**	**0.028**	< 0.0033	< 0.0030
CS-8	10/01/2012	0 - 2 in	N	< 0.028	< 0.089	< 0.037	< 0.038	< 0.041	< 0.03	< 0.034	< 0.037	< 0.04	< 0.048	< 0.032	**0.047 J**	< 0.033	< 0.033	< 0.03
CS-8	10/01/2012	0 - 2 in	FD	< 0.028	< 0.089	< 0.037	< 0.038	**0.065 J**	< 0.03	< 0.034	< 0.037	< 0.04	< 0.048	< 0.032	**0.091 J**	< 0.033	< 0.033	< 0.03
CS-9	10/01/2012	0 - 2 in	N	< 0.028	< 0.089	< 0.037	< 0.038	**0.068 J**	< 0.03	< 0.034	< 0.037	< 0.04	< 0.048	< 0.032	**0.073 J**	< 0.033	< 0.033	< 0.03

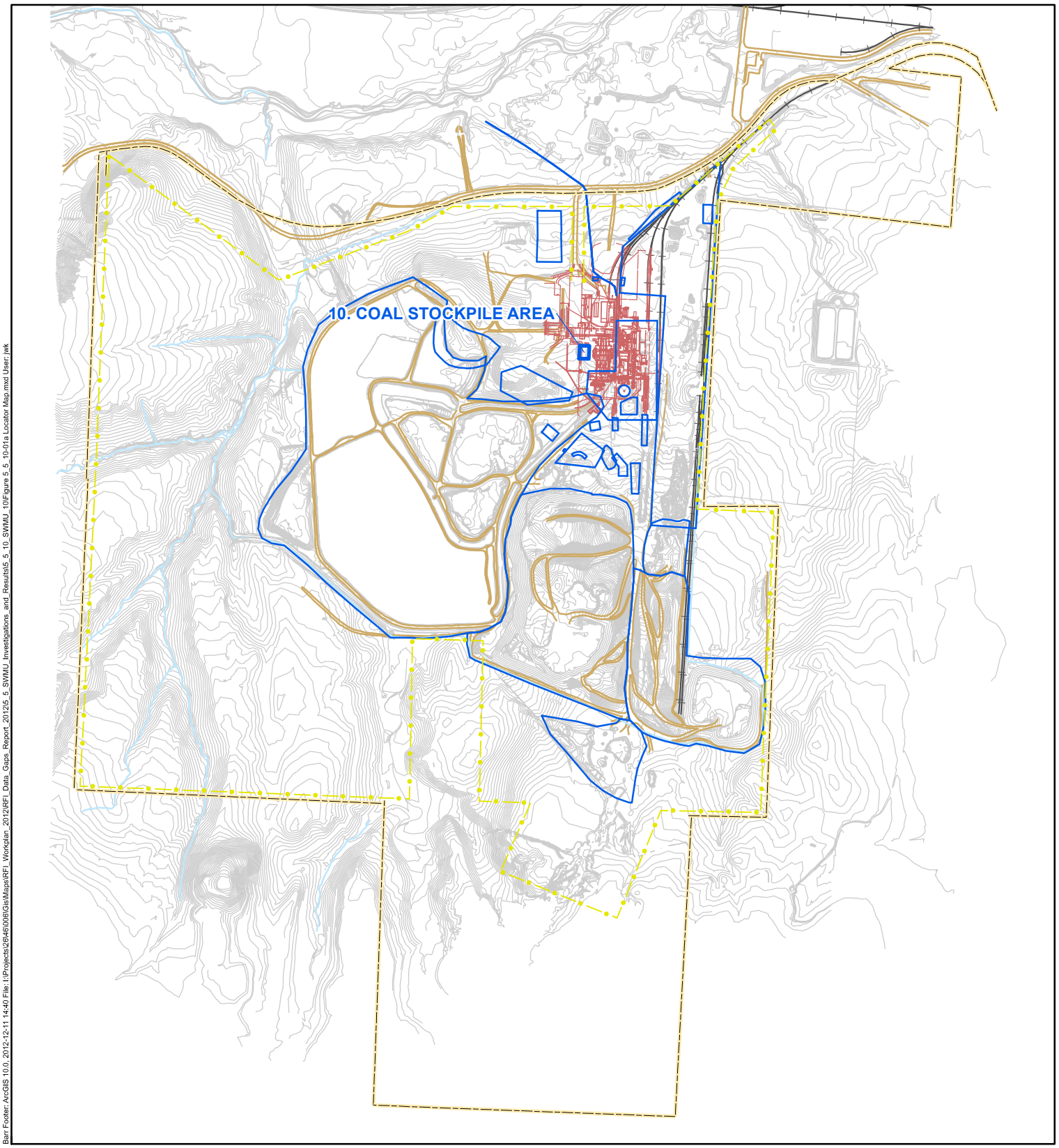
Table 5.5.10-2
Soil Data - SVOCs
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

Chemical Name				Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd)pyrene	Isophorone	m,p cresols	Naphthalene	Nitrobenzene	N-Nitrosodimethylamine	N-Nitrosodi-n-propylamine	N-Nitrosodiphenylamine	o-cresol	p-cresol	Pentachlorophenol
Location ID	Sample Date	Depth	Sample Type													
CS-1	05/15/2009	0 - 2 in	N	< 0.013	< 0.022	< 0.039	< 0.014	--	**0.017 J**	< 0.027	< 0.026	< 0.020	< 0.018	< 0.017	< 0.017	< 0.13
CS-2	09/13/2006	0 - 2 in	N	< 0.68	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	--	< 1.7
CS-2	09/13/2006	2 - 12 in	N	< 0.76	< 0.38	**0.16 J**	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	--	< 1.9
CS-4	05/15/2009	0 - 2 in	N	< 0.013	< 0.022	**0.040 J**	< 0.014	--	**0.017 J**	< 0.027	< 0.026	< 0.020	< 0.018	< 0.017 R	< 0.017 R	< 0.13
CS-4	05/15/2009	2 - 12 in	N	< 0.047	< 0.080	< 0.15	< 0.052	--	**0.056 J**	< 0.097	< 0.093	< 0.071	< 0.067	< 0.062	< 0.062	< 0.47
			FD	< 0.024	< 0.041	< 0.073	< 0.027	--	< 0.027	< 0.049	< 0.047	< 0.036	< 0.034	< 0.032 R	< 0.032 R	< 0.24 R
CS-7	10/01/2012	0 - 2 in	N	< 0.0040	< 0.0025	**0.063**	< 0.0028	--	**0.026**	< 0.0034	< 0.02	< 0.0033	< 0.0032	< 0.0041	< 0.0045	< 0.0053 J
CS-8	10/01/2012	0 - 2 in	N	< 0.04	< 0.025	< 0.032	< 0.028	--	< 0.029	< 0.034	< 0.2	< 0.033	< 0.032	< 0.041	< 0.045	< 0.053 J
CS-8	10/01/2012	0 - 2 in	FD	< 0.04	< 0.025	**0.05 J**	< 0.028	--	< 0.029	< 0.034	< 0.2	< 0.033	< 0.032	< 0.041	< 0.045	< 0.053 J
CS-9	10/01/2012	0 - 2 in	N	< 0.04	< 0.025	**0.055 J**	< 0.028	--	< 0.029	< 0.034	< 0.2	< 0.033	< 0.032	< 0.041	< 0.045	< 0.053 J

Table 5.5.10-2
Soil Data - SVOCs
SWMU 10
Rhodia Silver Bow Plant
[concentration in mg/kg]

			Chemical Name	Phenanthrene	Phenol	Pyrene	Pyridine
Location ID	Sample Date	Depth	Sample Type				
CS-1	05/15/2009	0 - 2 in	N	**0.034 J**	< 0.020	**0.047 J**	< 0.020
CS-2	09/13/2006	0 - 2 in	N	< 0.34	< 0.34	< 0.34	< 0.34
CS-2	09/13/2006	2 - 12 in	N	< 0.38	< 0.38	**0.21 J**	< 0.38
CS-4	05/15/2009	0 - 2 in	N	**0.047 J**	< 0.020	**0.066 J**	< 0.020
CS-4	05/15/2009	2 - 12 in	N	**0.26 J**	< 0.072	**0.52 J**	< 0.074
			FD	**0.15 J**	< 0.037 R	**0.30 J**	< 0.038
CS-7	10/01/2012	0 - 2 in	N	**0.21**	**0.0037 J**	**0.15**	< 0.05 R
CS-8	10/01/2012	0 - 2 in	N	**0.037 J**	< 0.031	**0.049 J**	< 0.5 R
CS-8	10/01/2012	0 - 2 in	FD	**0.067 J**	< 0.031	**0.089 J**	< 0.5 R
CS-9	10/01/2012	0 - 2 in	N	**0.068 J**	< 0.031	**0.085 J**	< 0.5 R

Figures



SWMU 10
Other SWMUs
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures
Property Boundary
Fence Line

N

Feet
1,000 0 1,000

Figure 5.5.10-1a

SWMU 10 LOCATION
Rhodia Silver Bow Plant
Montana

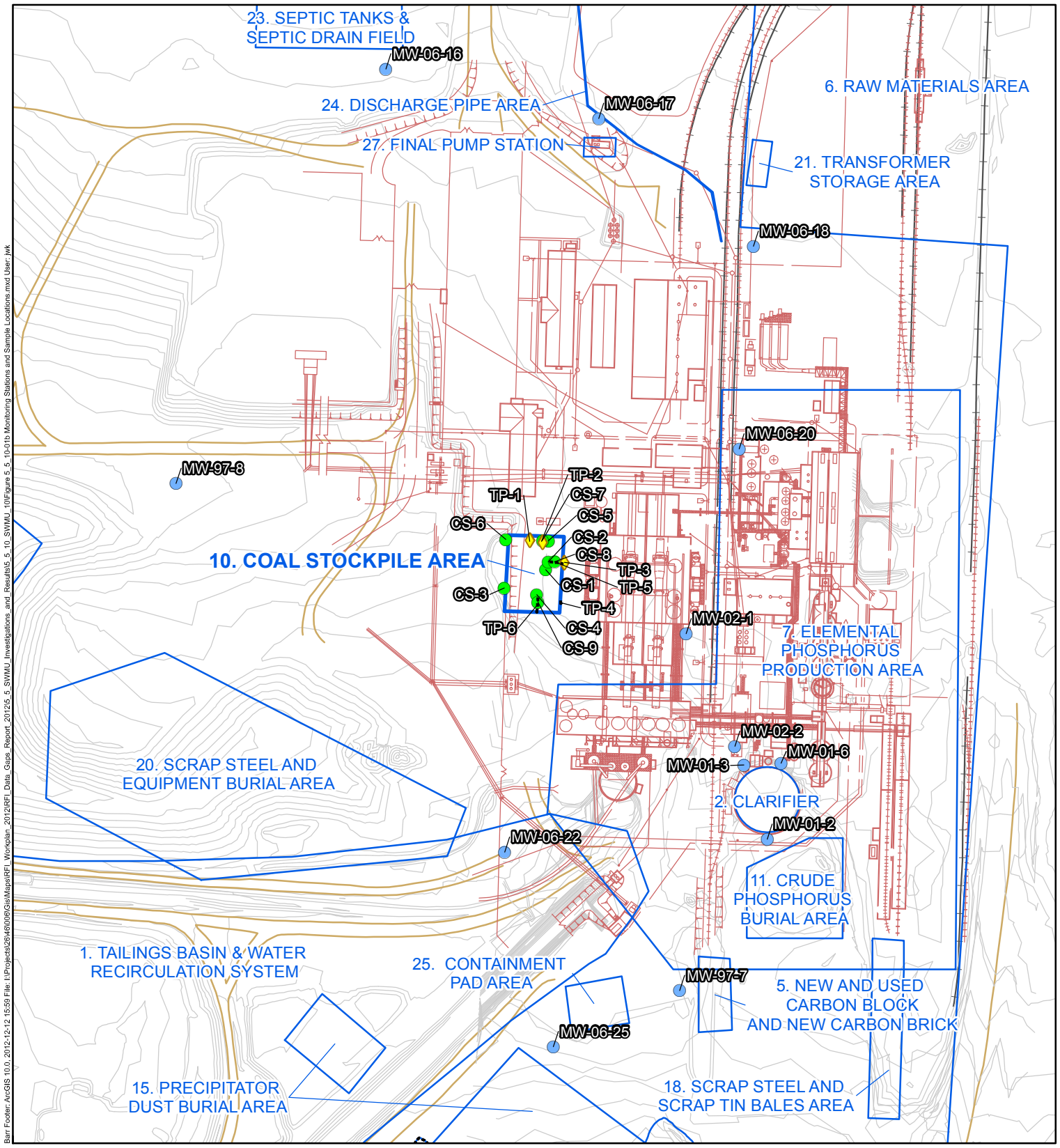


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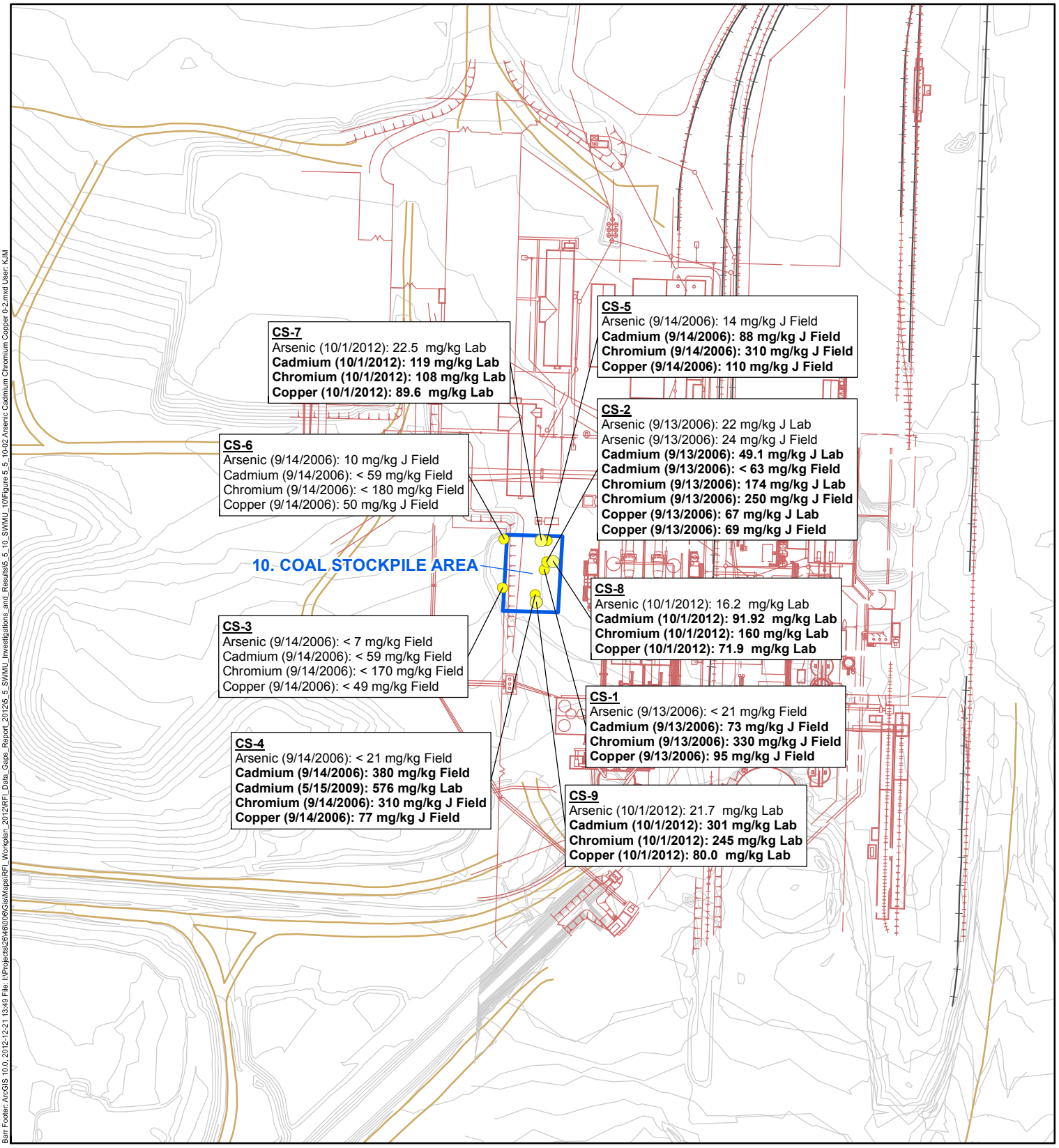
Figure 5.5.10-1b

SWMU 10
MONITORING STATIONS
AND SAMPLE LOCATIONS
Rhodia Silver Bow Plant
Montana



Sample Location

SWMU 10

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.

