Figure 3.3-6 Water Levels and Flow Directions in Alluvium

This page Figure 3.3-6 back.

Figure 3.3-7 Cross-sections Showing Geologic Features

Figure 3.3-8a Figure 3.3-8b Hydrographs for Selected Monitoring Wells

(Two Pages)

Figure 3.3-9 Cross Section Showing Monitoring Wells in Reese Canyon Area

Figure 3.3-10 Regional Bedrock Groundwater Level Elevations

3.3.5 Groundwater Quality

Groundwater samples were collected from 13 monitoring wells in the alluvium, 3 monitoring wells in the Rex Chert Member, 1 monitoring well in the Upper Meade Peak Member, and one production well in the Wells Formation. The wells were sampled in Fall 2001 and late Spring 2002, although five of the alluvial wells were dry in 2001 and could not be sampled. Samples collected for the baseline characterization program had a high degree of turbidity and suspended sediment (Maxim 2002d and 2002f), and turbid or cloudy samples may not be representative of in-situ groundwater conditions. Samples for dissolved constituents were field filtered to remove suspended material and preserved according to generally accepted sampling methodology (Maxim 2002d and 2002f). Because the samples were filtered, laboratory analyses for dissolved constituents in groundwater are considered to be representative of in-situ conditions. Samples that were analyzed for total recoverable concentrations, however, were not filtered (which is standard sampling protocol), and laboratory analyses are considered to overestimate total concentrations for in-situ groundwater because of the high suspended sediment content. Thus, the following discussion is based on results of the dissolved analyses from the baseline sampling.

Groundwater in the alluvium is a calcium-bicarbonate type, generally well-buffered, with moderate concentrations of total dissolved solids (116 to 506 mg/L) and neutral to slightly acidic pH (5.39 to 7.8). Median TDS concentrations are lower in No Name Creek (168 mg/L) than in Reese Canyon Creek (242 mg/L) or the West Fork of Sheep Creek (246 mg/L). The alluvial groundwater samples showed eight of 21 samples were high in dissolved manganese and results for 2 of 21 samples exceeded standards for dissolved aluminum and iron. No other dissolved metals were detected at concentrations that exceeded groundwater standards (**Table 3.3-14**).

Groundwater in the Rex Chert is a calcium-bicarbonate type with moderately high concentrations of total dissolved solids (98 to 421 mg/L) and neutral to slightly acidic pH (5.21 to 7.1). Groundwater from wells NR-C-4 and NR-R-12 is strongly buffered, while groundwater from well NR-R-2 is weakly buffered. Dissolved concentrations of manganese, cadmium, and nickel were detected at concentrations that exceeded groundwater standards in 33 to 83 percent of the samples. Dissolved iron and aluminum were detected at concentrations exceeding standards in 17 percent of samples. No other results for dissolved metals exceeded standards (**Table 3.3-15**).

Groundwater in the Upper Meade Peak Member is a calcium-bicarbonate type, moderately well buffered, with moderate concentrations of total dissolved solids (176 to 288 mg/L). The result from one of the two groundwater samples from the Upper Meade Peak exceeded groundwater standards for dissolved selenium (0.082 mg/L) and manganese (0.06 mg/L). No other results for dissolved metals exceeded groundwater standards (**Table 3.3-15**).

Groundwater from Dust Control Well #2 is a mixture of water from the Wells Formation and the Rex Chert and was analyzed for a limited suite of parameters in May 2002. The water is a moderately well buffered calcium-bicarbonate type. Cadmium and selenium were not detected (**Table 3.3-15**). Site-specific water quality data for the Wells Formation are not available, but in the region, water quality in the Wells Formation generally meets applicable standards. Naturally occurring elevated manganese concentrations (up to 1.1 mg/L) in Wells Formation water have been observed, however, at the nearby Dry Valley Mine (Whetstone 2002).

