

TABLES

Table 1. Groundwater Data Availability for each Analyte and Stratigraphic Unit

Analyte	Alluvium	Clinker	Colluvium	Interburden	McKay Coal	Rosebud Coal	Rosebud Overburden	Shallow	Spoils	SubMcKay	SubMcKay Deep	Total
Aluminum	1498	27	4	480	1146	578	294	3	518	1137	20	5705
Ammonia	41	0	0	25	54	31	22	0	32	50	0	255
Antimony	118	0	4	0	42	26	0	3	61	54	0	308
Arsenic	501	7	4	174	383	179	88	3	305	385	1	2030
Barium	301	9	4	6	88	30	13	4	83	177	0	715
Beryllium	211	7	0	5	74	25	11	0	63	97	1	494
Boron	6256	674	84	643	3544	1180	1134	48	1658	8031	98	23350
Bromide	2144	349	24	50	839	173	174	35	556	2993	38	7375
Cadmium	1528	31	4	477	1190	672	372	3	519	1157	22	5975
Calcium	6306	678	84	643	3616	1238	1146	49	1731	8112	97	23700
Chloride	6291	668	81	636	3499	1230	1137	46	1694	7997	96	23375
Chromium	319	7	4	24	178	68	16	6	241	274	1	1138
Cobalt	186	7	0	6	55	18	11	0	41	97	0	421
Copper	1311	29	4	338	1000	597	344	2	408	1030	20	5083
Fluoride	1810	38	8	498	1624	831	545	6	793	1883	26	8062
Iron	1826	33	9	506	1649	845	554	8	793	1967	26	8216
Lead	1535	29	4	483	1212	679	375	3	506	1275	21	6122
Lithium	79	2	0	0	125	60	5	0	256	23	0	550
Magnesium	6305	676	85	649	3613	1234	1158	46	1733	8097	97	23693
Manganese	1794	37	9	484	1617	781	542	7	774	1982	26	8053
Mercury	1425	58	6	318	861	393	239	10	214	1353	23	4900
Molybdenum	260	6	4	7	141	52	12	3	223	118	1	827
Nickel	639	28	4	56	512	240	149	3	288	731	20	2670
Nitrate	176	0	0	1	218	207	98	0	304	131	1	1136
Nitrite	116	0	0	0	17	13	0	0	26	105	1	278
Nitrite + Nitrate	2479	50	6	504	1529	661	461	32	541	2344	29	8636
Orthophosphate	1203	21	0	354	878	458	222	0	352	962	20	4470

Table 1 continued

Analyte	Alluvium	Clinker	Colluvium	Interburden	McKay Coal	Rosebud Coal	Rosebud Overburden	Shallow	Spoils	SubMcKay	SubMcKay Deep	Total
pH (Field)	1307	76	10	29	505	133	90	37	482	1144	16	3829
pH (Laboratory)	4676	674	81	202	2899	686	827	44	1463	7396	97	19045
Phosphate	40	0	0	0	0	0	0	0	0	27	0	67
Phosphorus	78	0	0	0	1	1	0	0	0	2	0	82
Potassium	5761	633	57	595	3072	1107	928	47	1476	6942	84	20702
SC (Field)	3113	518	43	93	1462	315	352	42	874	4411	53	11276
SC (Laboratory)	5468	674	79	200	2907	700	835	42	1464	7780	97	20246
Selenium	5279	673	82	494	3142	899	957	48	1457	7350	88	20469
Silica	255	0	0	0	157	82	6	0	306	139	0	945
Silver	143	0	0	0	104	56	1	0	230	63	0	597
Sodium	6306	676	85	646	3609	1231	1155	47	1735	8110	98	23698
Strontium	268	10	0	7	150	56	13	0	232	144	0	880
Sulfate	6240	670	80	637	3577	1240	1140	46	1695	8030	96	23451
TDS	5215	668	82	197	2675	572	792	43	1164	7655	99	19162
Thallium	106	7	0	6	48	13	12	0	32	49	0	273
Tin	102	0	0	0	43	20	1	0	103	48	0	317
Titanium	140	2	0	0	86	48	2	0	209	66	0	553
Vanadium	1264	29	0	333	885	449	235	0	378	1021	20	4614
Zinc	1795	36	9	508	1631	817	551	6	723	1834	27	7937
Zirconium	71	2	0	0	88	48	3	0	209	22	0	443

