

FINAL

Site Investigation Report

Smoky Canyon Mine, Caribou County, Idaho

July 2005

Prepared for:

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APPENDIX D

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SITE-SPECIFIC REFERENCE DATA FOR STREAM SEDIMENT AND SOIL

Baseline sediment and soil conditions were described and then used in the Site Investigation to assist in identifying the nature and extent of sediment and soil contamination by contaminants of potential concern (COPCs: cadmium, chromium, copper, nickel, selenium, vanadium, and zinc) (refer to Section 7 of the Site Investigation Report). The baseline data sets and the procedures used to describe baseline COPC concentrations in sediments and soils are explained below.

Stream Sediments

The site-specific baseline, or reference, conditions for stream sediments were evaluated to serve as a basis for comparison to stream sediments collected during the Site Investigation.

All available analyses of stream sediment samples collected from locations upstream of the mining-disturbed areas were used to describe the baseline conditions. Figure D-1 identifies the locations where stream sediments were considered uninfluenced by the effects of mining at the Smoky Canyon Mine. These locations are all upstream of the active mining areas. As such, all are also upstream of the surface outcrops of the Phosphoria Formation, which is a likely natural source of the constituents of potential concern (COPCs) to stream sediments. For this reason, the samples selected to represent the site-specific baseline conditions potentially have lower COPC concentrations than natural stream sediments located on or just below Phosphoria Formation outcrops. Use of a potentially low-biased baseline data set establishes a conservative screening tool for identifying contamination due to mining activities.

Sediment samples were collected from one or more of the locations shown in Figure D-1 during 1998, 1999, 2000 and 2001 (IDEQ, 2001; Maxim, 2002) and also during the Smoky Canyon Mine Site Investigation in 2004. There are 13 stream sediment samples in the baseline data set; Table D-1 presents the COPC concentration data for these 13 samples.

Summary statistics were calculated for each of the COPCs to describe the range and variability of concentrations in the baseline sediments. The summary statistics are reported on Table D-1. For results reported by a laboratory as less than the detection limit, a value of one-half the detection limit was used for calculation of statistics. The values reported on Table D-1 include the half-detection-limit substitutions.

The 95th percentile value from the baseline data set was adopted to describe the upper range of the baseline concentrations. Based on the data available to describe baseline conditions, only 5 percent of baseline sediments are expected to have COPC concentrations higher than the 95th percentile value.

The box plot in Figure D-2 displays the concentration range, the mean and the 95th percentile value, for each COPC in the baseline stream sediments. The 95th percentile value for each COPC is identified in Section 7 of the SI Report as the site-specific reference concentration for stream sediments (refer to Tables 7-1 through 7-7).

Soils

The site-specific baseline, or reference, conditions for soils were evaluated to serve as a basis for comparison to soils collected within mining-disturbed areas and from areas potentially influenced by surface water transport of COPCs from the mining-disturbed areas.

Analyses of soil samples collected from the top 12 inches of soil at undisturbed locations, either outside of the mining-disturbed area or collected prior to mining disturbances, were used to describe the baseline conditions. Figure D-3 identifies the soil-sample locations considered uninfluenced by the effects of mining at the Smoky Canyon Mine. Some of these locations appear within active mining areas; however, at these locations the samples were collected prior to mining disturbance. Soils were collected (from the top 12 inches) at the locations shown on Figure D-3 during one of three different investigations:

1. Area-wide environmental investigations performed on behalf of the Interagency and Idaho Mining Association Selenium Working Group (MWH, 1999),
2. Baseline soil characterization performed in support of the Supplemental Environmental Impact Statement (SEIS) prepared for the Panels B and C operations (Maxim, 2001), and
3. Supplemental sampling in the Panels D and E areas also performed in support of the Panels B and C SEIS (JBR, 2001).

There are a total of 31 soil samples in the baseline data set; Table D-1 presents the COPC concentration data for these samples.

None of the baseline soil samples were analyzed for chromium. Therefore, the baseline conditions for chromium could not be described.

Summary statistics were calculated for each of the COPCs to describe the range and variability of concentrations in the baseline soils. The summary statistics are reported on Table D-2. For results reported by a laboratory as less than the detection limit, a value of one-half the detection limit was used for calculation of statistics. The values reported on Table D-2 include the half-detection-limit substitutions.

The 95th percentile value from the baseline data set was adopted to describe the upper range of the baseline concentrations. Based on the data available to describe baseline conditions, only 5 percent of baseline soils are expected to have COPC concentrations higher than the 95th percentile value.