Table 3.3-14 GROUNDWATER QUALITY IN ALLUVIAL MONITORING WELLS

Location		No Name Creek Drainage									Reese Canyon							West Sheep Creek Drainage					Ground Water Standards	
Sample Station		NR-C-1	NR-NN-1	NR-NN-1	NR-NN-2	NR-NN-2	NR-NN-2A	NR-NN-2A	NR-NN-3	NR-NN-3	NR-R-1	NR-R-5	NR-R-6	NR-R-7	NR-R-7	NR-R-11	NR-R-11	NR-WS-1	NR-WS-1	NR-WS-2	NR-WS-2	NR-WS-3		
Date		6/13/02	9/18/01	6/10/02	9/18/01	6/10/02	9/18/01	6/10/02	9/18/01	6/11/02	6/12/02	6/12/02	6/12/02	9/19/01	6/12/02	10/2/01	6/12/02	9/18/01	6/11/02	9/18/01	6/11/02	6/11/02	Primary	Secondary
General Parameters																								
pH (field)	Std. Units	6.71	7.1	**6.2**	7.5	**6.26**	6.9	**5.39**	7.8	**5.98**	**5.61**	6.35	6.72	7.3	**6.25**	6.6	**6.35**	6.7	**6.19**	7.1	**6.43**	6.9	6.5 - 8.5	
pH (lab)	Std. Units	8.3	8.2	8.0	8.2	8	7.7	7.4	7.6	7.7	7.1	7.6	7.4	7.8	7.7	7.6	7.8	7.1	7	7.9	8	8	6.5 - 8.5	
Temp. (field)	C	10.5	7.3	8.6	7.1	6.2	8	4.8	6.8	5.2	5.8	5.0	6.3	7.3	5.7	7.0	5.2	9.1	5.6	9	6.4	6.5		
Total Alkalinity	mg/l $CaCO_3$	90	102	212	146. J	396. J	93	101	49	60	35	176	387	208	189	221	153	177	162	159	171	149		
Bicarbonate Alkalinity	mg/l HCO_3	110. F	124	259. F	178. J	483. JF	114	123. F	60	73. F	43. F	215. F	472. F	254	231. F	270	187. F	216	198. F	194	209. F	182. F		
Carbonate Alkalinity	mg/l CO_3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Hydroxide	mg/l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Acidity	mg/l $CaCO_3$	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.	<2.		
E.C. (field)	uS/cm	172	223	208	296	240	425	212	1211	342	171	361	619	476	404	441	346	426	326	353	367	302		
E.C. (lab)	uS/cm	162	219	202	1285	252	1231	217	109	310	127	346	687	437	394	325	306	359	334	353	339	264		
TDS	mg/l	124	188	116	247	169	229	158	154	**506**	231	205	413	300	242	254	231	267	248	246	198	161		500
Hardness	mg/l $CaCO_3$	85	89	103	151	136	85	125	40	125	45	203	467	208	235	191	176	159	162	152	201	142		
Major Ions																								
Ca	mg/l	21	29	33	44	33	27	32	11	8	13	63	93	65	71	60	54	44	40	41	49	47		
Cl	mg/l	<4.	<4.	7	5	6	6	6	<4.	5	<4.	5	<4.	5	5	<4.	<4.	<4.	<4.	4	<4.	5		250