Table 2. Surface Water Data Availability for each Analyte

Analyte	AR-12	SW-55	SW-60	SW-75	Total
Aluminum	6	32	28	30	66
Arsenic	6	16	0	6	22
Barium	2	0	0	0	2
Beryllium	6	0	0	0	6
Boron	12	26	15	32	53
Bromide	4	0	0	0	4
Cadmium	6	32	28	24	66
Calcium	6	16	14	18	36
Chloride	6	16	14	17	36
Chromium	2	24	28	30	54
Cobalt	2	0	0	0	2
Copper	6	32	29	30	67
Fluoride	2	16	14	14	32
Iron	7	32	28	33	67
Lead	4	32	28	30	64
Lithium	2	0	0	0	2
Magnesium	6	16	14	18	36
Manganese	7	27	14	25	48
Mercury	10	24	28	24	62
Molybdenum	2	0	0	0	2
Nickel	7	16	0	6	23
Nitrite + Nitrate	6	16	14	14	36
Orthophosphate	0	12	14	14	26
Phosphorus	1	0	0	0	1
Potassium	6	16	14	18	36
SC (Field)	6	0	0	0	6
SC (Laboratory)	6	0	0	0	6
Selenium	12	32	28	30	72
Sodium	6	16	14	18	36
Strontium	6	0	0	0	6
Sulfate	6	16	14	17	36
TDS	6	0	0	0	6
Thallium	6	0	0	0	6
Vanadium	4	32	28	30	64
Zinc	5	32	28	30	65
Zirconium	2	0	0	0	2

Table 3. Analytes Excluded from Random Forests Step by Stratigraphic Unit

	Analytes Excluded from RF
Alluvium	Barium, Beryllium, Chromium, Cobalt, Lithium, Molybdenum, Nitrate, Nitrite, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Zirconium
Spoils	Arsenic, Barium, Beryllium, Chromium, Cobalt, Copper, Lithium, Mercury, Molybdenum, Nickel, Nitrate, Nitrite, Orthophosphate, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Vanadium, Zirconium
Clinker	Aluminum, Arsenic, Barium, Beryllium, Bromide, Cadmium, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Lithium, Manganese, Mercury, Molybdenum, Nickel, Nitrate, Nitrite, Nitrite + Nitrate, Orthophosphate, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Vanadium, Zinc, Zirconium
Rosebud Overburden	Aluminum, Arsenic, Barium, Beryllium, Bromide, Cadmium, Chromium, Cobalt, Copper, Lead, Lithium, Mercury, Molybdenum, Nickel, Nitrate, Nitrite, Nitrite + Nitrate, Orthophosphate, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Vanadium, Zirconium
Rosebud Coal	Arsenic, Barium, Beryllium, Bromide, Chromium, Cobalt, Lithium, Mercury, Molybdenum, Nickel, Nitrate, Nitrite, Orthophosphate, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Vanadium, Zirconium
Interburden	Aluminum, Arsenic, Barium, Beryllium, Bromide, Cadmium, Chromium, Cobalt, Copper, Fluoride, Lead, Lithium, Manganese, Mercury, Molybdenum, Nickel, Nitrate, Nitrite, Orthophosphate, Phosphate, Phosphorus, SC (Lab), Selenium, Strontium, TDS, Thallium, Titanium, Vanadium, Zirconium
McKay Coal	Arsenic, Barium, Beryllium, Chromium, Cobalt, Lithium, Molybdenum, Nitrate, Nitrite, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Zirconium
SubMcKay	Arsenic, Barium, Beryllium, Chromium, Cobalt, Lithium, Molybdenum, Nitrate, Nitrite, Phosphate, Phosphorus, Strontium, Thallium, Titanium, Zirconium