The box plot in Figure D-4 displays the concentration range, the mean and the 95th percentile value, for each COPC in the baseline soils. The 95th percentile value for each COPC is identified in Section 7 of the SI Report as the site-specific reference concentration for soils (refer to Tables 7-1 through 7-7).

References

Idaho Department of Environmental Quality (IDEQ), 2001. Draft 2001 Data Summary Report-Area Wide Investigation, Southeast Idaho Phosphate Mining Resource Area

JBR Environmental Consultants, 2001. Data Report for Soil/Growth Medium and Vegetation Sampling at the Smoky Canyon Mine, June 2001.

Maxim Technologies, 2001. Revised Draft Baseline Study for Smoky Canyon Mine Panels B & C Soil Resources, Caribou County, Idaho. Prepared for J.R. Simplot Company, March 2001.

Maxim Technologies, 2002. Revised Final Water Resources Baseline Report, Smoky Canyon Mine, Caribou County, Idaho, April 2002.

Montgomery Watson Harza (MWH), 1999. Final 1998 Regional Investigation Report, Southeast Idaho Phosphate Resource Area Selenium Project. Idaho Mining Association Selenium Subcommittee. December.

TABLES

Table D-1. Site-Specific Reference Data Set for Stream Sediments

Station Location	Sample Date	Cadmium	Chromium	Copper	Nickel	Selenium	Vanadium	Zinc
US	9/16/1998	3.96			35.20	0.38	38.85	57.98
US	6/12/2001	0.10 U	43.0	13.0	22.00	1.00	47.00	77.00
US	7/23/2004	0.85	18.8	13.5	16.70	0.78	20.90	75.20
US-2	7/24/2001	1.10	31.0	12.0	19.80	1.00	32.00	88.00
UP	7/24/2004	0.65	22.9	20.6	24.30	0.46	29.70	91.50
USm	9/5/2000	2.00	16.0	13.0	15.00	2.50 U	18.00	51.00
USm	7/24/2004	0.89	24.4	23.0	27.30	0.51	30.30	99.50
USm-2	9/15/1998	4.08			47.57	2.50	53.88	120.50
USm-2	6/12/2001	0.10 U	43.0	17.0	23.00	1.40	55.00	96.00
USS	7/22/2004	2.80	28.2	16.8	23.50	0.47	34.20	107.00
USS-1b	9/15/1998	5.45			37.45	1.21	52.73	95.28
USS-1b	9/16/1999	6.30				0.95		
UT-1	9/5/2000	0.50 U	18.0	2.5 U	2.50 U	2.50 U	11.00	11.00