F	mg/l	**9.85**	0.13	0.19	0.19	0.16	0.2	0.19	0.12	0.18	0.23	0.25	0.9	0.16	0.17	0.13	0.21	0.2	0.18	0.23	0.23	0.43	4	
K	mg/l	2	1	<1.	2	1	5	<1.	2	<1.	2	1	2	4	2	3	<1.	3	1	7	2	2		
Mg	mg/l	8	4	5	10	13	7	11	3	4	3	11	57	11	14	10	10	12	15	12	19	6		
Na	mg/l	3	5	6	7	6	7	6	3	45	6	5	6	6	5	4	4	10	12	7	6	4		
SO_4	mg/l	6	6	5	12	9	13	8	8	95	31	15	13	13	23	13	16	6	27	7	17	10		250
Nutrients																								
$NO_3 + NO_2$	mg/l N	0.63	0.20	0.58	0.16	0.41	0.32	0.16	0.33	1.09	1.39	0.38	0.44	0.09	0.73	0.42	0.12 J	<0.05	0.46	0.32	0.68	0.37		
NO_3	mg/l N	0.44	0.20	0.49	0.16	0.29	0.32	0.16	0.09	0.74	1.23	0.13	0.44	0.09	0.5	0.36	<0.05	<0.05	0.33	0.32	0.63	0.29	10	
NO_2	mg/l N	0.19	<0.05	0.09	<0.05	0.12	<0.05	<0.05	0.24	0.35	0.16	0.25	<0.05	<0.05	0.23	0.06	0.24 J	<0.05	0.13	<0.05	0.05	0.08	1	
NH_4	mg/l N	<0.05	<0.05	0.12	<0.05	0.06	<0.05	<0.05	<0.05	0.26	0.35	0.11	0.05	<0.05	0.11	<0.05	0.12	0.09	0.24	<0.05	0.08	0.51		
PO_3	mg/l	5.4	13. J	6.4	29. J	11	2.5 J	0.46	5.3 J	9.3	5.8	0.76	1.8	0.11 J	0.3	18	0.6	3.1 J	0.09	0.44 J	0.48	0.71		
PO_3 Ortho	mg/l	0.17	0.10 J	0.07	0.12 J	0.14	0.17 J	0.07	0.29 J	0.12	0.18	0.03	0.25	0.02 J	0.03	0.08	0.07	0.04 J	0.04	0.03 J	0.03	0.02		
Dissolved Metals																								
Ag	mg/l	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001		0.1
Al	mg/l	<0.1	<0.1	<0.1	**1.3 J**	<0.1	<0.1	<0.1	**1.1 J**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		0.2
As	mg/l	0.002	<0.003	0.002	<0.003	0.003	<0.003	0.002	<0.003	0.003	0.002	0.002	0.003	<0.003	0.002	<0.003	0.003	<0.003	0.003	<0.003	0.003	0.003	0.05	
B	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Ba	mg/l	0.01	<0.02	<0.01	0.04	0.01	0.06	0.04	0.05	0.01	0.02	0.04	0.12	0.1	0.08	<0.1	0.02	0.12	0.11	0.08	0.04	0.03	2	
Be	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0004	
Cd	mg/l	<0.0001 F	<0.0001	<0.0001 F	<0.0001	<0.0001 F	<0.0001	0.0001 F	<0.0001	<0.0001 F	<0.0001 F	<0.0001 F	0.0014 F	<0.0001	<0.0001 F	<0.0001	0.0007 F	0.0008	0.0012 F	<0.0001	<0.0001 F	0.0004 F	0.005	
Cr	mg/l	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001	<0.01	<0.01	<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<0.001	<0.01	0.002	0.02	0.02	0.1	