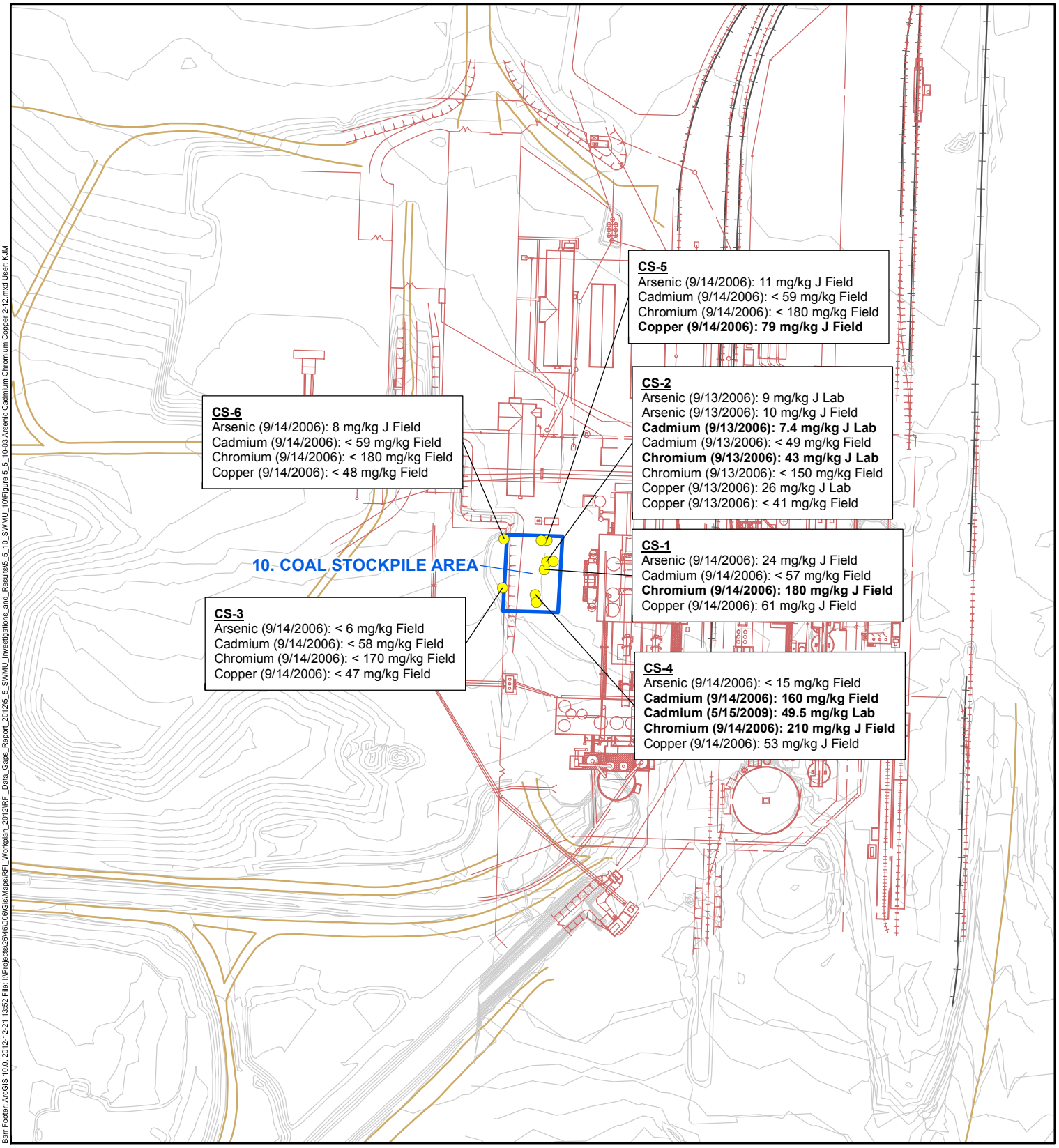
N

Feet

200 0 200

Figure 5.5.10-2

SWMU 10
ARSENIC, CADMIUM, CHROMIUM, AND COPPER, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



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Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

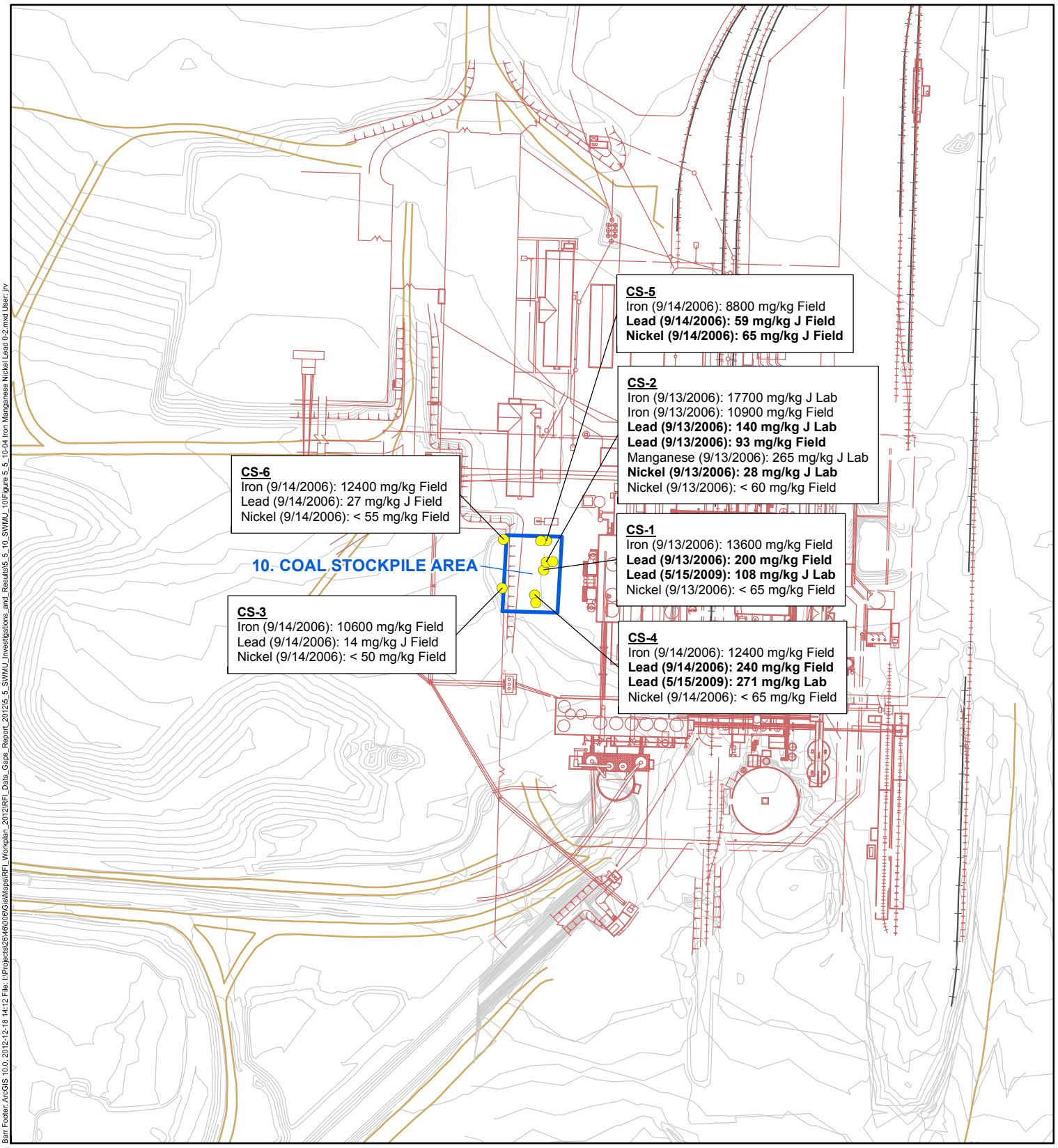
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
200 0 200

Figure 5.5.10-3

SWMU 10
ARSENIC, CADMIUM, CHROMIUM, AND COPPER, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



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Sample Location

SWMU 10

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.

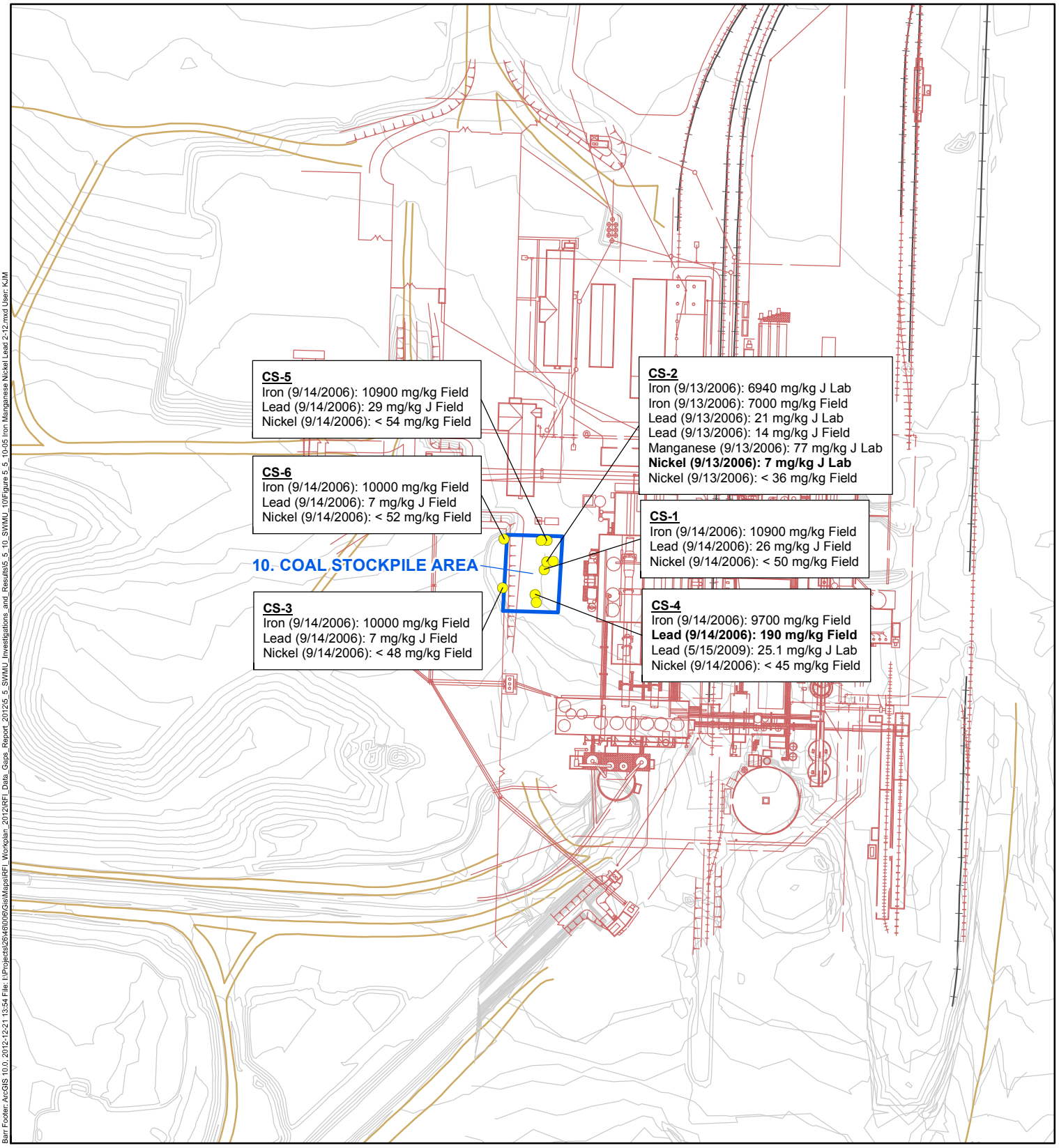
N

Feet

200 0 200

Figure 5.5.10-4

SWMU 10
IRON, MANGANESE, NICKEL, AND LEAD, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



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Sample Location

SWMU 10

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.

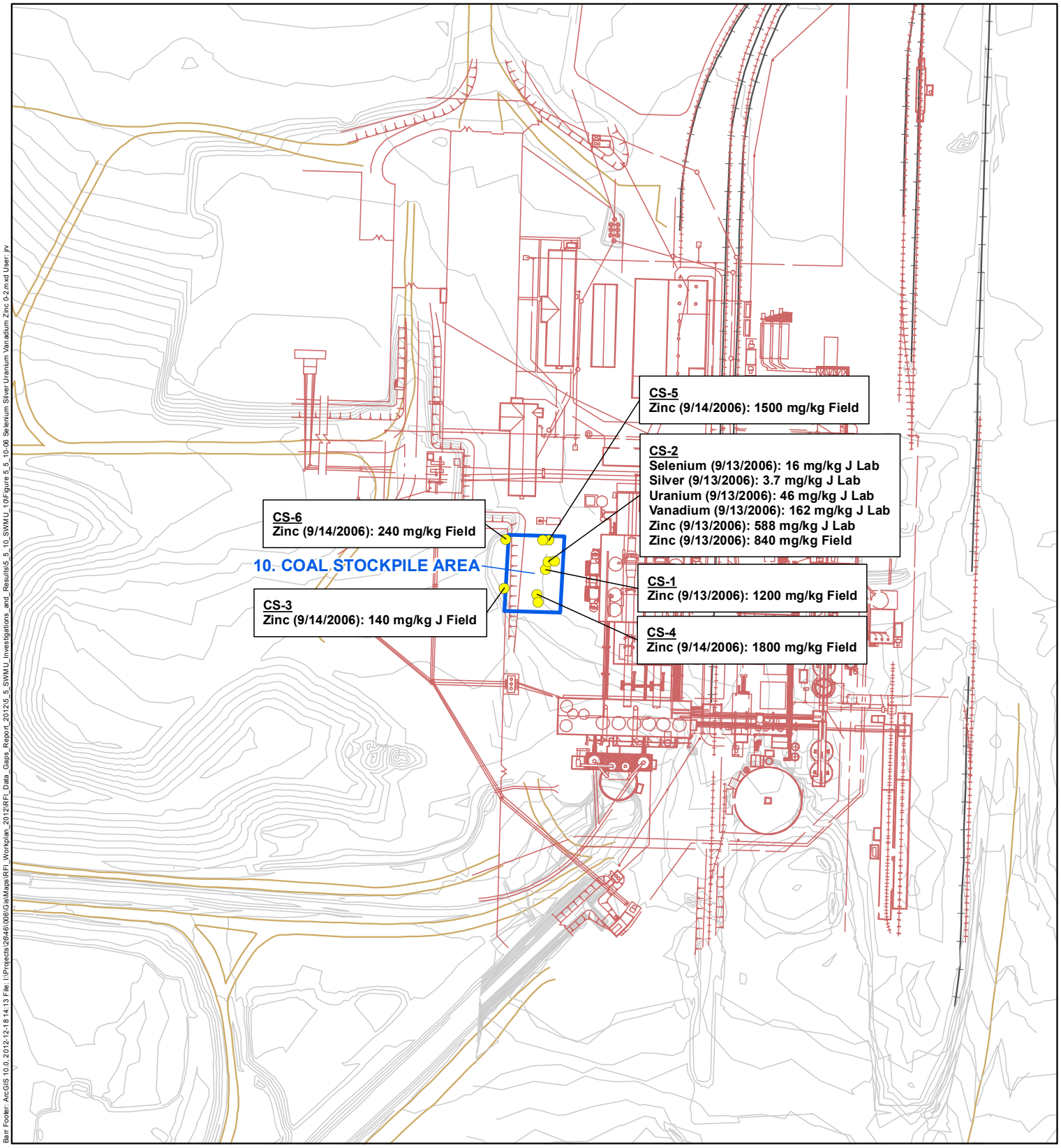
N

Feet

200 0 200

Figure 5.5.10-5

SWMU 10
IRON, MANGANESE, NICKEL, AND LEAD, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 14:13 File: I:\Projects\26646\006\GIs\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-06 Selenium Silver Uranium Vanadium Zinc 0-2.mxd User: jv

Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

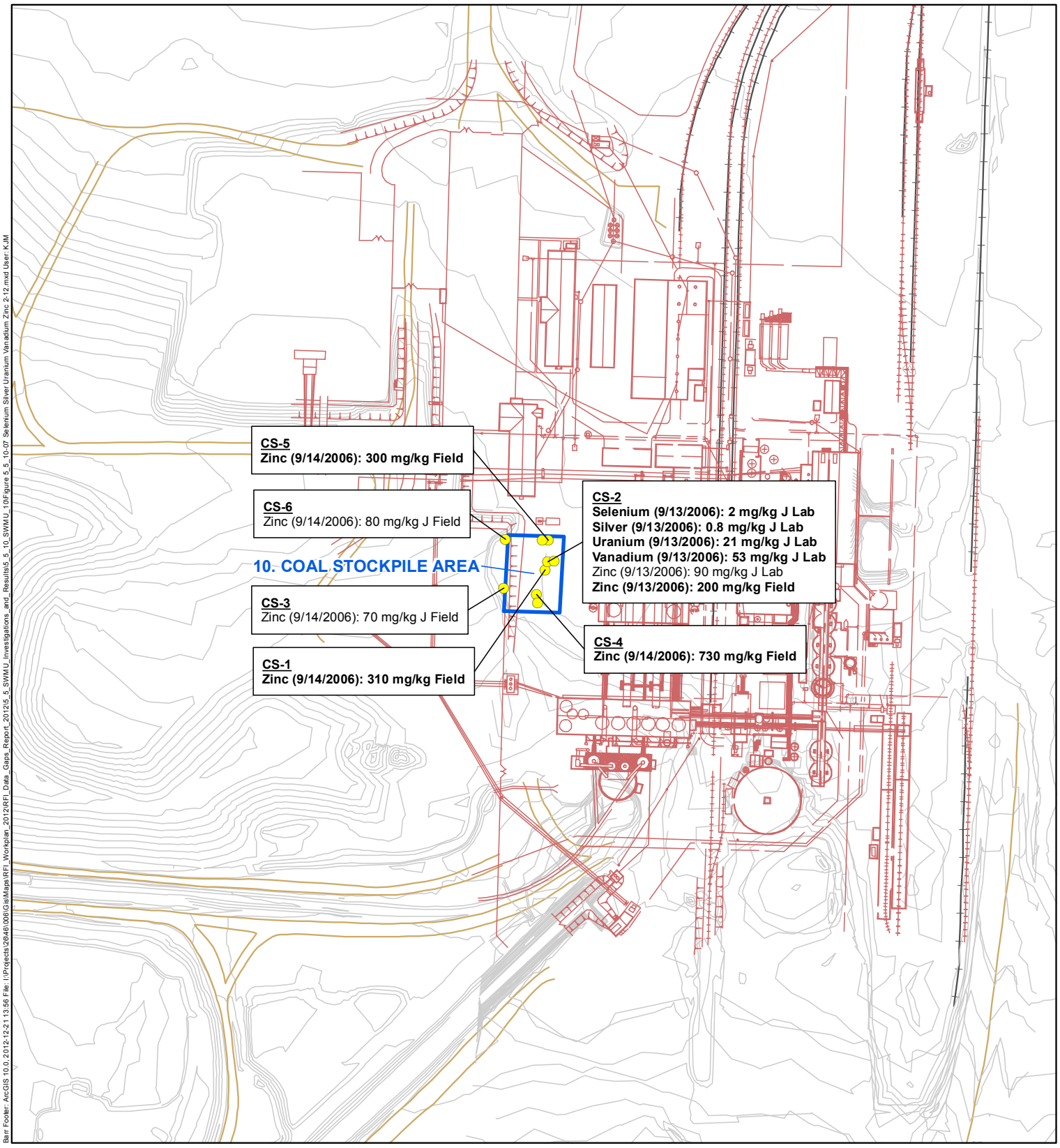
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
200 0 200

Figure 5.5.10-6

SWMU 10
SELENIUM, SILVER, URANIUM, VANADIUM, AND ZINC, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 13:56 File: I:\Projects\2664\006\GIS\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-07 Selenium Silver Uranium Vanadium Zinc 2-12.mxd User: KJM

- Sample Location
- SWMU 10
- 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.

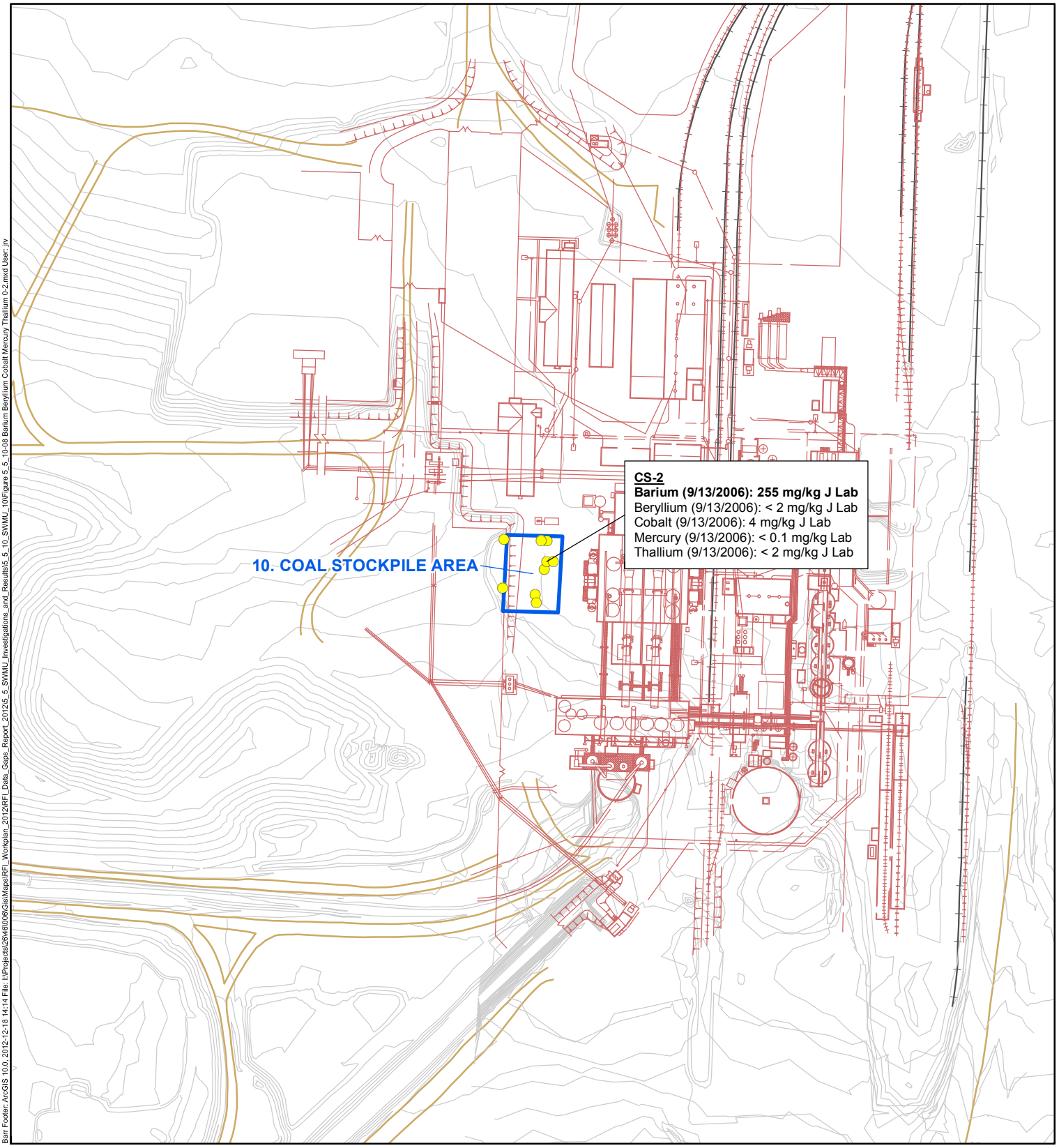
N

Feet

200 0 200

Figure 5.5.10-7

SWMU 10
SELENIUM, SILVER, URANIUM, VANADIUM, AND ZINC, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-18 14:14 File: I:\Projects\26\4\60006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_20125_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-08 Barium Beryllium Cobalt Mercury Thallium 0-2.mxd User: jrv

Sample Location

SWMU 10

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.

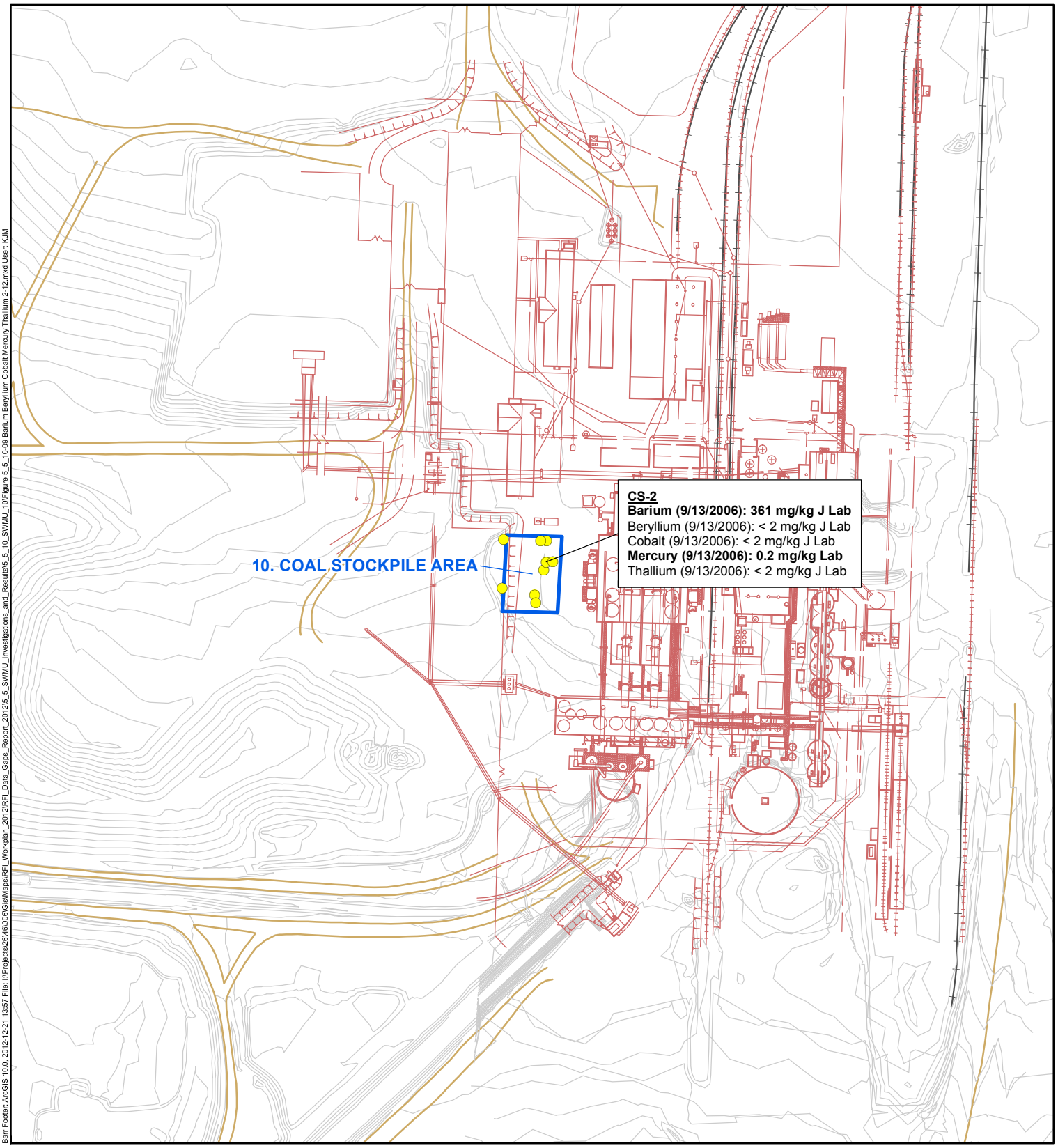
N

Feet

200 0 200

Figure 5.5.10-8

SWMU 10
BARIUM, BERYLLIUM, COBALT, MERCURY, AND THALLIUM, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 13:57 File: I:\Projects\26\4\60006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_20125_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-09 Barium Beryllium Cobalt Mercury Thallium 2-12.mxd User: KJM

Sample Location

SWMU 10

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.