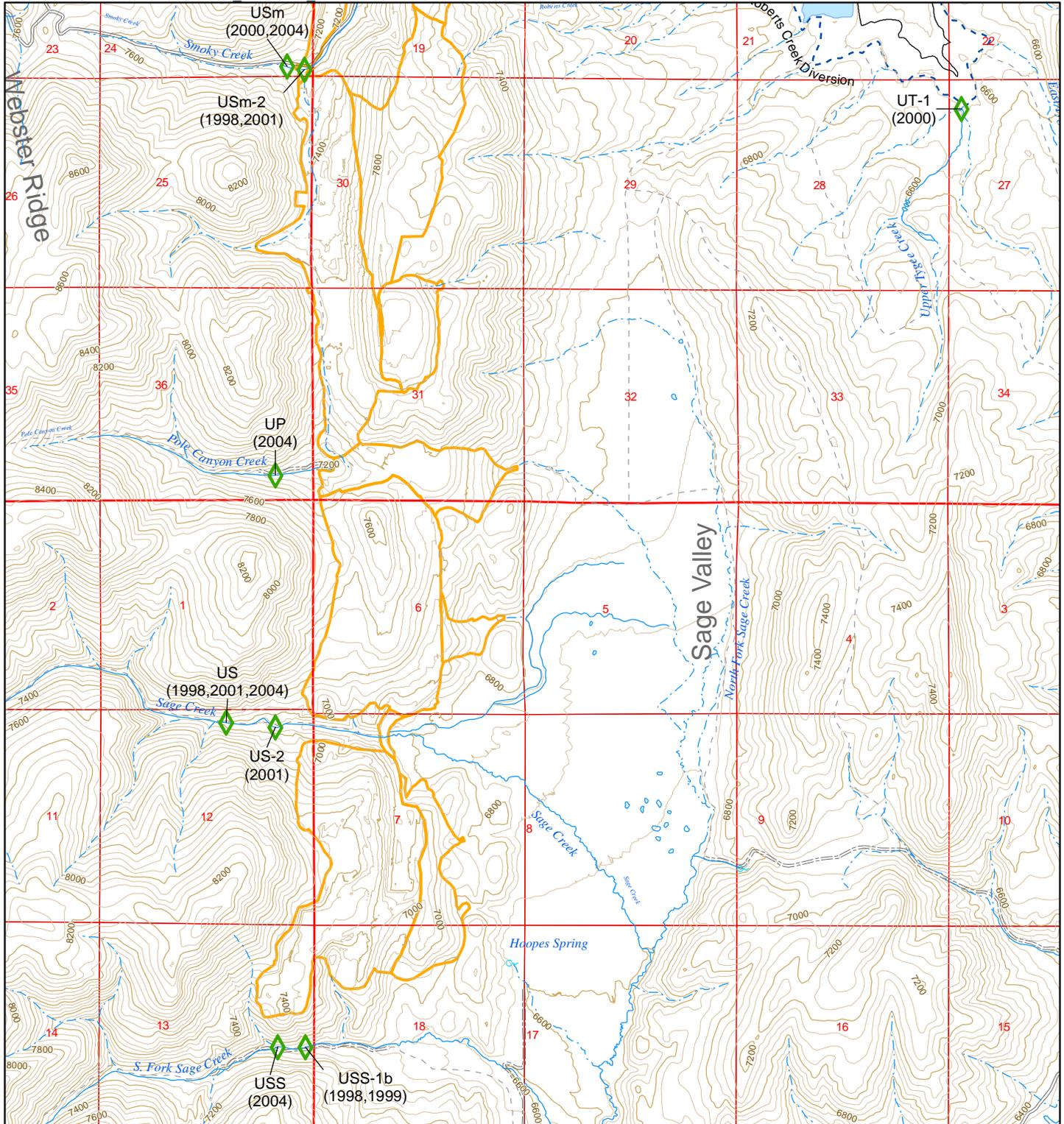
count	13	9	9	12	13	12	12
min	0.10	16.00	2.50	2.50	0.38	11.00	11.00
25th percentile	0.7	18.8	13.0	19.0	0.5	27.5	70.9
Average	2.2	27.3	14.6	24.5	1.2	35.3	80.8
median	1.1	24.4	13.5	23.3	1.0	33.1	89.8
75th percentile	4.0	31.0	17.0	29.3	1.4	48.4	96.9
95th percentile	6.3	43	23	47.6	2.5	55	120.5
max	6.3	43	23	47.57	2.5	55	120.5