Cu	mg/l	<0.01	<0.001	<0.01	0.001	<0.01	<0.001	<0.01	0.002	<0.01	<0.01	<0.01	<0.01	<0.001	<0.01	<0.01	<0.01	<0.001	<0.01	0.006	<0.01	<0.01	1.3	
Fe	mg/l	<0.05	0.11	<0.05	**1.97 J**	<0.05	0.07	<0.05	**1.57 J**	<0.05	<0.05	<0.05	<0.05	0.16 J	<0.05	0.17	<0.05	0.11 J	<0.05	0.11 J	<0.05	<0.05		0.3
Hg	mg/l	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.002	
Mn	mg/l	<0.02	<0.005	<0.02	**0.27**	0.03	0.042	0.03	**0.072**	0.03	**0.25**	**0.12**	<0.02	**0.1**	<0.02	<0.02	<0.02	**4.21**	**7.34**	**0.06**	<0.02	<0.02		0.05
Ni	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.1	
Pb	mg/l	<0.001	<0.003	<0.001	<0.003	<0.001	<0.003	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001	<0.003	<0.001	<0.003	<0.001	<0.001	0.015	
Sb	mg/l	0.004	<0.003	<0.001	<0.003	0.005	<0.003	0.002	<0.003	0.005	<0.001	<0.001	<0.001	<0.003	<0.001	<0.003	0.006	<0.003	0.003	<0.003	0.005	0.001	0.006	
Se	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.003	0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.002	<0.001	0.001	0.005	0.05	
Tl	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	
V	mg/l	<0.005	<0.05	<0.005	<0.05	<0.005	<0.05	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.05	<0.005	<0.05	<0.005	<0.05	<0.005	<0.005		
Zn	mg/l	<0.02	<0.01	<0.02	0.02	<0.02	0.02	0.1	0.02	<0.02	<0.02	0.16	0.04	0.03	0.02	<0.02	<0.02	0.01	<0.02	0.02	<0.02	<0.02		5
Total Metals																								
Ag	mg/l	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	<0.001 UJF	<0.001 UJF	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	<0.001 UJF		0.1
Al	mg/l	**176. F**	n/a	**95.2 F**	n/a	**246. F**	n/a	**12.6 F**	n/a	**213. F**	**89.8 F**	**13.3 F**	**5.1 F**	n/a	**6.1 F**	n/a	**11.1 F**	n/a	**57.3 F**	n/a	**11.2 F**	**24.5 F**		0.2
As	mg/l	0.022 F	n/a	0.021 F	n/a	0.034 F	n/a	0.011 F	n/a	0.036 F	0.03 F	0.015 F	0.013 F	n/a	0.011 F	n/a	0.014 F	n/a	0.017 F	n/a	0.012 F	0.012 F	0.05	
B	mg/l	<0.1	n/a	<0.1	n/a	<0.1	n/a	<0.1	n/a	<0.1	<0.1	<0.1	<0.1	n/a	<0.1	n/a	<0.1	n/a	<0.1	n/a	<0.1	<0.1		
Ba	mg/l	0.66 F	n/a	0.79 F	n/a	1.7 F	n/a	0.13 F	n/a	1.98 F	0.54 F	0.22 F	0.18 F	n/a	0.2 F	n/a	0.14 F	n/a	0.59 F	n/a	0.16 F	0.24 F	2	