Table 4. Available Groundwater BSL Calculations

Analyte	Alluvium	Spoils	Clinker	Coal-Related	SubMcKay
Aluminum	X	X	X	X	X
Ammonia	X	X	1	X	X
Antimony	X	X	1	X	X
Arsenic	X	X	1	X	X
Barium	X	X	1	X	X
Beryllium	X	X	1	X	X
Boron	X	X	X	X	X
Bromide	X	X	X	X	X
Cadmium	X	X	X	X	X
Calcium	X	X	X	X	X
Chloride	X	X	X	X	X
Chromium	X	X	1	X	X
Cobalt	X	X	1	X	X
Copper	X	X	X	X	X
Fluoride	X	X	X	X	X
Iron	X	X	X	X	X
Lead	X	X	X	X	X
Lithium	X	X	1	X	1
Magnesium	X	X	X	X	X
Manganese	X	X	X	X	X
Mercury	X	X	X	X	X
Molybdenum	X	X	1	X	X
Nickel	X	X	X	X	X
Nitrate	X	X	1	X	X
Nitrite	X	X	1	X	X
Nitrite + Nitrate	X	X	X	X	X
Orthophosphate	X	X	X	X	X
pH (Field)	X	X	X	X	X
pH (Laboratory)	X	X	X	X	X
Phosphate	X	1	1	1	X
Phosphorus	X	1	1	1	1
Potassium	X	X	X	X	X
SC (Field)	X	X	X	X	X
SC (Laboratory)	X	X	X	X	X
Selenium	X	X	X	X	X
Silica	X	X	1	X	X
Silver	X	X	1	X	X
Sodium	X	X	X	X	X
Strontium	X	X	1	X	X
Sulfate	X	X	X	X	X
TDS	X	X	X	X	X
Thallium	X	X	1	X	X
Tin	X	X	1	X	X
Titanium	X	X	1	X	X
Vanadium	X	X	X	X	X
Zinc	X	X	X	X	X
Zirconium	X	X	1	X	1

¹Analyte did not have enough data (at least 10 samples) to calculate a BSL for the unit

Table 5. Groundwater Data and Analysis: Summary Statistics, 90th Percentiles, and BSLs

Analyte	Stratigraphic Unit	Number of Wells	Total Number of Samples	Detect Freq. (%)	Non-detects		Detects				90th Percentile	BSL
					Number of Samples	Range	Number of Samples	Range	Median	Mean		
Aluminum	Alluvium	128	1110	31.8	757	0.001-2	353	0.002-5.2	0.2	0.3306	0.3	0.3
Ammonia	Alluvium	27	33	45.5	18	0.05-0.05	15	0.0666-0.6	0.21	0.216973333	0.268	0.415
Antimony	Alluvium	16	81	0	81	0.002-0.15	0				0.15	0.15
Arsenic	Alluvium	68	293	43.7	165	0-0.3	128	0-0.3	0.005	0.0388	0.3	0.01
Barium	Alluvium	21	139	86.3	19	0.001-0.1	120	0-0.05	0.012	0.0127	0.0212	0.022
Beryllium	Alluvium	24	100	0	100	0.0002-0.003	0				0.003	0.003
Boron	Alluvium	189	1681	98.7	22	0-0.5	1659	0.08-10.5	0.9	0.9242	1.6	1.6
Bromide	Alluvium	39	132	12.1	116	0.05-5	16	0.113-1.7	1	0.9883	4.7	5
Cadmium	Alluvium	136	1116	33	748	0-0.025	368	0-0.05	0.003	0.0045	0.008	0.005
Calcium	Alluvium	197	1712	100	0		1712	13-1700	254	260.2564	374	378
Chloride	Alluvium	197	1698	98.9	18	1-50	1680	0-260	20	25.0007	43.12	45
Chromium	Alluvium	43	128	7.8	118	0.001-0.1	10	0-0.0283	0.0055	0.0078	0.03	0.1
Cobalt	Alluvium	18	95	13.7	82	0.0018-0.02	13	0.00024-0.02	0.00072	0.0024	0.02	0.02
Copper	Alluvium	129	971	14.1	834	0.0005-0.1	137	0-0.42	0.015	0.0229	0.02	0.02
Fluoride	Alluvium	141	1259	98.2	23	0.1-2.5	1236	0-801	0.32	1.0480	0.63	0.65
Iron	Alluvium	149	1265	42.8	723	0.002-0.1	542	0-6.75	0.06	0.2700	0.17	0.22
Lead	Alluvium	143	1133	16.4	947	0-1	186	0-0.67	0.01	0.0188	0.02	0.01
Lithium	Alluvium	4	11	100	0		11	0.035-0.092	0.049	0.0531	0.062	0.092
Magnesium	Alluvium	197	1709	99.8	3	0.01-0.01	1706	0-856	270	280.6732	397.2	409
Manganese	Alluvium	150	1181	57.1	507	0.001-0.1	674	0-4.61	0.125	0.3346	0.52	0.6
Mercury	Alluvium	141	938	4.1	900	0.00002-0.001	38	0-0.004	0.0001	0.0003	0.001	0.001
Molybdenum	Alluvium	28	111	6.3	104	0.001-0.2	7	0.001-0.003	0.003	0.0026	0.04	0.04
Nickel	Alluvium	65	387	13.2	336	0.0005-0.3	51	0-0.04	0.0042	0.0128	0.03	0.1
Nitrate	Alluvium	20	40	77.5	9	0.01-0.5	31	0.01-6.08	0.29	0.9694	1.87	4.7
Nitrite	Alluvium	20	22	18.2	18	0.02-0.5	4	0.04-0.92	0.16	0.3200	0.5	0.92
Nitrite + Nitrate	Alluvium	170	1293	83.1	218	0.01-0.1	1075	0-19.73	0.3	0.7824	1.636	1.78
Orthophosphate	Alluvium	122	948	69.6	288	0.005-2	660	0-18	0.05	0.2454	0.39	0.43
pH (Field)	Alluvium	61	139	100	0		139	6-8.1	7.09	7.12	7.5	7.5
pH (Laboratory)	Alluvium	98	833	100	0		833	6.1-8.44	7.4	7.41	7.7	7.8
Phosphate	Alluvium	11	40	92.5	3	0.4-0.4	37	0-0.98	0.66	0.6624	0.881	0.95
Phosphorus	Alluvium	14	14	92.9	1	0.4-0.4	13	0.01-0.72	0.44	0.4092	0.685	0.72
Potassium	Alluvium	196	1572	99.8	3	12.5-12.5	1569	0-100	9	9.6265	16	16.7
SC (Field)	Alluvium	81	340	100	0		340	6.6-5890	3256	3263.9660	4258.3	4314
SC (Laboratory)	Alluvium	112	976	100	0		976	862-6320	3190	3228.1443	4175	4270