Table D-2. Site-Specific Reference Data Set for Soils

Sample Information						COPC Concentrations (mg/Kg, dry weight)						SampleNotes
Data Source	Sample ID	DepthMin	DepthMax	DepthUnit	Date	Cadmium, Total	Copper, Total	Nickel, Total	Selenium, Total	Vanadium, Total	Zinc, Total	
MWH	BB003-1	0	2	inches	7/25/1998	5.6		44	0.64	47	210	
MWH	BB003-2	0	2	inches	7/25/1998	9.1		67	0.61	52	310	
MWH	BB003-3	0	2	inches	7/25/1998	7.4		79	1.04	61	330	
MWH	BB003-4	0	2	inches	7/25/1998	4.5		55	1.40	43	220	
MWH	BB003-5	0	2	inches	7/25/1998	4.5		73	1.40	57	260	
Maxim	SS-1	0	3	inches	7/27/2000	1 U	15	13	0.5 U	6	40	Date approximate, sampling conducted July 26-28, 2000
Maxim	SS-7	0	4	inches	7/26/2000	42	25	115	3	276	788	Soil type: CP Soil texture: L
Maxim	SS-16	0	5	inches	11/1/2000	5	31	10 U	0.5 U	30	141	Soil type: CP Soil texture: SiL
Maxim	SS-5	0	5	inches	7/26/2000	40	33	87	5	233	728	Soil type: ECS Soil texture: L
Maxim	SS-9	0	5	inches	7/27/2000	1 U	29	38	0.5 U	26	154	Soil type: UDR Soil texture: CL
Maxim	SS-1	0	6	inches	7/27/2000	1 U	11	20	0.5 U	31	42	Date approximate, sampling conducted July 26-28, 2000
Maxim	SS-12	0	6	inches	10/31/2000	16	8	30	0.5 U	50	348	Soil type: EC Soil texture: SiL
Maxim	SS-3	0	6	inches	7/26/2000	1 U	9	16	0.5 U	24	76	Soil type: JK Soil texture: SiL
JBR	Q34	0	7	inches	8/18/2000	2.7	10.9	17.8	0.1 U	28.6	163	Depth from Appendix F: Field Data Sheets (Depth of Rooting Zone)
Maxim	SS-23	0	7	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	16	20	Soil type: CP Soil texture: L
Maxim	SS-25	0	7	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	22	60	Soil type: FR Soil texture: L
Maxim	SS-32	0	7	inches	1/31/2001	2 U	2.5 U	10 U	0.5 U	19	30	Soil type: ST Soil texture: SL
Maxim	SS-22	0	8	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	12	20	Soil type: FR Soil texture: SL
Maxim	SS-24	0	8	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	18	40	Soil type: CP Soil texture: SiL
Maxim	SS-26	0	8	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	14	20	Soil type: CP Soil texture: L
Maxim	SS-30	0	8	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	11	30	Soil type: FR Soil texture: SL
Maxim	SS-34	0	8	inches	1/31/2001	10	7	30	0.5 U	34	254	Soil type: FR Soil texture: L
Maxim	SS-6	0	8	inches	7/26/2000	5	24	35	0.5 U	31	223	Soil type: ST Soil texture: L
Maxim	SS-31	0	10	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	18	30	Soil type: FR Soil texture: SL
Maxim	SS-4	0	10	inches	7/26/2000	6	15	38	0.5 U	23	180	Soil type: FR Soil texture: L
JBR	Q32	0	11	inches	8/8/2000	1.8	14.2	16.4	1.1	18	98.6	Depth from Appendix F: Field Data Sheets (Depth of Rooting Zone)
Maxim	SS-21	0	11	inches	1/30/2001	2 U	2.5 U	10 U	0.5 U	14	40	Soil type: EC Soil texture: L
Maxim	SS-33	0	11	inches	1/31/2001	17	2.5 U	50	0.5 U	42	388	Soil type: UDR Soil texture: L
Maxim	SS-13	0	12	inches	11/1/2000	6	20	10 U	0.5 U	20	203	Soil type: EC Soil texture: SiL
Maxim	SS-8	0	12	inches	7/27/2000	1 U	23	23	0.5 U	28	74	Soil type: CC Soil texture: L
Maxim	SS-25	7	12	inches	1/30/2001	2 U	2.5 U	20	1	35	70	Soil type: FR Soil texture: CL

count	31	26	31	31	31	31
min	1	2.5	10	0.1	6	20
25th percentile	2	2.5	10	0.5	18	40
Average	6.7	11.6	31.5	0.8	43.2	180.3
median	2	8.5	20	0.5	28	141
75th percentile	6.0	18.8	41	0.6	43	239
95th percentile	40	31	87	3	233	728
max	42	33	115	5	276	788

FIGURES



Legend

 Reference Sediment Locations
(Date of Sampling)