Be	mg/l	**0.007**	n/a	0.004	n/a	**0.008**	n/a	<0.001	n/a	**0.015**	**0.005**	0.001	<0.001	n/a	<0.001	n/a	<0.001	n/a	0.002	n/a	<0.001	0.001	0.004	
Cd	mg/l	**0.0082**	n/a	0.0027	n/a	0.0034	n/a	0.0007	n/a	**0.0058**	0.0035	0.0014	**0.026**	n/a	0.0007	n/a	0.0007	n/a	**0.01**	n/a	0.0004	0.0005	0.005	
Cr	mg/l	**0.15 F**	n/a	0.06 F	n/a	**0.18 F**	n/a	<0.01 F	n/a	**0.11 F**	**0.24 F**	0.02 F	0.03 F	n/a	0.02 F	n/a	0.01 F	n/a	0.05 F	n/a	0.03 F	0.05 F	0.1	
Cu	mg/l	0.05	n/a	0.08	n/a	0.09	n/a	<0.01	n/a	0.08	0.13	0.02	0.01	n/a	0.01	n/a	<0.01	n/a	0.09	n/a	0.02	0.01	1.3	
Fe	mg/l	**259. F**	n/a	**106. F**	n/a	**314. F**	n/a	**10.2 F**	n/a	**233. F**	**115. F**	**26.4 F**	**4.87 F**	n/a	**8.18 F**	n/a	**12. F**	n/a	**56.2 F**	n/a	**12.9 F**	**32.3 F**		0.3
Hg	mg/l	<0.0004 F	n/a	<0.0004 F	n/a	<0.0004 F	n/a	<0.0004 F	n/a	<0.0004 F	0.0004 F	<0.0004 F	<0.0004 F	n/a	<0.0004 F	n/a	**0.0118 F**	n/a	<0.0004 F	n/a	<0.0004 F	<0.0004 F	0.002	
Mn	mg/l	**4.51 F**	n/a	**20.8 F**	n/a	**42.7 F**	n/a	**0.24 F**	n/a	**5.13 F**	**1.29 F**	**1.78 F**	**0.21 F**	n/a	**2.05 F**	n/a	**2.86 F**	n/a	**10.8 F**	n/a	**0.71 F**	**3.41 F**		0.05
Ni	mg/l	**0.2 F**	n/a	0.07 F	n/a	**0.2 F**	n/a	<0.02 F	n/a	**0.11 F**	**0.19 F**	0.04 F	**0.15 F**	n/a	<0.02 F	n/a	<0.02 F	n/a	0.06 F	n/a	<0.02 F	0.03 F	0.1	
Pb	mg/l	**0.063**	n/a	**0.051**	n/a	**0.19**	n/a	0.014	n/a	**0.24**	**0.058**	**0.024**	0.008	n/a	0.015	n/a	**0.017**	n/a	**0.028**	n/a	0.01	**0.024**	0.015	
Sb	mg/l	<0.001 UJ	n/a	0.002 J	n/a	<0.001 UJ	n/a	0.002	n/a	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	n/a	<0.001 UJ	n/a	<0.001 UJ	n/a	<0.001 UJ	n/a	<0.001 UJ	<0.001 UJ	0.006	
Se	mg/l	<0.001	n/a	<0.001	n/a	<0.001	n/a	<0.001	n/a	0.006	0.006	<0.001	<0.001	n/a	<0.001	n/a	<0.001	n/a	<0.001	n/a	<0.001	<0.001	0.05	
Tl	mg/l	**0.005**	n/a	<0.002	n/a	<0.002	n/a	<0.002	n/a	<0.002	<0.002	<0.002	<0.002	n/a	<0.002	n/a	<0.002	n/a	<0.002	n/a	<0.002	<0.002	0.002	
V	mg/l	0.29 F	n/a	0.063 F	n/a	0.13 F	n/a	0.008 F	n/a	0.14 F	0.049 F	0.017 F	0.015 F	n/a	0.007 F	n/a	0.014 F	n/a	0.051 F	n/a	0.011 F	0.021 F		
Zn	mg/l	0.78 F	n/a	0.65 F	n/a	1.01 F	n/a	0.35 F	n/a	1.25 F	1.09 F	0.43 F	1.09 F	n/a	0.11 F	n/a	0.14 F	n/a	0.22 F	n/a	0.07 F	0.16 F		5