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

Table 5 continued

Analyte	Stratigraphic Unit	Number of Wells	Total Number of Samples	Detect Freq. (%)	Non-detects		Detects				90th Percentile	BSL
					Number of Samples	Range	Number of Samples	Range	Median	Mean		
Silica	Alluvium	27	135	100	0		135	3-29.6	19	18.593	26.42	27.2
Silver	Alluvium	17	88	2.3	86	0.001-0.03	2	0.006-0.03	0.018	0.018	0.03	0.03
Sodium	Alluvium	197	1709	99.9	1	0.01-0.01	1708	14-938	157.5	199.6847	348.2	372
Strontium	Alluvium	18	129	100	0		129	0-16.999	6.28	6.2510	8.198	8.7
Sulfate	Alluvium	197	1701	100	0		1701	9-4560	1750	1744.0420	2550	2600
TDS	Alluvium	99	896	100	0		896	552-6730	2970	2978.5443	3950	4000
Thallium	Alluvium	5	19	0	19	0.0003-0.5	0				0.104	0.5
Tin	Alluvium	12	75	1.3	74	0.001-0.03	1	0.0005-0.0005	0.0005	0.0005	0.03	0.03
Titanium	Alluvium	15	84	13.1	73	0.001-0.1	11	0.007-0.052	0.012	0.0211	0.012	0.1
Vanadium	Alluvium	127	951	8.6	869	0.0001-1	82	0-0.3	0.02	0.0535	0.5	1
Zinc	Alluvium	132	1236	62.5	463	0-0.03	773	0-2.09	0.03	0.0750	0.12	0.13
Zirconium	Alluvium	4	12	8.3	11	0.004-0.02	1	0.0309-0.0309	0.0309	0.0309	0.02	0.0309
Aluminum	Spoils	74	407	41	240	0.004-0.3	167	0.004-18.7	0.1	0.2786	0.2	0.2
Ammonia	Spoils	26	32	87.5	4	0.05-0.05	28	0.13-4.49	0.9255	1.1594	1.793	3.04
Antimony	Spoils	17	39	20.5	31	0.001-0.2	8	0.22-0.6	0.35	0.3625	0.326	0.45
Arsenic	Spoils	61	254	63.8	92	0-0.01	162	0.0000053-0.013	0.0012	0.0021	0.005	0.005
Barium	Spoils	30	55	94.5	3	0.005-0.02	52	0.0002-3.2	0.02635	0.1084	0.0988	0.27
Beryllium	Spoils	17	40	2.5	39	0.0005-0.02	1	0.005-0.005	0.005	0.0050	0.005	0.01
Boron	Spoils	85	528	97	16	0-0.3	512	0.05-42.7	0.4	0.5496	0.786	0.818
Bromide	Spoils	41	162	20.4	129	0.094-10	33	0.061-2.4	0.2	0.6895	2	1
Cadmium	Spoils	75	408	26	302	0-0.02	106	0.000044-0.047	0.002	0.0047	0.006	0.005
Calcium	Spoils	88	569	100	0		569	12.5-3821	333	334.0359	478.2	495
Chloride	Spoils	87	562	99.6	2	10-20	560	1-2700	21	33.5248	54.09	62
Chromium	Spoils	44	161	42.9	92	0.001-0.02	69	0.002-0.09	0.008	0.0135	0.02	0.0215
Cobalt	Spoils	13	27	85.2	4	0.002-0.002	23	0.0015-0.0232	0.014	0.0133	0.02152	0.0232
Copper	Spoils	75	298	41.6	174	0.0005-0.02	124	0.000103-0.07	0.013	0.0175	0.025	0.031
Fluoride	Spoils	82	472	84.1	75	0-2.5	397	0-4.133	0.17	0.3159	0.399	0.4
Iron	Spoils	81	473	79.1	99	0-0.1	374	0-19.9	0.2075	1.0425	1.714	2.608
Lead	Spoils	73	398	30.4	277	0.0001-4	121	0.000031-0.2	0.01	0.0346	0.053	0.05
Lithium	Spoils	41	171	93.6	11	0.002-0.25	160	0.002-0.161	0.0605	0.0570	0.089	0.09
Magnesium	Spoils	88	571	100	0		571	11.6-6000	331	351.3596	488	547
Manganese	Spoils	81	453	97.4	12	0-0.02	441	0-7.3	0.84	1.1333	2.308	2.79
Mercury	Spoils	34	122	7.4	113	0.0003-0.005	9	0.00009-0.005	0.0004	0.0009	0.001	0.005