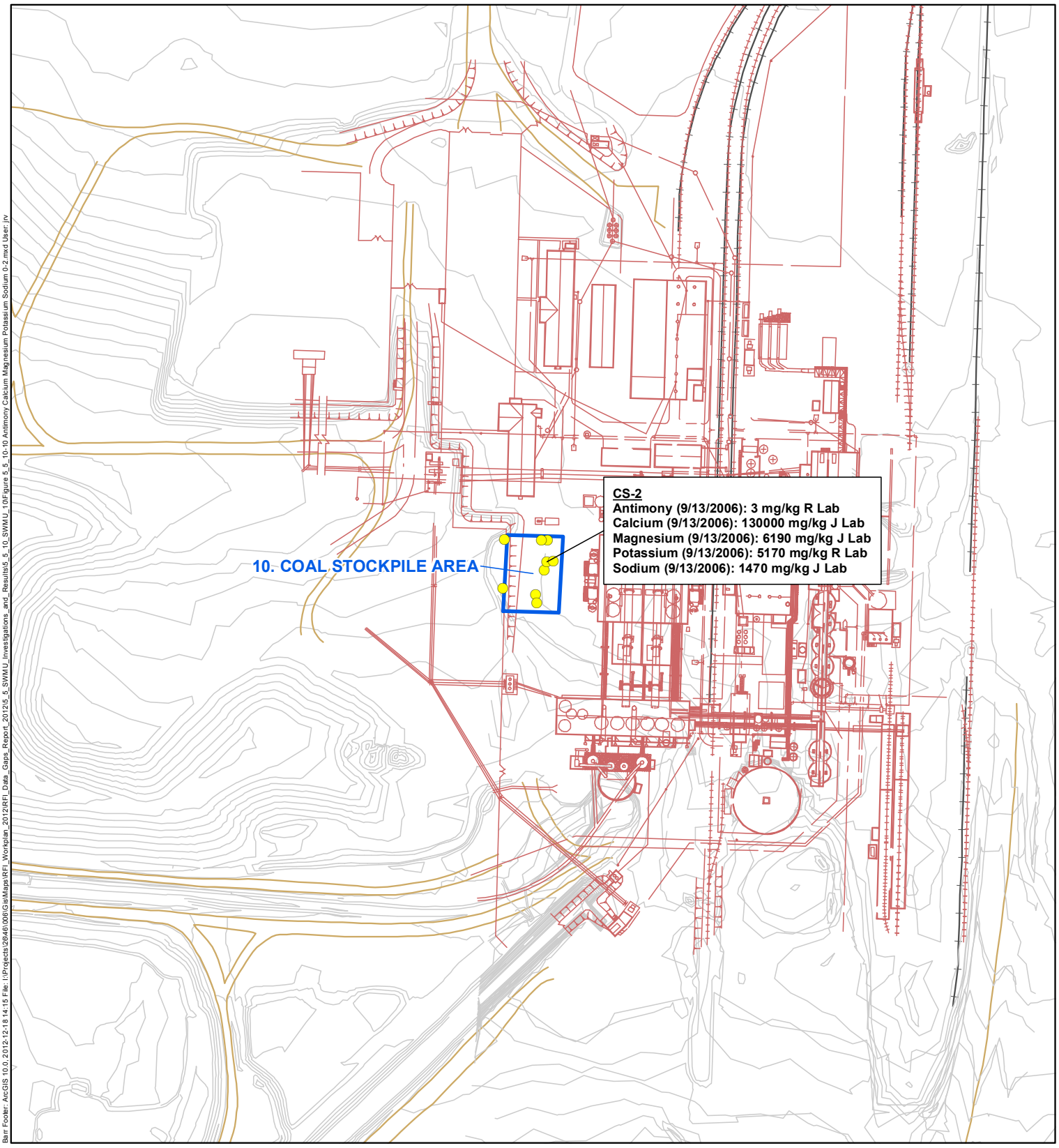
N

Feet

200 0 200

Figure 5.5.10-9

SWMU 10
BARIUM, BERYLLIUM, COBALT,
MERCURY, AND THALLIUM, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

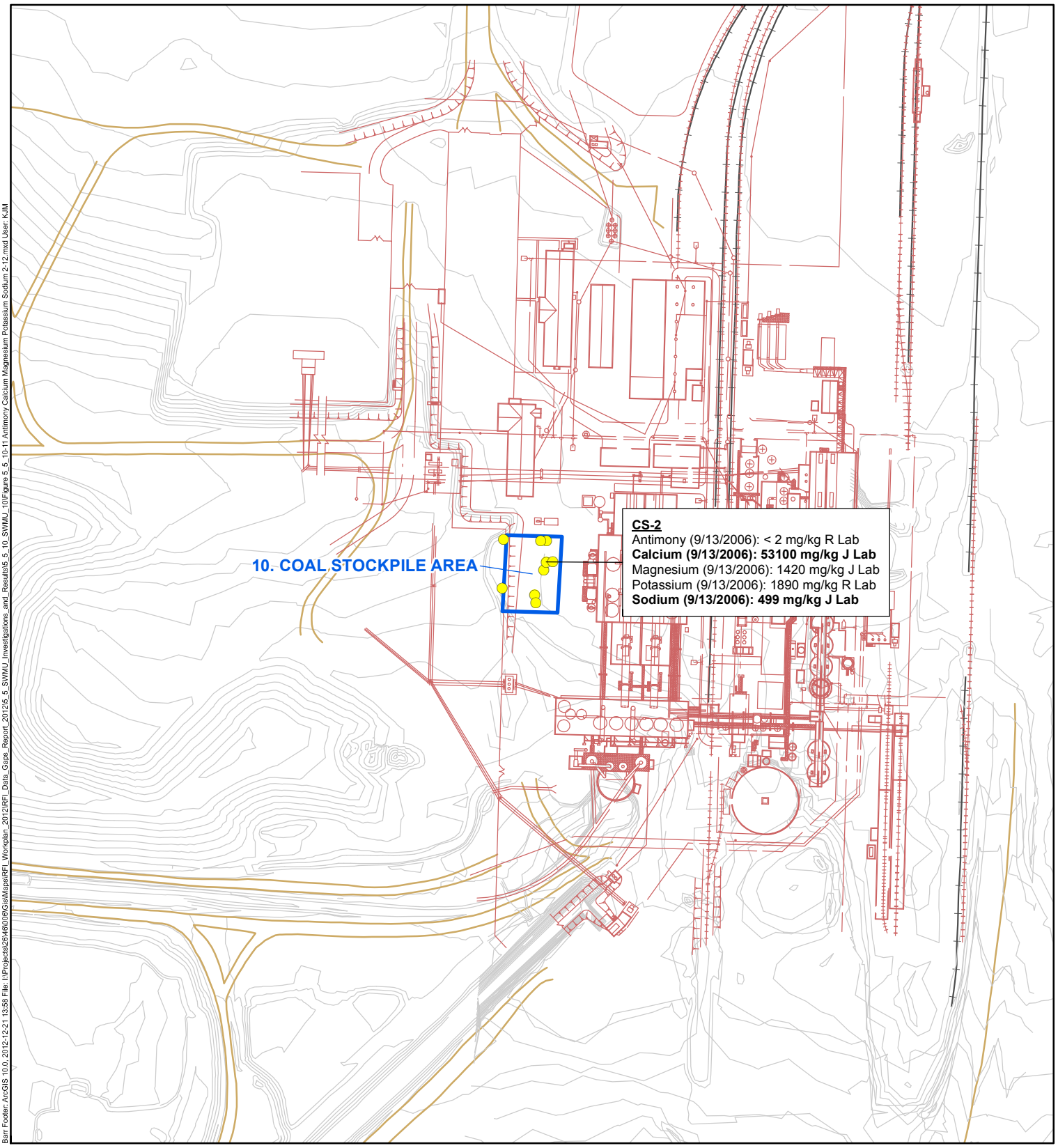
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
200 0 200

Figure 5.5.10-10

SWMU 10
ANTIMONY, CALCIUM, MAGNESIUM, POTASSIUM, AND SODIUM, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 13:58 File: I:\Projects\26\4\60006\Gis\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_20125_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-11 Antimony Calcium Magnesium Potassium Sodium 2-12.mxd User: KJM

Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

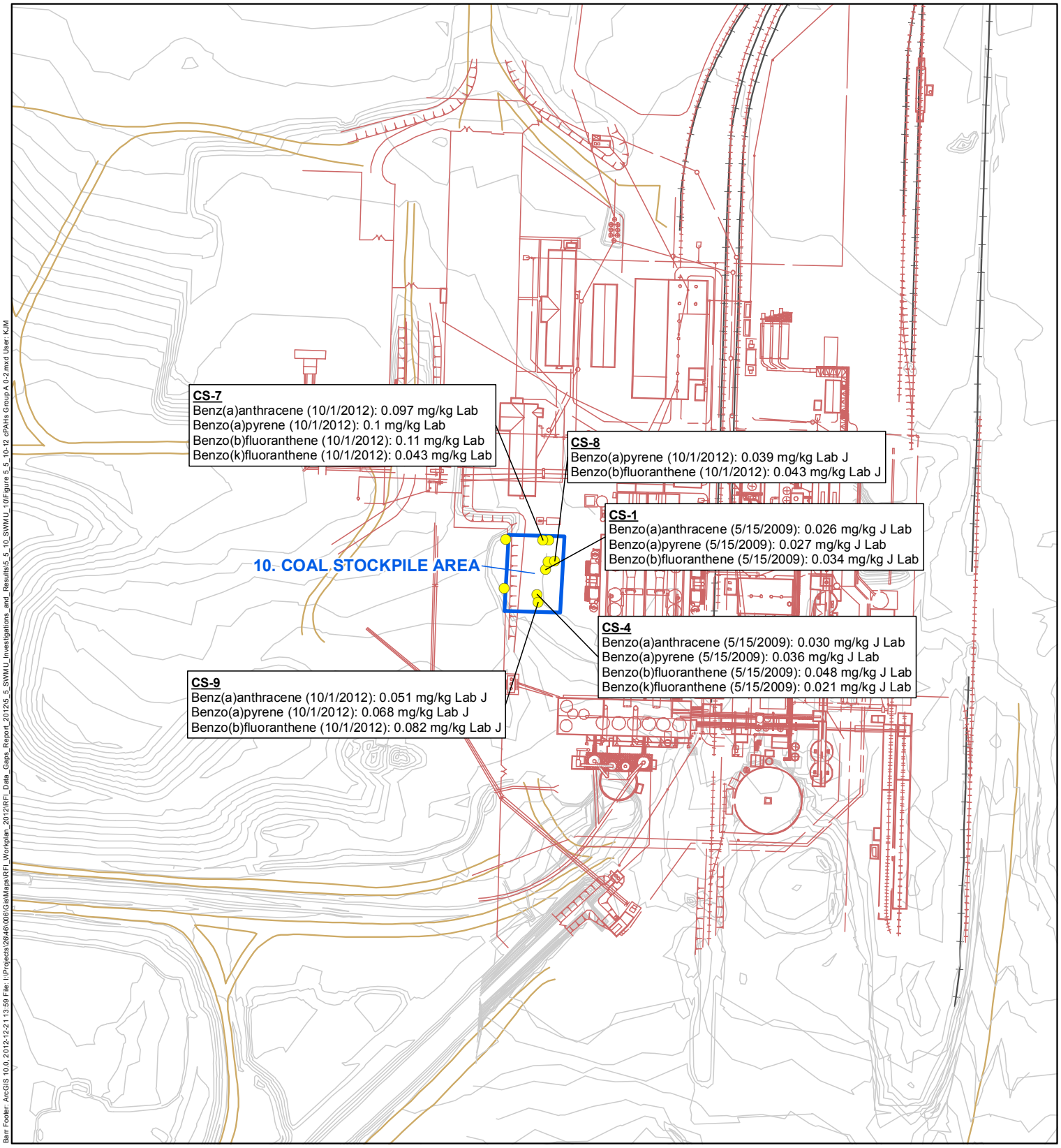
Bold font indicates that sample concentration is greater than the 95% UCL of mean Reference Area Concentration.

N

Feet
200 0 200

Figure 5.5.10-11

SWMU 10
ANTIMONY, CALCIUM, MAGNESIUM, POTASSIUM, AND SODIUM, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

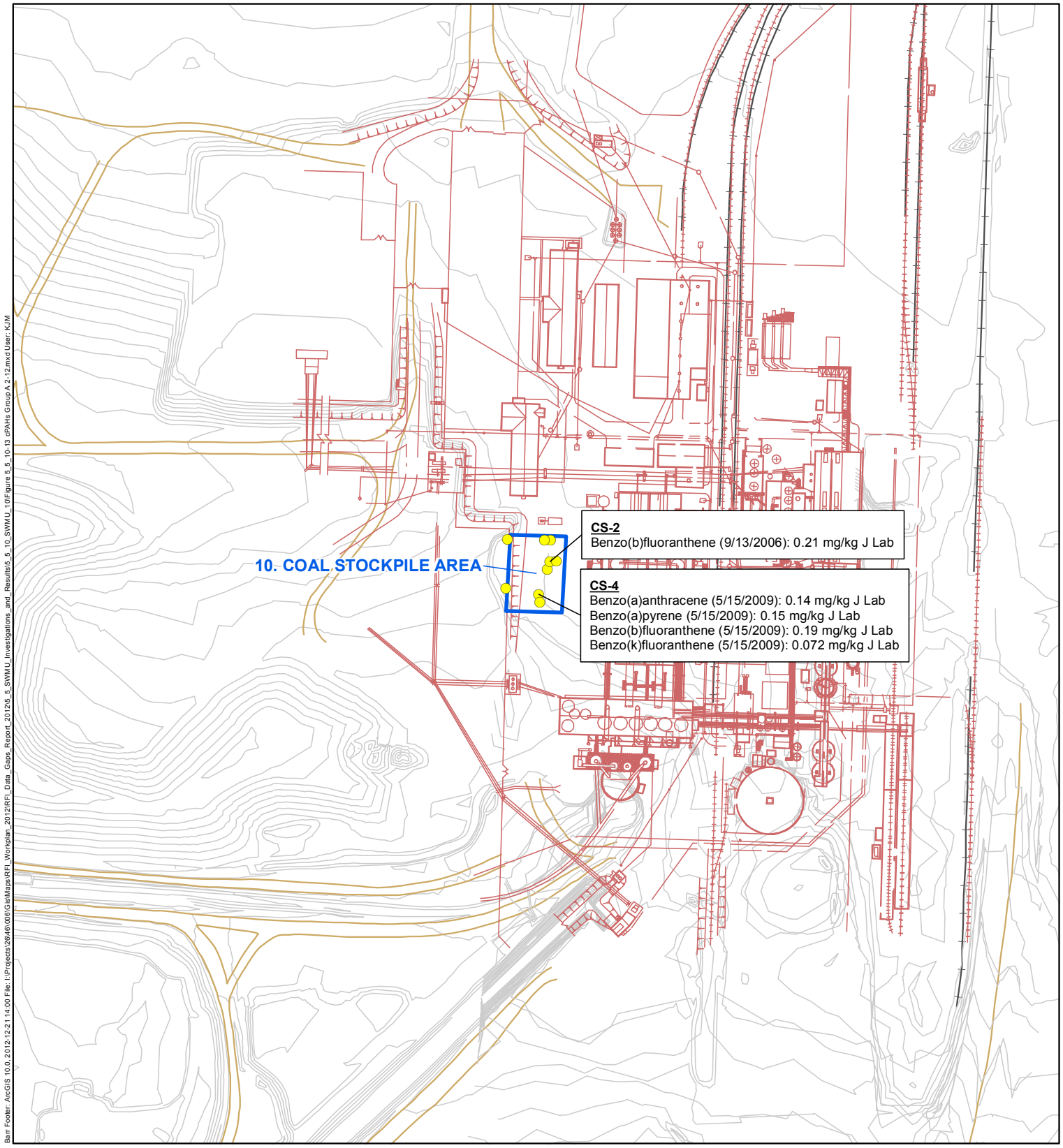
Only detected concentrations are shown on this figure.

N

Feet
200 0 200

Figure 5.5.10-12

SWMU 10
cPAHs
GROUP A, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

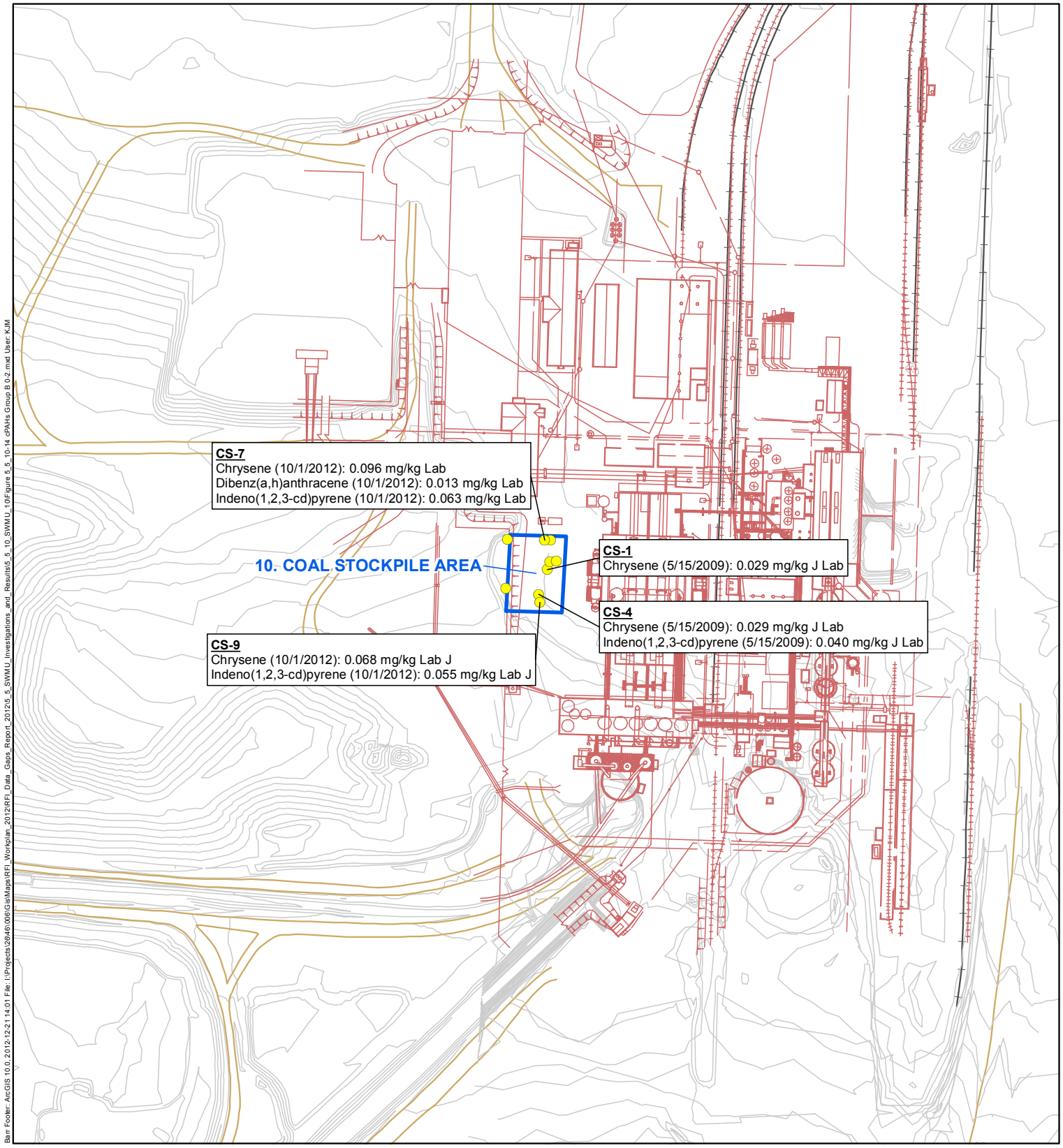
Only detected concentrations are shown on this figure.