J.R. SIMPLOT COMPANY
SMOKY CANYON MINE SITE

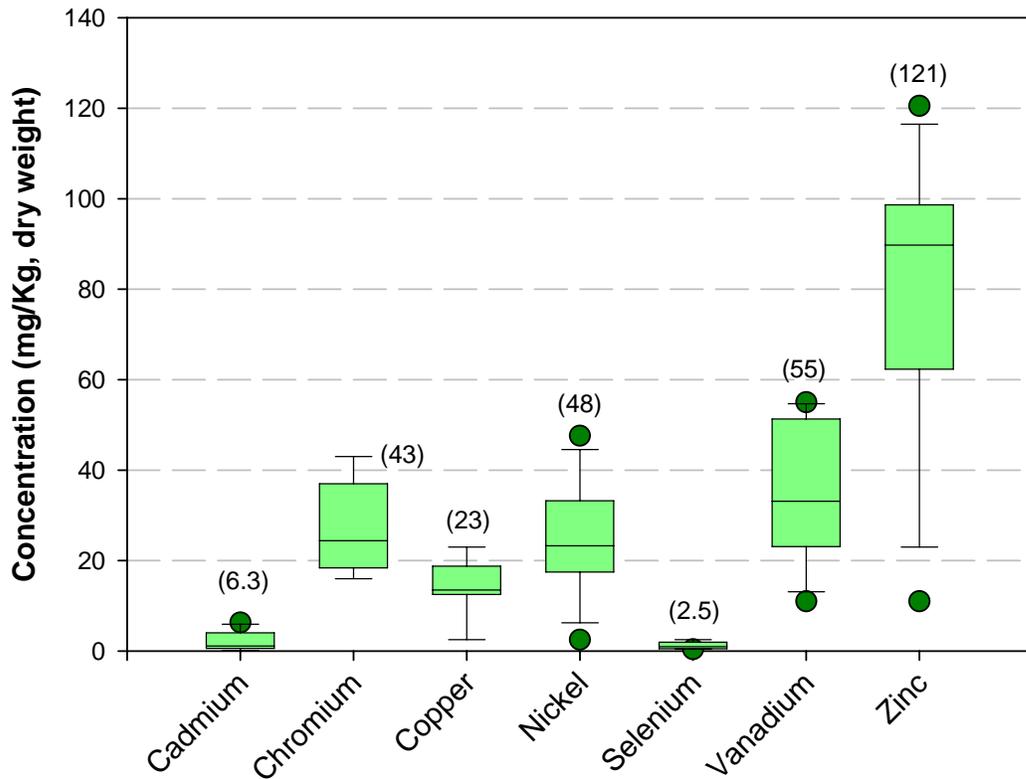
FIGURE D-1

**SEDIMENT LOCATIONS
USED TO DESCRIBE
REFERENCE CONDITIONS**

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REV: 0	BY: JMP CHK: KJT

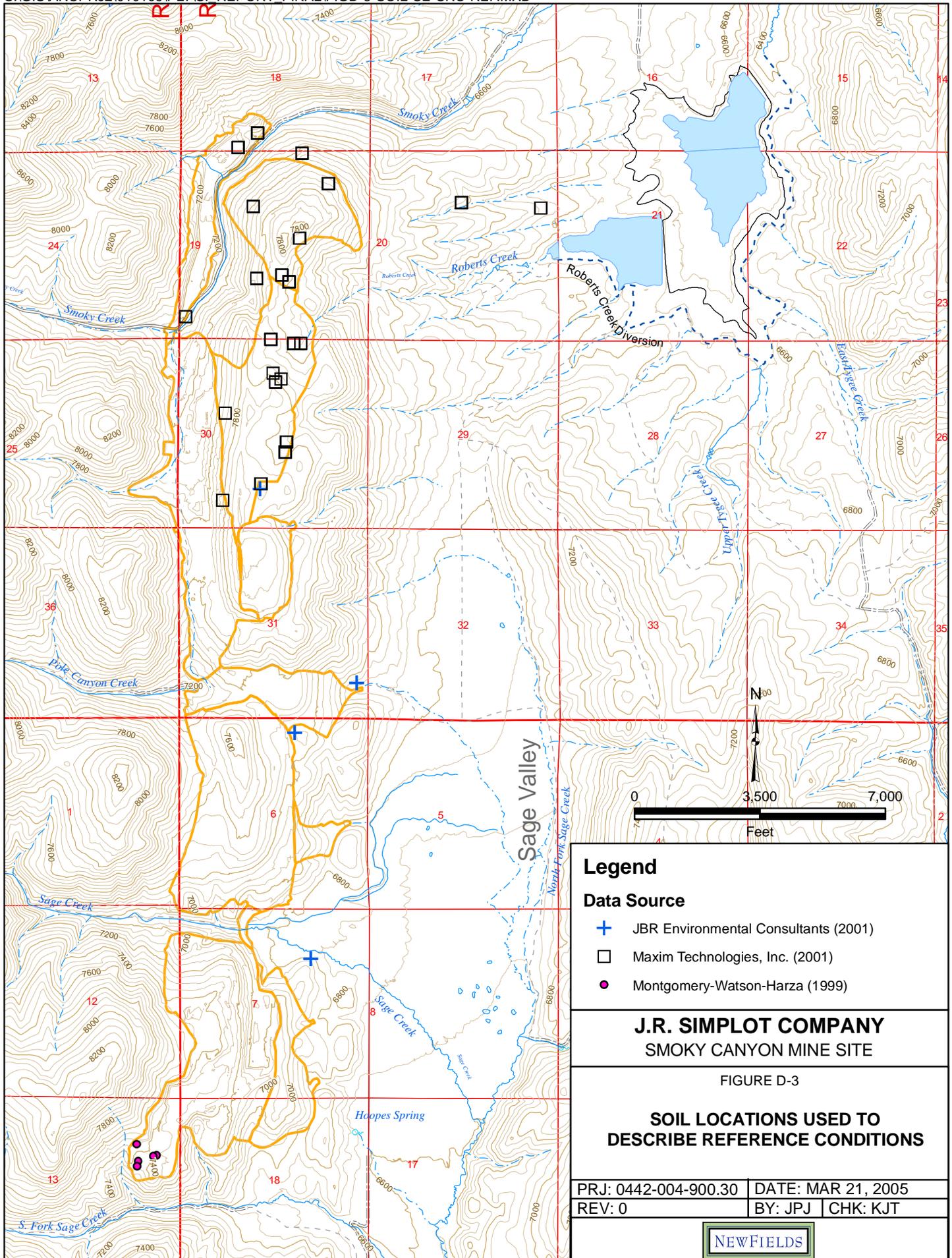


Reference Stream Sediments COPC Concentration Distributions



● 95th Percentile of Distribution (value is posted)

J.R. SIMPLOT COMPANY Smoky Canyon Mine		
FIGURE D-2		
Reference Sediment COPC Concentrations and 95 th Percentile Values		
0442-004-900	DATE: 3/15/05	
REV: 0	BY:	CHK: KJT
NEWFIELDS		



Legend

Data Source