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 5 continued

Analyte	Stratigraphic Unit	Number of Wells	Total Number of Samples	Detect Freq. (%)	Non-detects		Detects				90th Percentile	BSL
					Number of Samples	Range	Number of Samples	Range	Median	Mean		
Nickel	Spoils	68	192	66.1	65	0.0005-0.05	127	0.00059-0.15	0.03	0.0369	0.0622	0.08
Nitrate	Spoils	45	197	72.6	54	0-0.5	143	0.004-44	0.15	1.2964	1.822	2.92
Nitrite	Spoils	14	18	0	18	0.05-0.5	0				0.325	0.5
Nitrite + Nitrate	Spoils	56	299	71.6	85	0.01-0.25	214	0.01-50	0.13	2.3129	2.988	5.8
Orthophosphate	Spoils	62	264	58.7	109	0.003-2.5	155	0.01-13.2	0.1	0.5298	1	1.3
pH (Field)	Spoils	45	172	100	0		172	6.05-8.8	6.7	6.78	7.08	7.16
pH (Laboratory)	Spoils	58	321	100	0		321	5.71-8.5	7.12	7.23	7.8	7.88
Phosphate	Spoils	0	0		0		0					
Phosphorus	Spoils	0	0		0		0					
Potassium	Spoils	87	547	99.1	5	12.5-12.5	542	0-320	12.205	12.2105	17.64	18.5
SC (Field)	Spoils	52	251	100	0		251	204-34200	3490	3542.6970	4500	4900
SC (Laboratory)	Spoils	58	321	100	0		321	181.3-35000	3556	3520.2458	4470	4633
Selenium	Spoils	82	380	20	304	0.0001-0.01	76	0.0001-0.029	0.001485	0.0038	0.005	0.0023
Silica	Spoils	44	196	100	0		196	3.6-30	13.55	14.591	20.8	22
Silver	Spoils	39	157	19.1	127	0.001-0.01	30	0.001-0.051	0.01	0.0138	0.01	0.012
Sodium	Spoils	88	571	100	0		571	1.18-4270	130	177.4956	301	339
Strontium	Spoils	39	158	100	0		158	0.0052-20	8.705	8.1922	13.86	15.2
Sulfate	Spoils	87	562	100	0		562	30.2-30700	1760.5	1878.9989	2830	3045
TDS	Spoils	16	125	100	0		125	859-48500	3670	4020.9440	4640	4930
Thallium	Spoils	11	21	0	21	0.001-0.05	0				0.025	0.05
Tin	Spoils	28	72	36.1	46	0.0005-0.005	26	0.0006-4.88	0.0058	0.5166	0.716	0.88
Titanium	Spoils	37	145	63.4	53	0.001-1	92	0.001-0.062	0.012	0.0178	0.0492	0.039
Vanadium	Spoils	71	283	26.9	207	0.0001-1	76	0.00011-2.2	0.0045	0.0374	0.2	0.0107
Zinc	Spoils	78	433	79.4	89	0-0.02	344	0.00000729-3	0.034	0.1658	0.35	0.44
Zirconium	Spoils	37	145	14.5	124	0.0009-0.1	21	0.004-1.3	0.011	0.0766	0.05	0.1
Aluminum	Clinker	1	22	18.2	18	0.1-0.1	4	0.2-1.2	0.9	0.8000	0.74	1.2
Ammonia	Clinker	0	0		0		0					
Antimony	Clinker	0	0		0		0					
Arsenic	Clinker	0	0		0		0					
Barium	Clinker	0	0		0		0					
Beryllium	Clinker	0	0		0		0					