N

Feet
200 0 200

Figure 5.5.10-13

SWMU 10
cPAHs
GROUP A, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

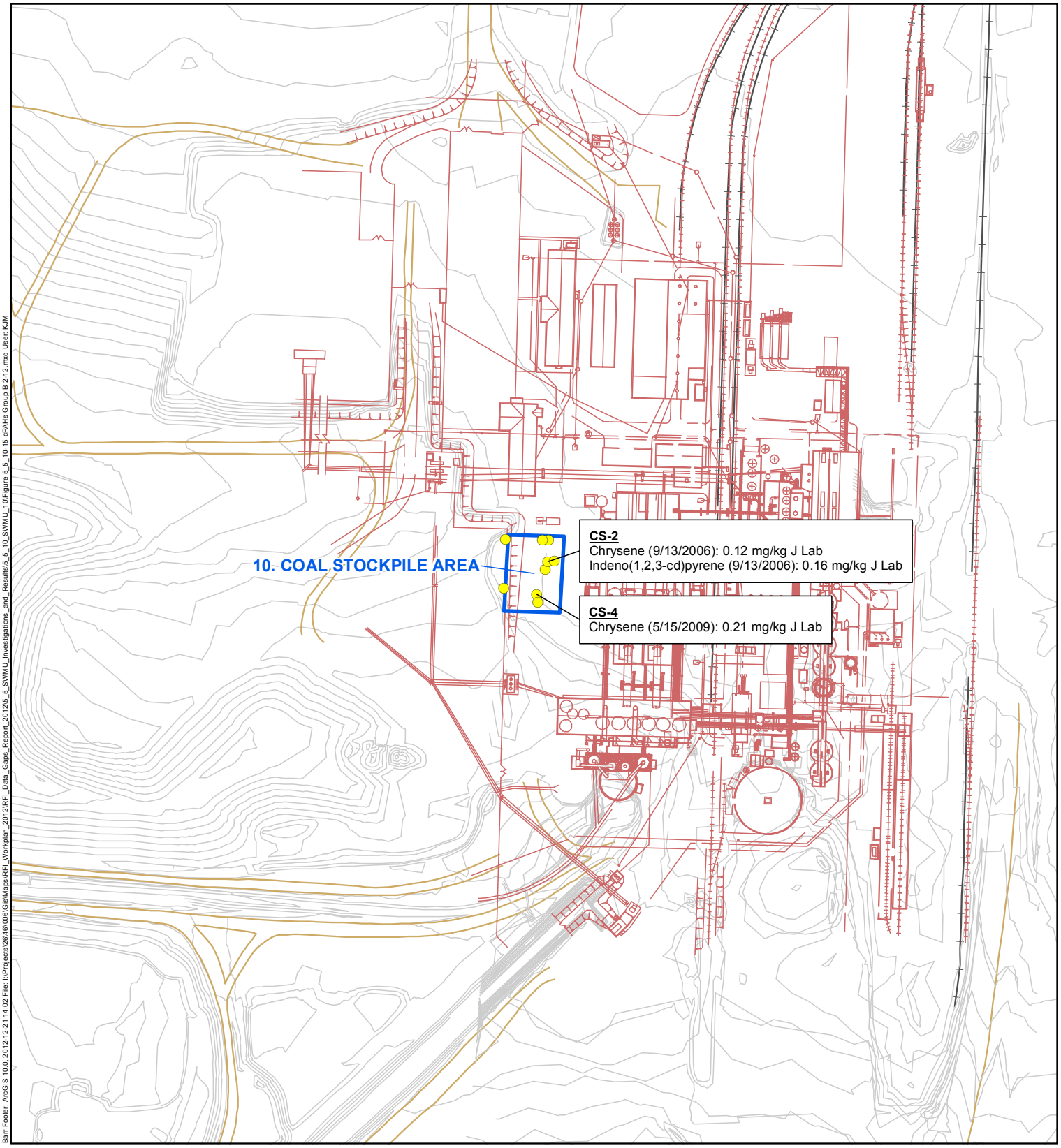
Only detected concentrations are shown on this figure.

N

Feet
200 0 200

Figure 5.5.10-14

SWMU 10
cPAHs
GROUP B, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

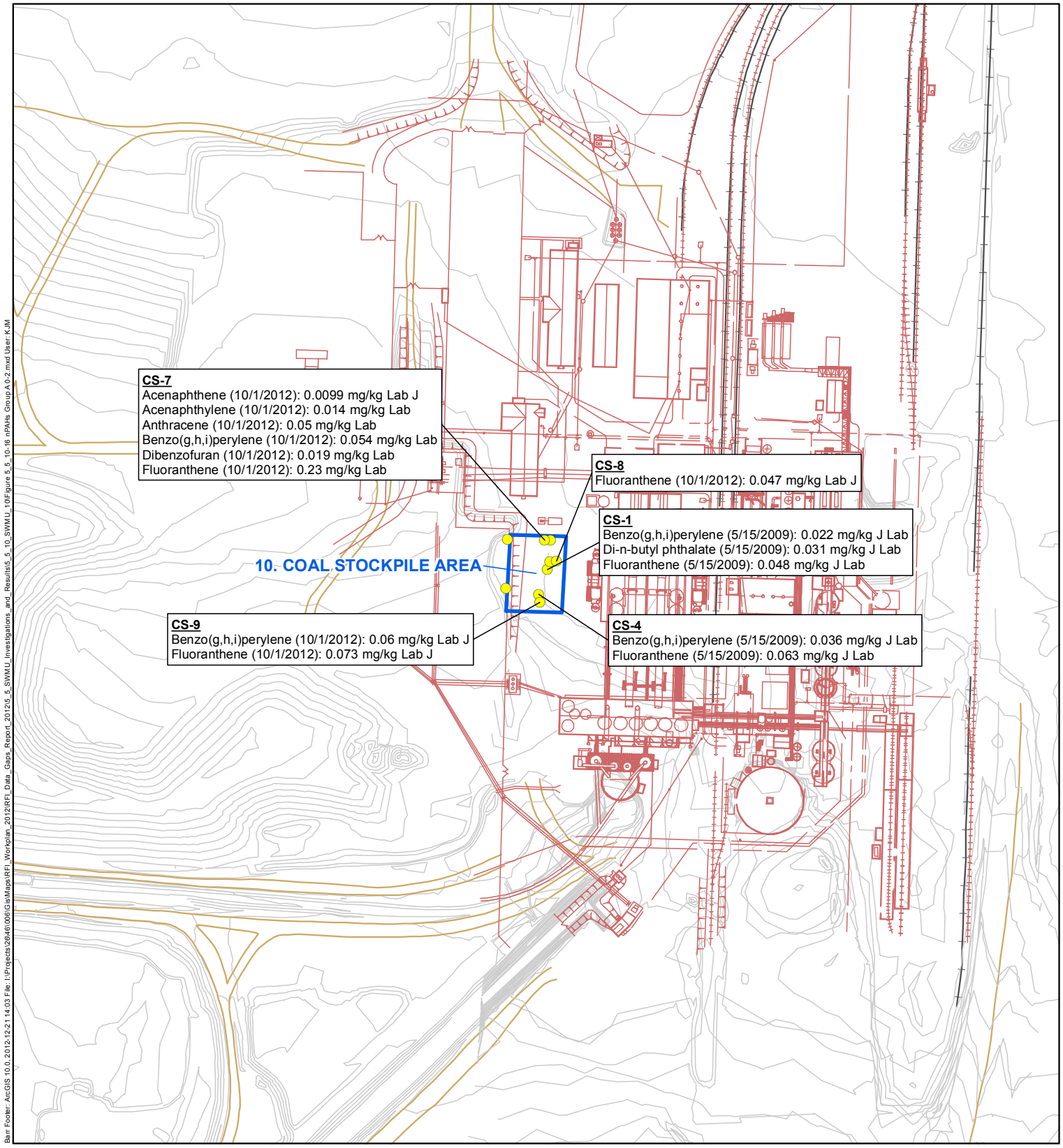
Only detected concentrations are shown on this figure.

N

Feet
200 0 200

Figure 5.5.10-15

SWMU 10
cPAHs
GROUP B, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 14:03 File: I:\Projects\26646\006\GIS\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-16 nPAHs Group A 0-2.mxd User: KJM

Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

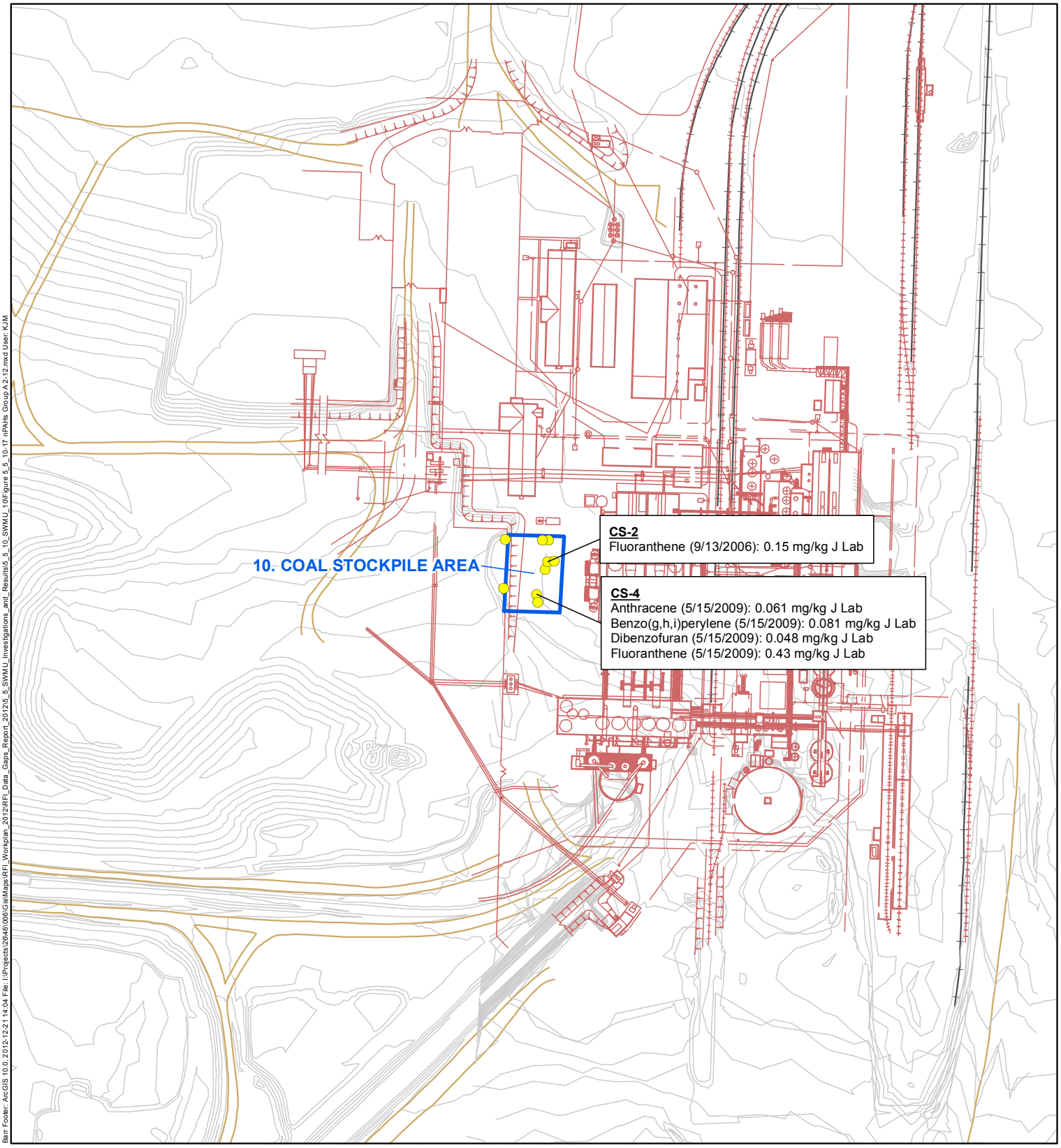
Only detected concentrations are shown on this figure.

N

Feet
200 0 200

Figure 5.5.10-16

SWMU 10
nPAHs
GROUP A, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 14:04 File: I:\Projects\2664\006\GisMaps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-17 nPAHs Group A 2-12.mxd User: KJM

Sample Location
SWMU 10
Elevation Contour
Drainage
Railroad
Road
Former Plant Structures

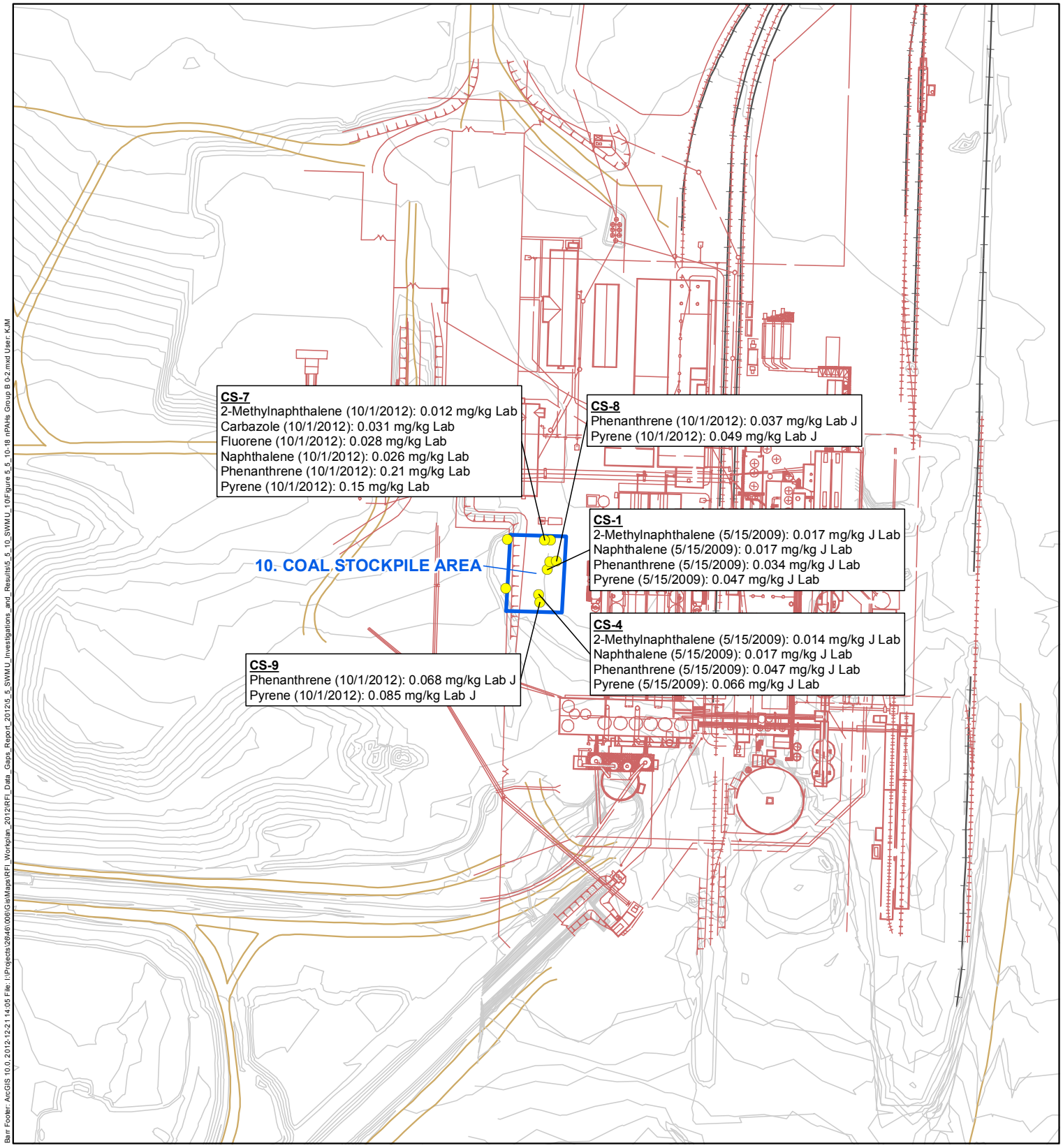
Only detected concentrations are shown on this figure.

N

Feet
200 0 200

Figure 5.5.10-17

SWMU 10
nPAHs
GROUP A, 2-12 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 14:05 File: I:\Projects\26646\006\GIS\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-18 nPAHs Group B 0-2.mxd User: KJM

Sample Location

SWMU 10

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Only detected concentrations are shown on this figure.