Notes:
All concentrations reported in milligrams per liter (mg/l)
< indicates parameter was not detected above the listed practical quantitation limit (PQL),
J = estimated concentration,
UJ = Reported PQL for sample is approximate
F = field duplicate results exceeded acceptable limits, Bold and shaded values exceeds ground water standard listed in IDAPA 58.01.11 (IDAPA, 2002b),
Results for total metals are not considered to be representative of in-situ conditions because of high sample turbidity

Table 3.3-14 Back.

TABLE 3.3-15
GROUNDWATER QUALITY IN BEDROCK MONITORING WELLS

Hydrostratigraphic Unit		Rex Chert						Upper Meade Peak			Wells / RC.	Ground Water Standard	
Sample Station		NR-C-4	NR-C-4	NR-R-2	NR-R-2	NR-R-12	NR-R-12	NR-C-3	NR-C-3	NR-C-3	DC # 2		
Date		10/4/01	6/13/02	10/3/01	6/13/02	10/6/01	6/13/02	10/5/01	6/13/02	6/13/02	5/20/02	Primary	Secondary
General Parameters													
pH (field)	Std. Units	n/a	6.74	**5.9**	**5.21**	7.1	6.75	6.5	**6.23**	**6.23**		6.5 - 8.5	
pH (lab)	Std. Units	n/a	7.6	6.7	7	7.8	7.6	7.6	7.8	7.8	7.2	6.5 - 8.5	
Temp. (field)	C	n/a	10.2	7.6	6.4	7.7	7.7	7.2	9.6	9.6			
Total Alkalinity	mg/l $CaCO_3$	n/a	210	62	43	168	176	194	131	131	157		
Bicarbonate Alkalinity	mg/l HCO_3	n/a	256. F	76	52. F	205	215. F	237	160. F	160. F	157		
Carbonate Alkalinity	mg/l CO_3	n/a	0	0	0	0	0	0	0	0	<2.		
Hydroxide	mg/l	n/a	0	0	0	0	0	0	0	0	<2.		
Acidity	mg/l $CaCO_3$	n/a	<2.	<2.	41	<2.	<2.	<2.	<2.	<2.			
E.C. (field)	umhos/cm	n/a	512	213	148	314	553	450	296	296			
E.C. (lab)	umhos/cm	n/a	610	187	134	348	572	324	277	278	403		
TDS	mg/l	n/a	421	278	405	98	398	288	176	215			500
Hardness	mg/l $CaCO_3$	n/a	381	42	53	182	354	213	158	162	193		
Major Ions													
Ca	mg/l	n/a	113	12	13	45	79	59	45	45	46.9		
Cl	mg/l	n/a	<4.	4	<4.	6	6	<4.	<4.	<4.	5		250
F	mg/l	n/a	0.58	0.15	0.31	0.17	0.17	0.24	0.94	0.87	n/a	4	
K	mg/l	n/a	2	1	<1.	<1.	<1.	1	<1.	<1.	n/a		
Mg	mg/l	n/a	24	3	5	17	38	16	11	12	18.4		
Na	mg/l	n/a	7	35	7	5	5	10	6	6	12.9		
SO_4	mg/l	n/a	135	44	26	25	141	43	21	24	20		250
Nutrients													
$NO_3 + NO_2$	mg/l N	n/a	<0.05	0.90	1.23	<0.05	0.08	0.91	0.34	0.29			
NO_3	mg/l N	n/a	<0.05	0.25	1.05	<0.05	<0.05	0.91	0.16	0.11		10	
NO_2	mg/l N	n/a	0.12 J	0.65	0.18	<0.05	<0.05	<0.05	0.18	0.18		1	
NH_4	mg/l N	n/a	0.1	<0.05	0.1	<0.05	0.07	0.1	0.12	0.11			
PO_3	mg/l	n/a	2.3	5.4	2	0.13	0.07	20	2.9	3.7			
PO_3 Ortho	mg/l	n/a	0.02	0.04	0.56	0.02	0.04	0.13	0.19	0.19			
Dissolved Metals													
Ag	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			0.1
Al	mg/l	<0.1	<0.1	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			0.2
As	mg/l	<0.001	0.004	0.001	0.003	<0.001	0.003	0.004	0.007	0.007		0.05	
B	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Ba	mg/l	<0.1	0.03	0.2	0.05	<0.1	0.02	<0.1	<0.01	<0.01		2	
Be	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		0.0004	