Boron	Clinker	6	108	92.6	8	0.1-0.1	100	0.1-13.3	1.75	2.1260	3.6	4
Bromide	Clinker	4	30	0	30	0.5-10	0				5.5	10
Cadmium	Clinker	1	22	40.9	13	0.001-0.005	9	0.002-0.01	0.003	0.0046	0.0068	0.01

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 5 continued

Analyte	Stratigraphic Unit	Number of Wells	Total Number of Samples	Detect Freq. (%)	Non-detects		Detects				90th Percentile	BSL
					Number of Samples	Range	Number of Samples	Range	Median	Mean		
Chloride	Clinker	7	107	100	0		107	2-53	14	15.8598	26	34
Chromium	Clinker	0	0		0		0					
Cobalt	Clinker	0	0		0		0					
Copper	Clinker	1	22	9.1	20	0.01-0.02	2	0.01-0.02	0.015	0.0150	0.02	0.02
Fluoride	Clinker	1	26	100	0		26	0.38-0.81	0.555	0.5481	0.64	0.81
Iron	Clinker	1	25	68	8	0.03-0.05	17	0.05-1.45	0.08	0.2224	0.39	1.45
Lead	Clinker	1	22	4.5	21	0.01-0.02	1	0.01-0.01	0.01	0.0100	0.02	0.02
Lithium	Clinker	0	0		0		0					
Magnesium	Clinker	6	109	100	0		109	4-1040	173	257.4404	491.2	524
Manganese	Clinker	1	25	88	3	0.02-0.02	22	0.03-0.67	0.21	0.2255	0.36	0.67
Mercury	Clinker	4	26	0	26	0.001-0.001	0				0.001	0.001
Molybdenum	Clinker	0	0		0		0					
Nickel	Clinker	1	19	0	19	0.01-0.03	0				0.03	0.03
Nitrate	Clinker	0	0		0		0					
Nitrite + Nitrate	Clinker	4	30	26.7	22	0.05-0.05	8	0.06-1.24	0.15	0.3163	0.2	0.53
Orthophosphate	Clinker	1	21	57.1	9	0.01-0.01	12	0.01-0.19	0.02	0.0392	0.05	0.19
pH (Field)	Clinker	4	11	100	0		11	6.4-8.3	7.44	7.34	8	8.3
pH (Laboratory)	Clinker	7	108	100	0		108	6.4-8.4	7.8	7.73	8.2	8.2
Phosphate	Clinker	0	0		0		0					
Phosphorus	Clinker	0	0		0		0					
Potassium	Clinker	6	94	100	0		94	3-61	12	14.8298	27	30
SC (Field)	Clinker	5	53	100	0		53	268-6200	1610	2128.4400	4366	4700
SC (Laboratory)	Clinker	7	109	100	0		109	366-7420	3730	3001.3578	4944	5310
Selenium	Clinker	7	108	20.4	86	0.005-0.005	22	0.005-0.048	0.008	0.0116	0.008	0.01
Silica	Clinker	0	0		0		0					
Silver	Clinker	0	0		0		0					
Sodium	Clinker	6	110	100	0		110	8-695	224.5	231.2091	562.5	586
Strontium	Clinker	0	0		0		0					
Sulfate	Clinker	7	107	100	0		107	23-5700	1930	1669.8411	3030	3160
TDS	Clinker	7	108	100	0		108	201-8130	3070	2762.3704	4848	5170
Thallium	Clinker	0	0		0		0					
Tin	Clinker	0	0		0		0					
Titanium	Clinker	0	0		0		0					
Vanadium	Clinker	1	22	13.6	19	0.1-1	3	0.06-0.07	0.06	0.0633	0.1	1