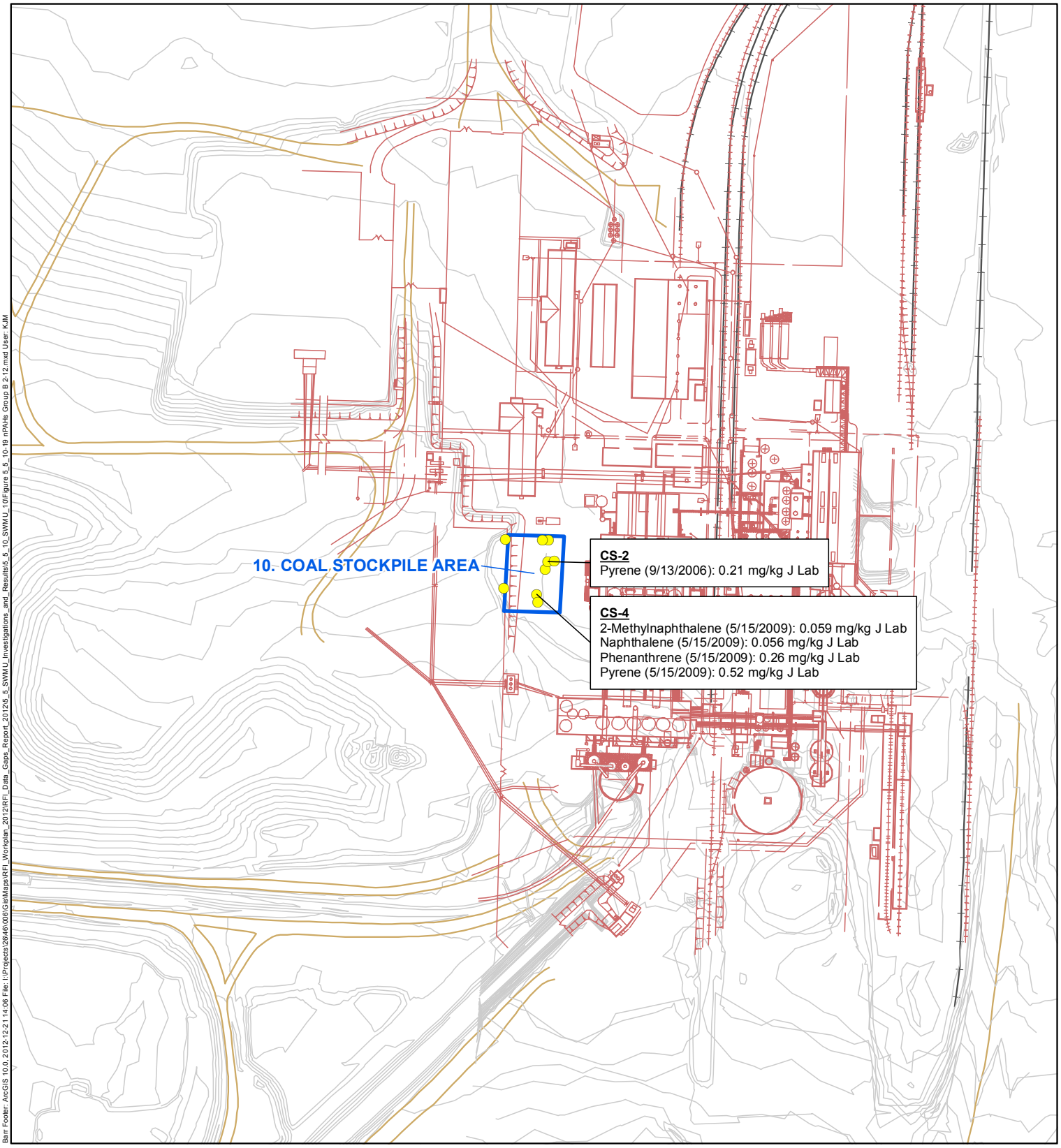
N

Feet

200 0 200

Figure 5.5.10-18

SWMU 10
nPAHs
GROUP B, 0-2 INCHES
Rhodia Silver Bow Plant
Montana



Barr Footer: ArcGIS 10.0, 2012-12-21 14:06 File: I:\Projects\26646\006\GIs\Maps\RFI_Workplan_2012\RFI_Data_Gaps_Report_2012\5_5_SWMU_Investigations_and_Results\5_5_10_SWMU_10\Figure 5_5_10-19 nPAHs Group B 2-12.mxd User: KJM

Sample Location

SWMU 10

Elevation Contour

Drainage

Railroad

Road

Former Plant Structures

Only detected concentrations are shown on this figure.

N

Feet

200 0 200

Figure 5.5.10-19

SWMU 10
nPAHs
GROUP B, 2-12 INCHES
Rhodia Silver Bow Plant
Montana

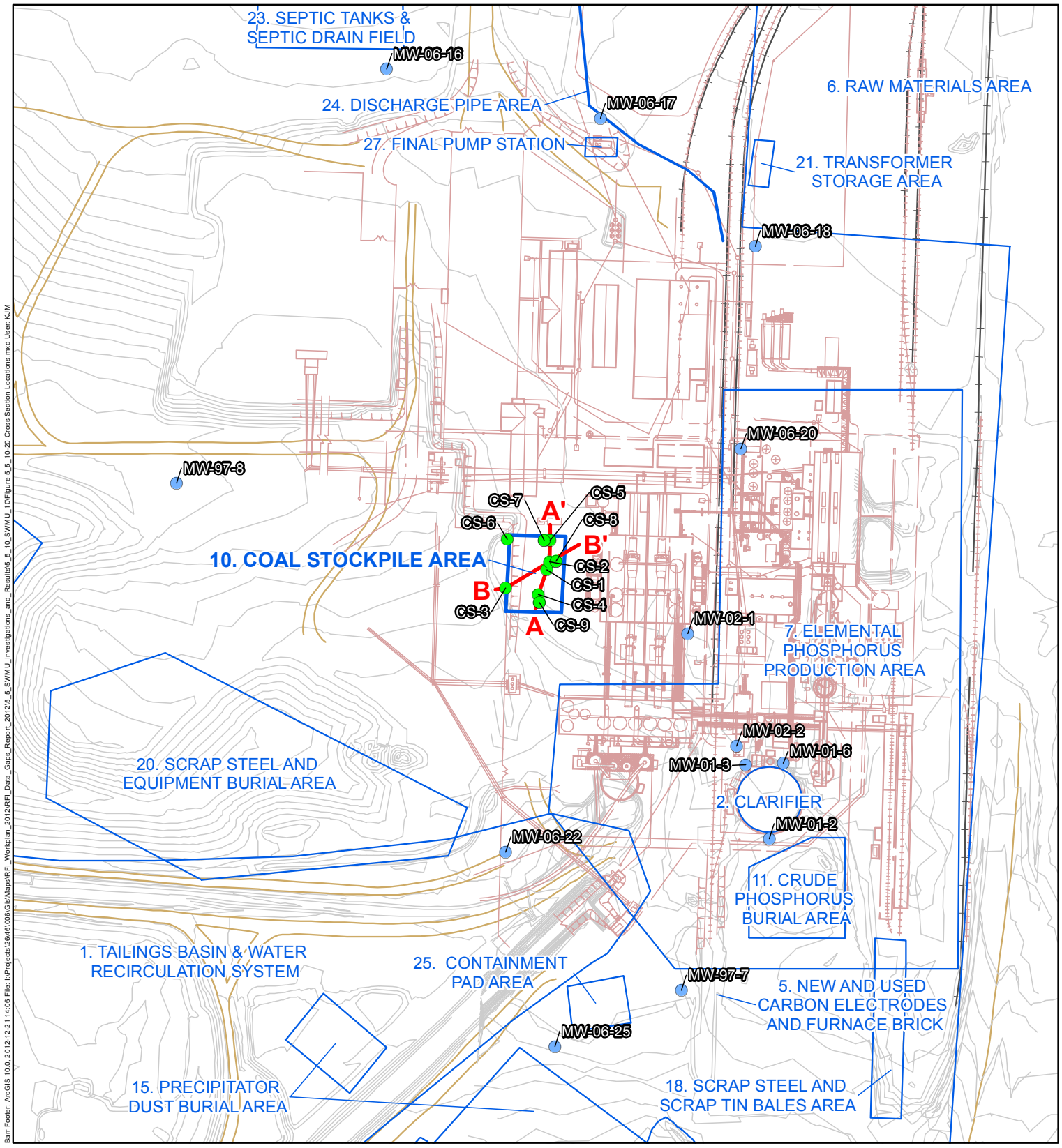
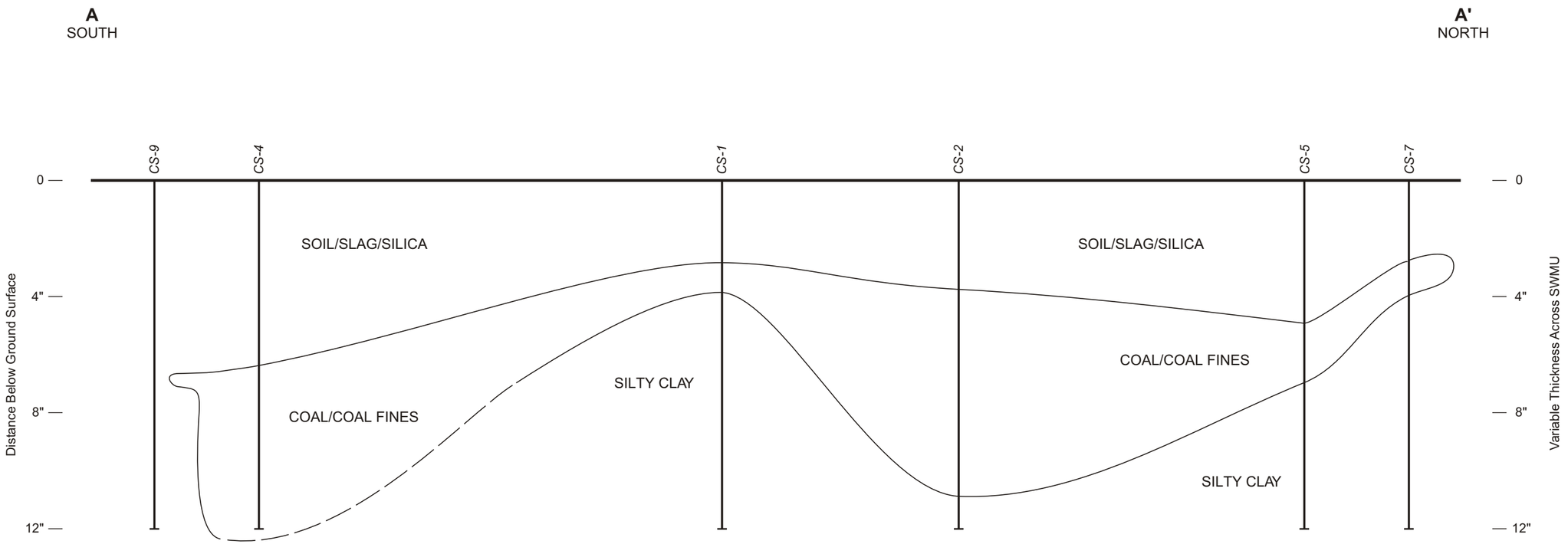


Figure 5.5.10-20

SWMU 10
CROSS SECTION LOCATIONS
Rhodia Silver Bow Plant
Montana

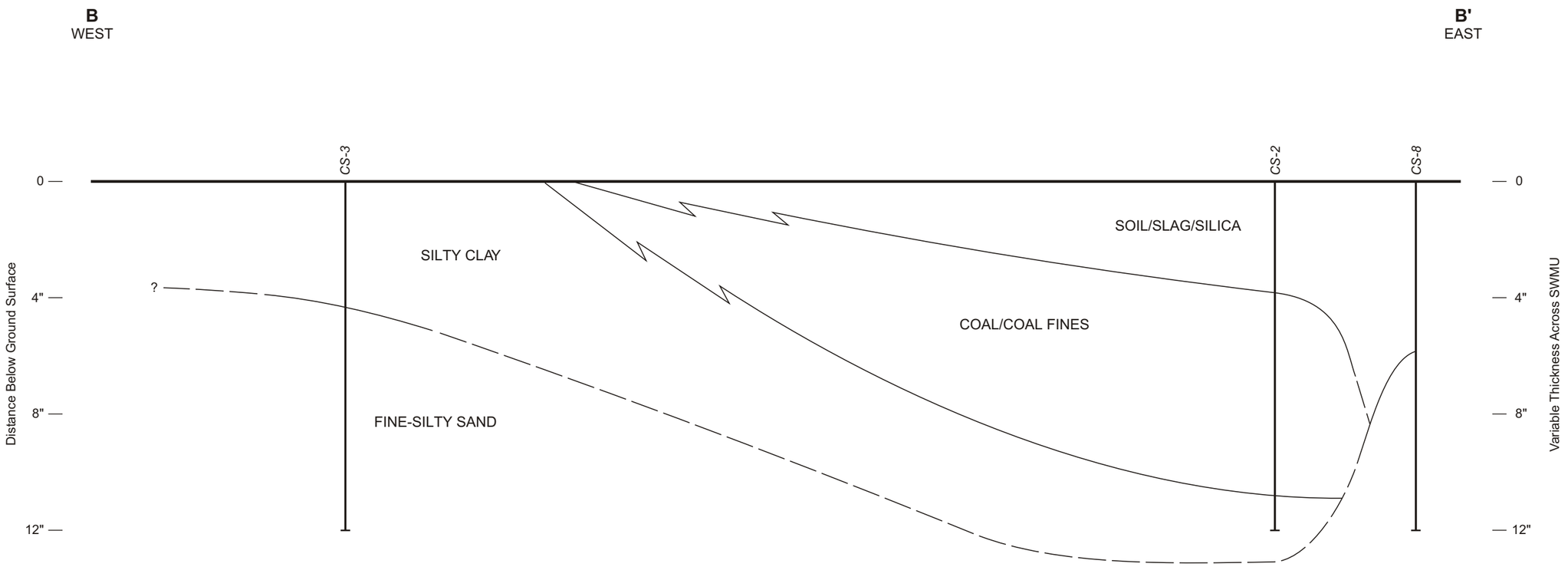


No Horizontal Scale

Figure 5.5.10-21

CONCEPTUAL CROSS SECTION A-A'
THROUGH SWMU 10
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\Conceptual Cross Section A-A' Thru SWMU 10.CDR RLG 12-21-12

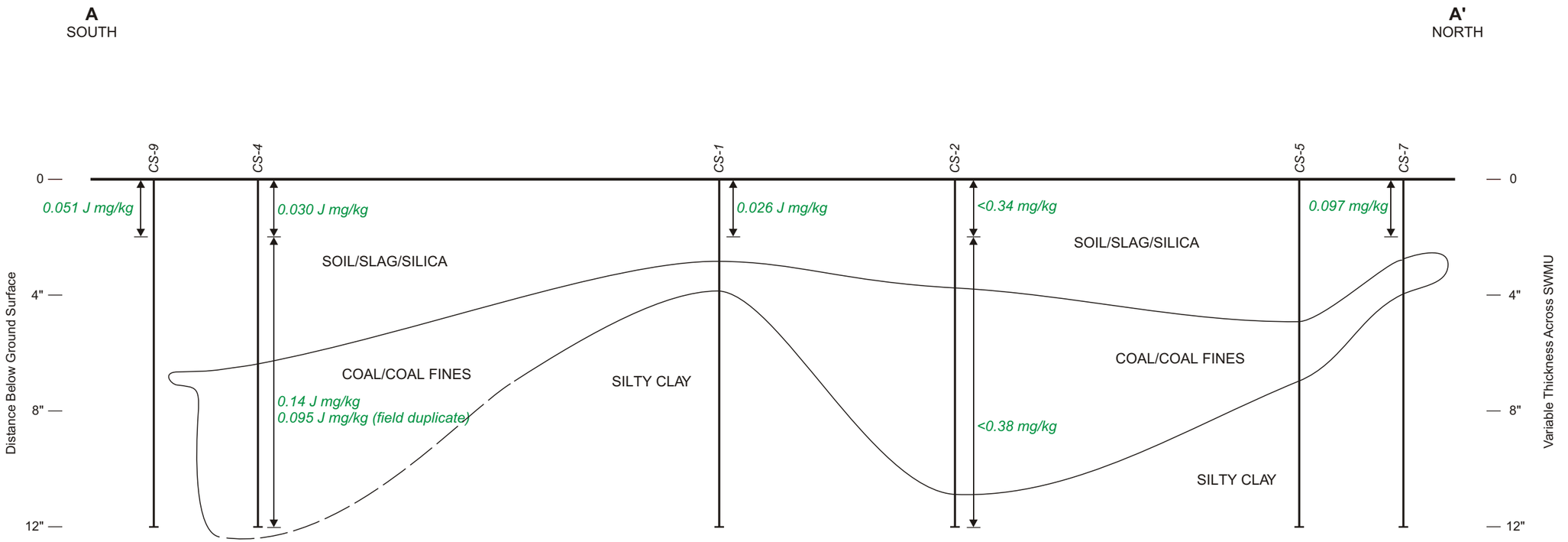


No Horizontal Scale

Figure 5.5.10-22

CONCEPTUAL CROSS SECTION B-B'
THROUGH SWMU 10
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\Conceptual Cross Section B-B' Thru SWMU 10.CDR RLG 12-27-12