- + JBR Environmental Consultants (2001)
- Maxim Technologies, Inc. (2001)
- Montgomery-Watson-Harza (1999)

**J.R. SIMPLOT COMPANY
SMOKY CANYON MINE SITE**

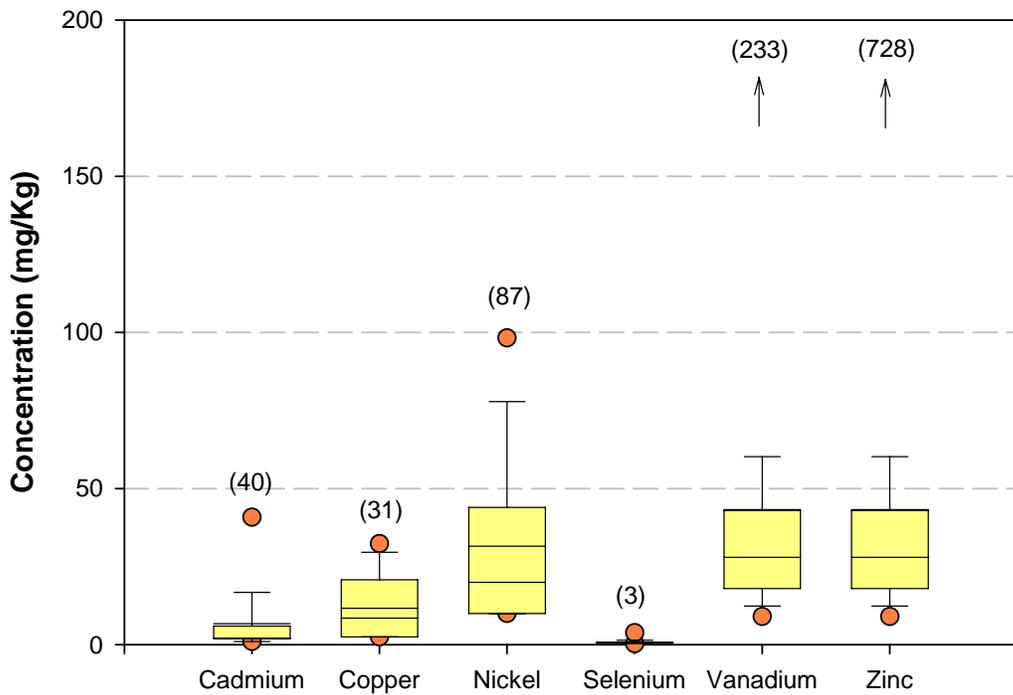
FIGURE D-3

**SOIL LOCATIONS USED TO
DESCRIBE REFERENCE CONDITIONS**

PRJ: 0442-004-900.30	DATE: MAR 21, 2005
REV: 0	BY: JPJ CHK: KJT



Reference Soils COPC Concentration Distributions (0- to 12-inch depth)



● 95th Percentile of Distribution (value is posted)

J.R. SIMPLOT COMPANY Smoky Canyon Mine		
FIGURE D-4 Reference Soil COPC Concentrations and 95 th Percentile Values		
0442-004-900	DATE: 3/15/05	
REV: 0	BY:	CHK: KJT
NEWFIELDS		