Cd	mg/l	**0.0057**	**0.008 F**	0.0013	0.0006 F	<0.0001	<0.0001 F	0.0019	0.0004 F	0.0005 F	<0.008	0.005	
Cr	mg/l	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01		0.1	
Cu	mg/l	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01		1.3	
Fe	mg/l	0.19	<0.05	**0.77**	<0.05	0.1	<0.05	0.15	<0.05	<0.05			0.3
Hg	mg/l	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		0.002	
Mn	mg/l	**0.32**	**0.32**	**0.08**	<0.02	**0.09**	**0.89**	**0.06**	<0.02	<0.02			0.05
Ni	mg/l	**0.36**	**0.55**	0.04	0.02	0.02	**0.39**	0.08	0.06	0.05			
Pb	mg/l	<0.001	<0.001	0.009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		0.015	
Sb	mg/l	0.005	0.002	<0.001	0.005	0.001	0.005	<0.001	0.002	0.002		0.006	
Se	mg/l	0.021	0.001	0.005	0.005	<0.001	0.002	**0.082**	0.02	0.02	<0.001	0.05	
Tl	mg/l	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002		0.002	
V	mg/l	0.018	<0.005	0.02	<0.005	<0.005	<0.005	0.014	<0.005	0.009			
Zn	mg/l	0.37	1.3	0.17	0.04	0.1	0.5	0.2	0.13	0.13			5
Total Metals													
Ag	mg/l	n/a	<0.001 UJF	n/a	<0.001 UJF	n/a	<0.001 UJF	n/a	0.004 JF	<0.001 UJF			0.1
Al	mg/l	n/a	**1. F**	n/a	**53.9 F**	n/a	<0.1 F	n/a	**5.3 F**	**3.9 F**			0.2
As	mg/l	n/a	0.018 F	n/a	0.026 F	n/a	0.015 F	n/a	0.038 F	0.032 F		0.05	
B	mg/l	n/a	<0.1	n/a	<0.1	n/a	<0.1	n/a	<0.1	<0.1			
Ba	mg/l	n/a	0.05 F	n/a	1.01 F	n/a	0.04 F	n/a	0.05 F	0.03 F		2	
Be	mg/l	n/a	<0.001	n/a	**0.008**	n/a	<0.001	n/a	<0.001	<0.001		0.004	
Cd	mg/l	n/a	**0.016**	n/a	**0.008**	n/a	0.0006	n/a	**0.0064**	0.0044		0.005	
Cr	mg/l	n/a	0.02 F	n/a	0.07 F	n/a	<0.01 F	n/a	**0.13 F**	0.09 F		0.1	
Cu	mg/l	n/a	0.01	n/a	0.05	n/a	<0.01	n/a	0.04	0.03		1.3	
Fe	mg/l	n/a	**1.89 F**	n/a	**47.1 F**	n/a	**0.7 F**	n/a	**10.8 F**	**6.93 F**			0.3
Hg	mg/l	n/a	<0.0004 F	n/a	<0.0004 F	n/a	<0.0004 F	n/a	**0.0055 F**	<0.0004 F		0.002	
Mn	mg/l	n/a	**0.34 F**	n/a	**0.57 F**	n/a	**0.96 F**	n/a	**0.32 F**	**0.18 F**			0.05
Ni	mg/l	n/a	**0.73 F**	n/a	**0.29 F**	n/a	**0.5 F**	n/a	**0.28 F**	**0.22 F**		0.1	
Pb	mg/l	n/a	0.004	n/a	**0.095**	n/a	<0.001	n/a	**0.029**	**0.026**		0.015	
Sb	mg/l	n/a	0.002	n/a	<0.001 UJ	n/a	<0.001 UJ	n/a	0.003 J	0.002		0.006	
Se	mg/l	n/a	0.005	n/a	0.012	n/a	<0.001	n/a	0.036	0.03		0.05	
Tl	mg/l	n/a	<0.002	n/a	<0.002	n/a	<0.002	n/a	<0.002	<0.002		0.002	
V	mg/l	n/a	0.016 F	n/a	0.071 F	n/a	<0.005 F	n/a	0.062 F	0.048 F			
Zn	mg/l	n/a	1.43 F	n/a	1.25 F	n/a	0.53 F	n/a	1.18 F	0.81 F			5

Notes:
< indicates parameter was not detected above the listed practical quantitation limit (PQL),
J = estimated concentration,
UJ = Reported PQL for sample is approximate
F = field duplicate results exceeded acceptable limits,
Bold and shaded values exceeds ground water standard listed in IDAPA 58.01.11 (IDAPA, 2002b), Results for total metals are not considered to be representative of in-situ conditions because of high sample turbidity