No Horizontal Scale

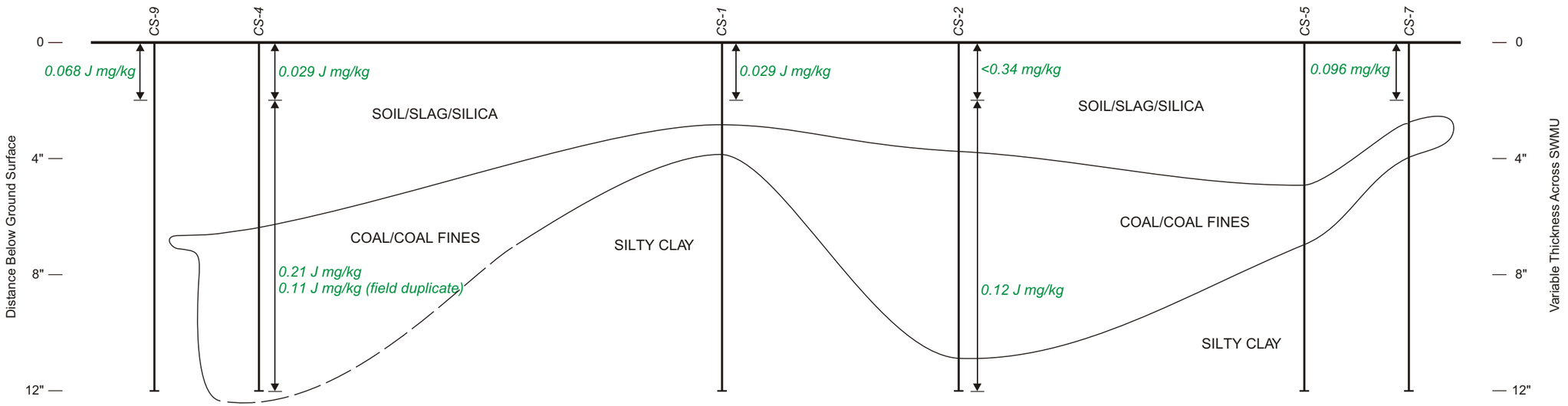
Figure 5.5.10-23

SWMU 10
CONCEPTUAL CROSS SECTION A-A'
BENZO(a) ANTHRACENE DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\SWMU 10 Conceptual Cross Section A-A' Benzo Anthracene Diagram.CDR RLG 12-28-12

A
SOUTH

A'
NORTH



No Horizontal Scale

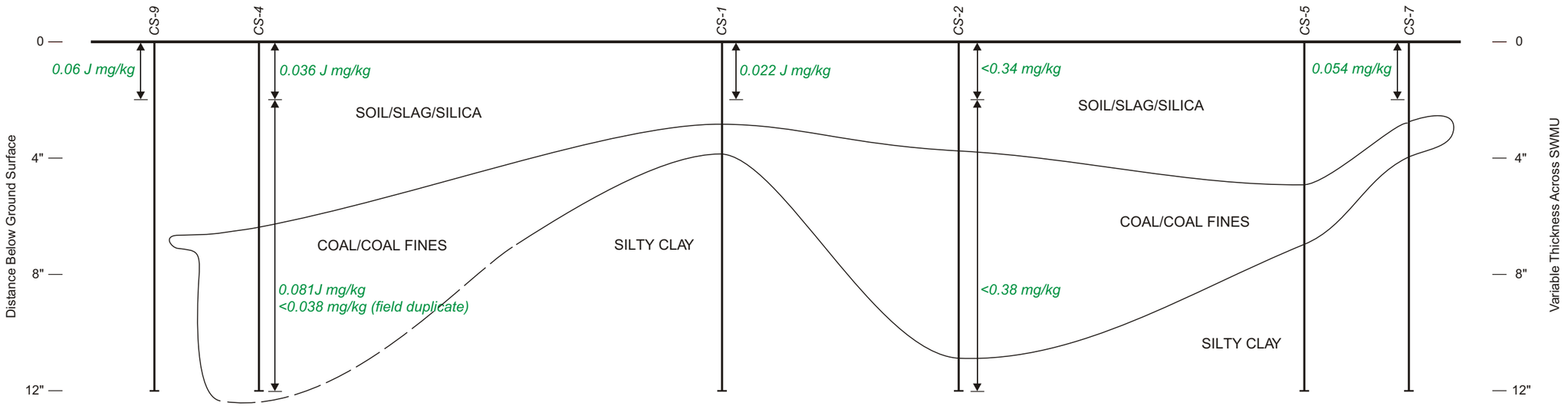
Figure 5.5.10-24

SWMU 10
CONCEPTUAL CROSS SECTION A-A'
CHRYSENE DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\SWMU 10 Conceptual Cross Section A-A' Chrysene Diagram.CDR RLG 12-28-12

A
SOUTH

A'
NORTH

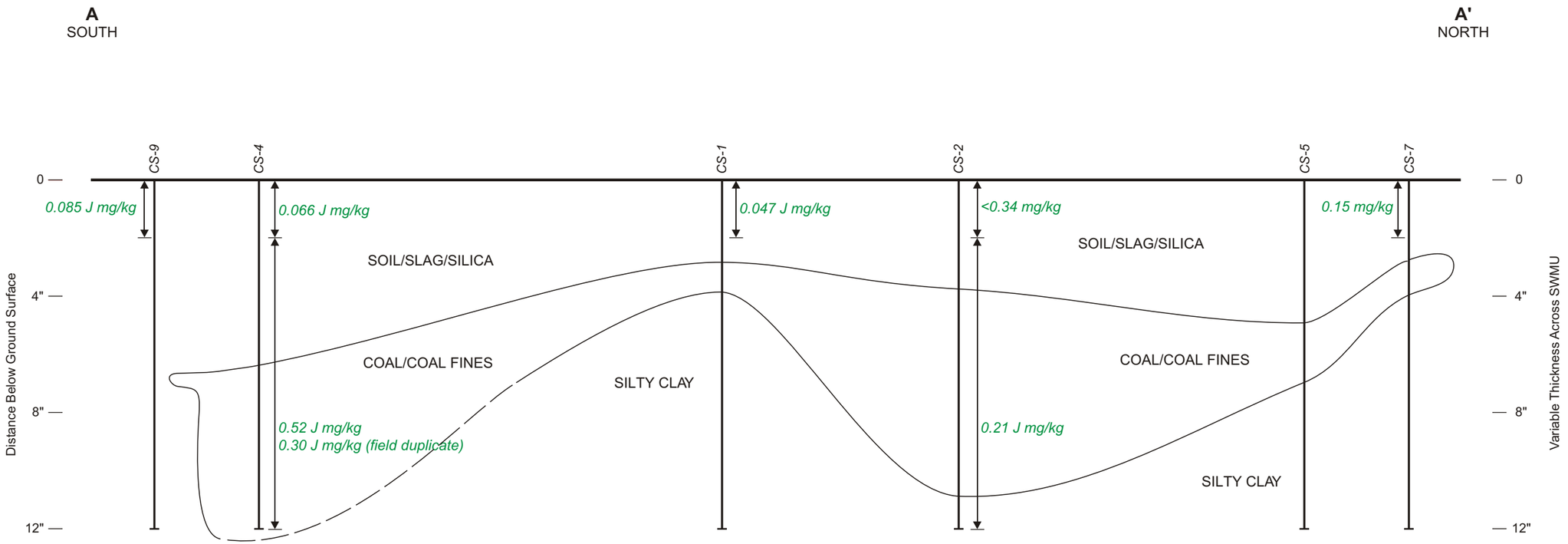


No Horizontal Scale

Figure 5.5.10-25

SWMU 10
CONCEPTUAL CROSS SECTION A-A'
BENZO (g, h, i) PERYLENE DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\SWMU 10 Conceptual Cross Section A-A' Benzo Perylene Diagram.CDR RLG 12-28-12



No Horizontal Scale

Figure 5.5.10-26

SWMU 10
CONCEPTUAL CROSS SECTION A-A'
PYRENE DIAGRAM
Rhodia Silver Bow Plant
Montana

P:\Mpls\26 MT\46\2646006\WorkFiles\Figures_Graphics\2012 Cross Sections\SWMU 10 Conceptual Cross Section A-A' Pyrene Diagram.CDR RLG 12-28-12

Appendices

Appendix 5.5.10-A

Test Pit Log

PROJECT NO. 26460006

TEST PIT NO. SWMU-10 TP-1 SHEET 1 OF 1

TEST PIT WALL LOG

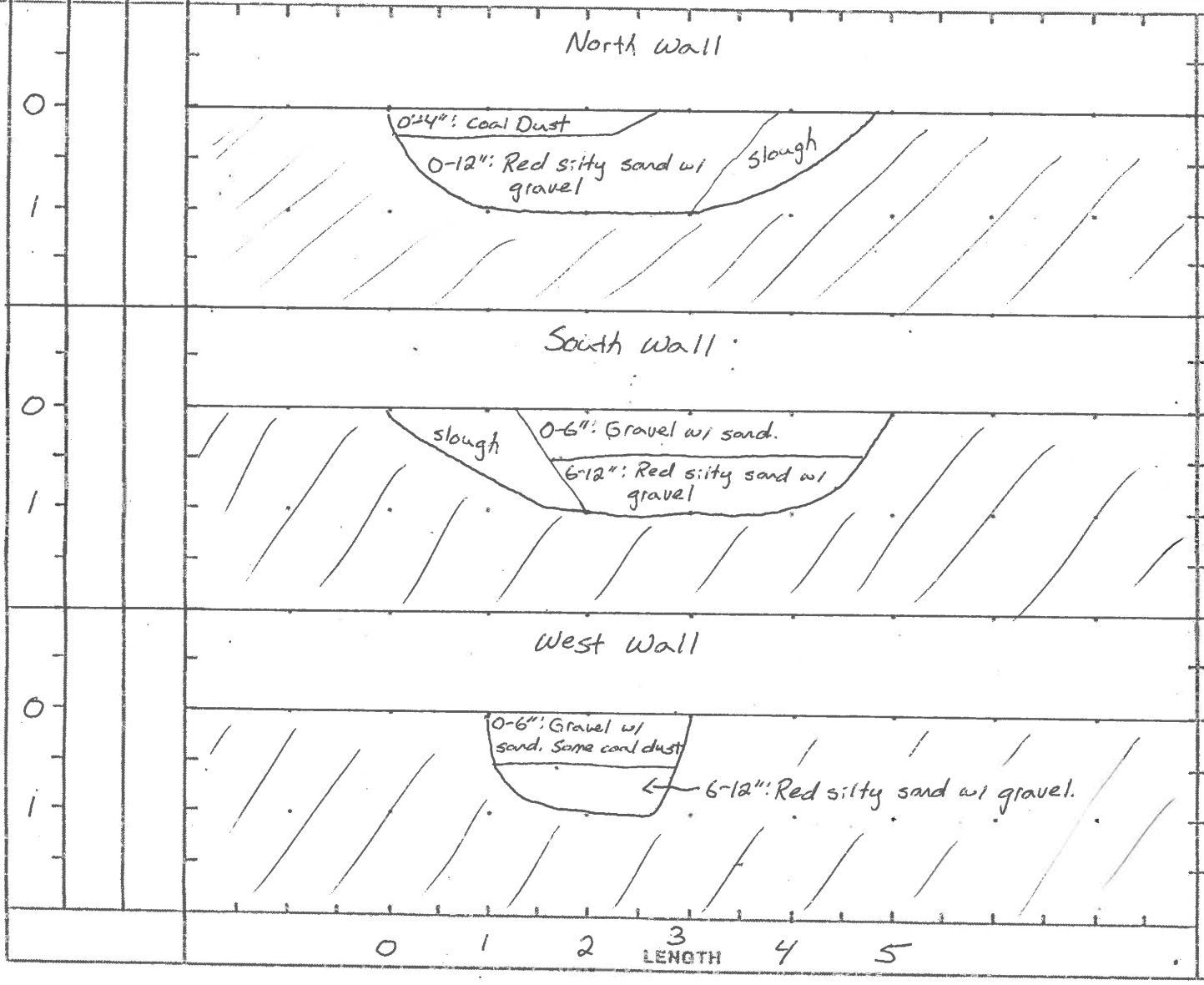
PROJECT Rhodia RFI LOCATION SWMU-10 Coal Stockpile Area MAP OF — WALL OF PIT

ELEVATION N/A CONTRACTOR MT Reclamation & Landscaping DATE EXCAVATED 10/1/12

WATER LEVEL AND DATE N/A - Dry EXCAVATION METHOD Backhoe LOGGER LML2

APPROXIMATE DIMENSIONS LENGTH 4' WIDTH 2' DEPTH 1' REMARKS

ELEVATION | DEPTH BELOW SURFACE ( ) | SAMPLE: INTERVAL | SAMPLE: TYPE AND NUMBER



COMMENTS

Silty sand appears to be native. g/s/f = 10/60/30

Due to underground electrical, excavation could not be moved further north to define extent of coal.

gravel is likely slag.

PROJECT NO. 264600036

TEST PIT NO. SWMU-10 TP-2 SHEET 1 OF 1

TEST PIT WALL LOG

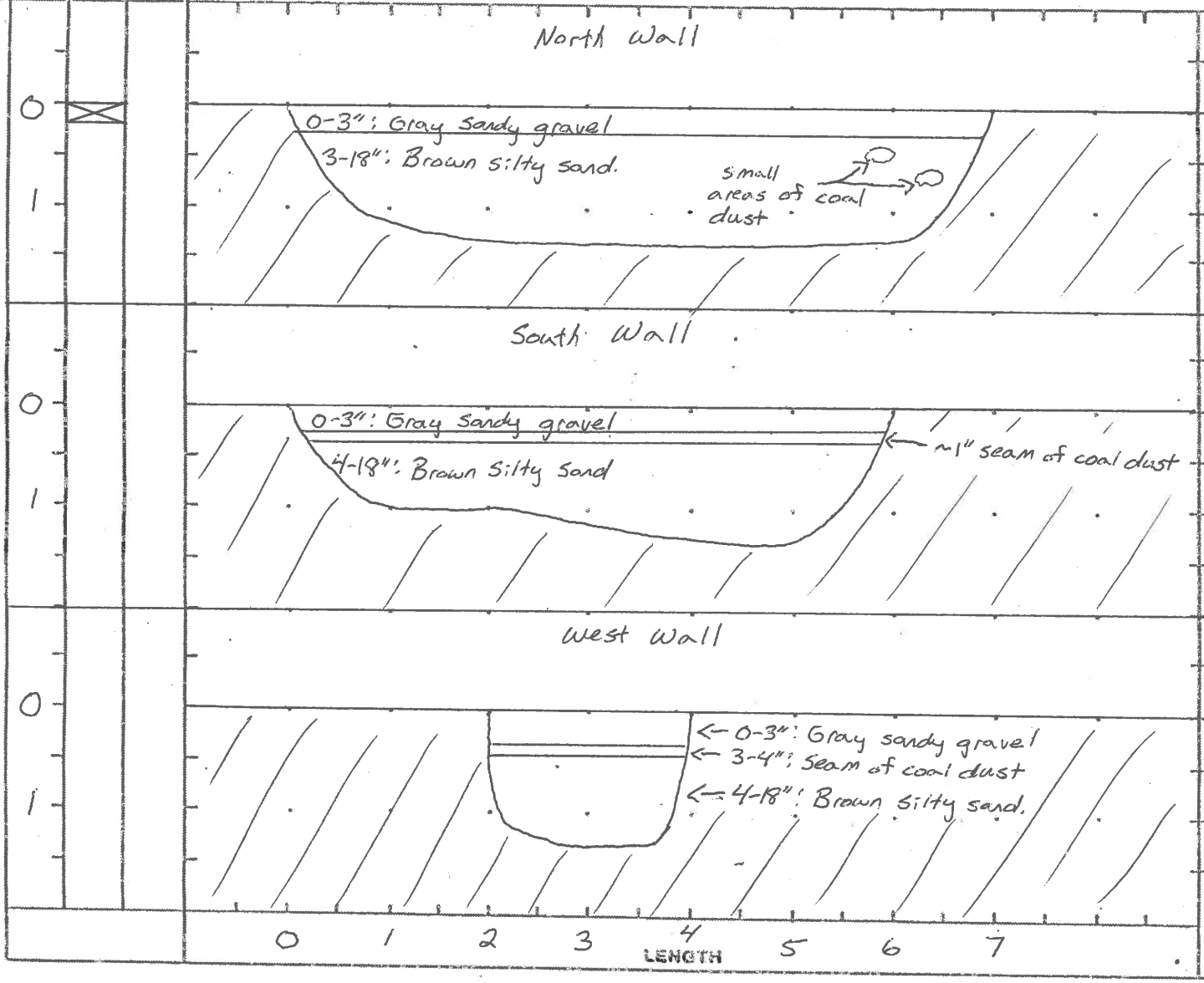
PROJECT Rhodia RFI LOCATION SWMU-10 Coal Stockpile Area MAP OF — WALL OF PIT

ELEVATION N/A CONTRACTOR MT Reclamation & Landscaping DATE EXCAVATED 10/1/12

WATER LEVEL AND DATE N/A- Dry EXCAVATION METHOD Backhoe LOGGER

APPROXIMATE DIMENSIONS LENGTH 7' WIDTH 2' DEPTH 1.5' REMARKS

ELEVATION | DEPTH BELOW SURFACE ( ) | SAMPLE: INTERVAL | SAMPLE: TYPE AND NUMBER



COMMENTS

Brown Silty Sand
g/s/f = 10/60/30
-appears to be native

Gray Sandy Gravel
g/s/f = 70/20/10
-gravel is likely slag

Collected sample at 1400 from north wall, CS-7 (0-2) w/ MS/MSD

PROJECT NO. 26460006

TEST PIT NO. SWMU-10 TP-3 SHEET 1 OF 1

TEST PIT WALL LOG

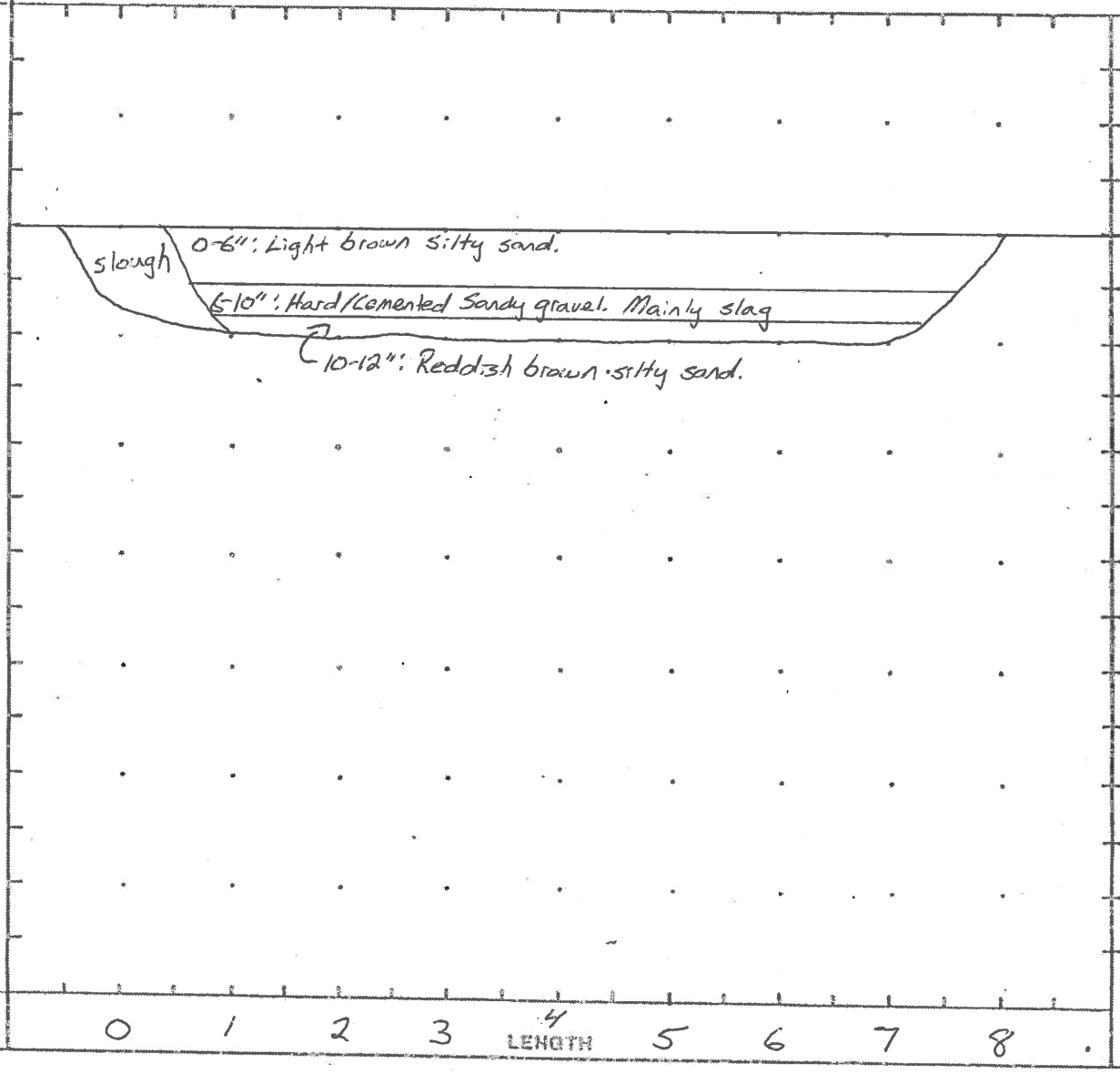
PROJECT Rhodia RFI LOCATION SWMU-10 Coal Stockpile Area MAP OF W WALL OF PIT

ELEVATION N/A CONTRACTOR MT Reclamation & Landscaping DATE EXCAVATED 10/1/12

WATER LEVEL AND DATE N/A - Dry EXCAVATION METHOD Backhoe LOGGER LML2

APPROXIMATE DIMENSIONS LENGTH 9' WIDTH 2' DEPTH 1' REMARKS

ELEVATION | DEPTH BELOW SURFACE ( ) | SAMPLE: INTERVAL | SAMPLE: TYPE AND NUMBER



COMMENTS

gravel is likely slag

PROJECT NO. 26460006

TEST PIT NO. SWMU-10 TP-4 SHEET 1 OF 1

TEST PIT WALL LOG

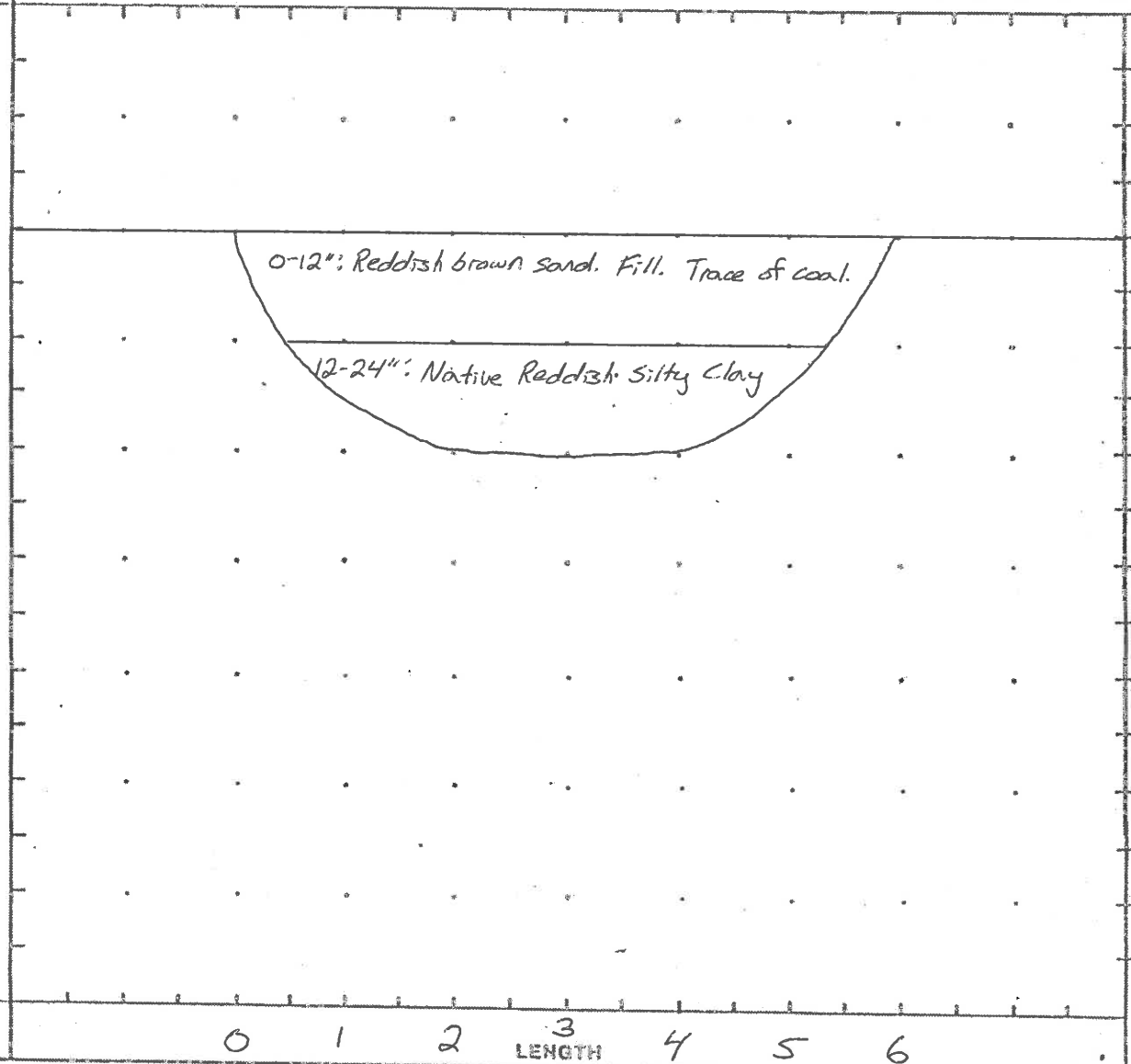
PROJECT Rhodia RFI LOCATION SWMU-10 Coal Stockpile Area MAP OF E WALL OF PIT

ELEVATION N/A CONTRACTOR MT Reclamation & Landscaping DATE EXCAVATED 10/1/12

WATER LEVEL AND DATE N/A - Dry EXCAVATION METHOD Backhoe LOGGER GML2

APPROXIMATE DIMENSIONS LENGTH 6' WIDTH 2' DEPTH 2' REMARKS

ELEVATION | DEPTH BELOW SURFACE ( ) | SAMPLE: INTERVAL | SAMPLE: TYPE AND NUMBER



COMMENTS

Sand
g/s/f = 10/80/10

Silty clay
g/s/f = 0/5/95

TEST PIT WALL LOG

PROJECT NO. 26460006

TEST PIT NO. SWMU-10 TP-5 SHEET 1 OF 1

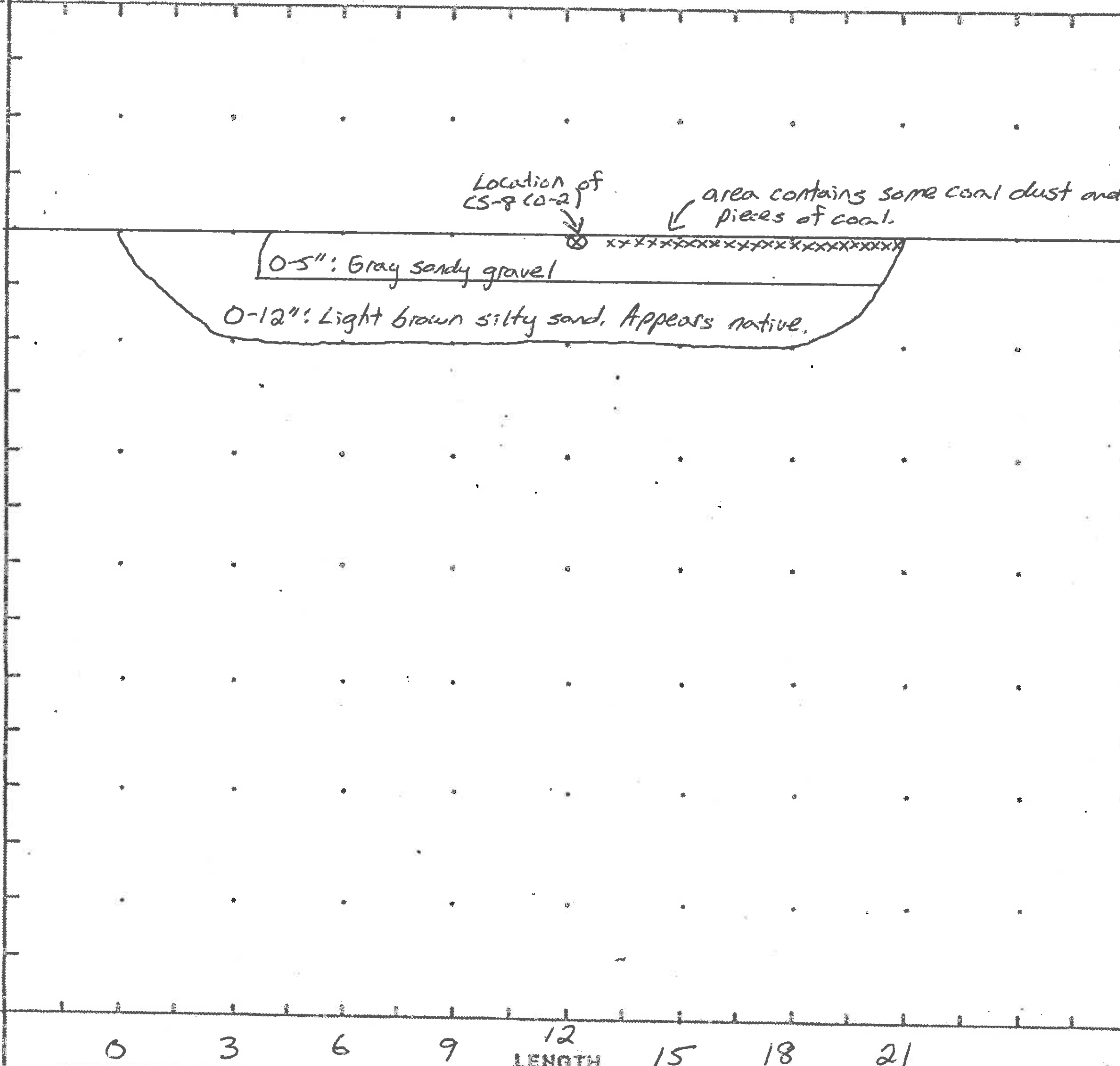
PROJECT Rhodia RFI LOCATION SWMU-10 Coal Stockpile Area MAP OF S WALL OF PIT

ELEVATION N/A CONTRACTOR MT Reclamation & Landscaping DATE EXCAVATED 10/1/12

WATER LEVEL AND DATE N/A - Dry EXCAVATION METHOD LOGGER BJL2

APPROXIMATE DIMENSIONS LENGTH WIDTH DEPTH REMARKS

ELEVATION	DEPTH BELOW SURFACE ( )	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER
	0	X	0" 2"
	1		



COMMENTS

Sandy gravel
g/s/f = 50/25/25
-gravel is likely slag
Silty Sand
g/s/f = 10/60/30

Sample collected at 1605
CS-8 (0-2)

Sample collected CS-101 (0-2)
Field duplicate

Sample collected CS-121
(0-2). Field Blank

PROJECT NO. 26460006

TEST PIT NO. SWMU-10 TP-6 SHEET 1 OF 1

TEST PIT WALL LOG

PROJECT Rhodia RFI LOCATION SWMU-10 Coal Stockpile Area MAP OF W WALL OF PIT

ELEVATION N/A CONTRACTOR MT Reclamation & Landscaping DATE EXCAVATED 10/1/12

WATER LEVEL AND DATE N/A - Dry EXCAVATION METHOD Backhoe LOGGER BJL2

APPROXIMATE DIMENSIONS LENGTH 20' WIDTH 2' DEPTH 1' REMARKS