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 5 continued

Analyte	Stratigraphic Unit				Non-detects		Detects				90th Percentile	BSL
		Number of Wells	Total Number of Samples	Detect Freq. (%)	Number of Samples	Range	Number of Samples	Range	Median	Mean		
Zirconium	Clinker	0	0		0		0					
Aluminum	Coal-Related	249	1809	35.2	1172	0.001-2	637	0-13	0.1	0.2046	0.2	0.2
Ammonia	Coal-Related	84	113	86.7	15	0.05-0.05	98	0.051-3.4	0.4085	0.6175	1.2	1.6
Antimony	Coal-Related	17	24	8.3	22	0.001-0.2	2	0.0021-0.39	0.19605	0.19605	0.2	0.39
Arsenic	Coal-Related	154	600	44.7	332	0-0.1	268	0-0.1	0.005	0.0041	0.005	0.005
Barium	Coal-Related	17	46	95.7	2	0.005-0.1	44	0.005-0.24	0.0144	0.0366	0.1	0.111
Beryllium	Coal-Related	20	42	0	42	0.0002-0.005	0				0.005	0.005
Boron	Coal-Related	311	3191	94.3	181	0-1	3010	0-20.4	0.485	0.6339	1.1	1.1
Bromide	Coal-Related	41	307	5.5	290	0.05-10	17	0.1-2.2	1	0.9588	1.52	10
Cadmium	Coal-Related	280	2018	21.4	1586	0-0.02	432	0-0.24	0.001	0.0037	0.005	0.002
Calcium	Coal-Related	316	3260	100	0		3260	0-1470	147	174.5378	338	351
Chloride	Coal-Related	313	3167	99.1	29	1-20	3138	0-481	8.9	11.3472	19	20
Chromium	Coal-Related	62	126	26.2	93	0.001-0.02	33	0-0.0691	0.008	0.0121	0.02	0.0146
Cobalt	Coal-Related	11	31	67.7	10	0.001-0.004	21	0.00027-0.00357	0.00091	0.0014	0.0034	0.0034
Copper	Coal-Related	276	1691	33.2	1130	0.0005-0.02	561	0-0.66	0.02	0.0245	0.03	0.03
Fluoride	Coal-Related	293	2385	95.3	112	0-35	2273	0-13	0.23	0.2849	0.5	0.51
Iron	Coal-Related	295	2398	69.2	739	0.003-0.1	1659	0-54.6	0.153	0.7384	1.13	1.23
Lead	Coal-Related	286	2044	21.2	1611	0-1.0001	433	0-0.29	0.01	0.0164	0.02	0.01
Lithium	Coal-Related	22	63	93.7	4	0.006-1	59	0.002-0.08	0.052	0.0481	0.0696	0.072
Magnesium	Coal-Related	316	3258	100	0		3258	0-1150	125	165.5723	286	303
Manganese	Coal-Related	289	2266	95.1	112	0.005-0.11	2154	0-361	0.12	0.4559	0.485	0.54
Mercury	Coal-Related	239	1240	2.3	1212	0.00005-0.005	28	0-0.002	0.00016	0.0005	0.001	0.001
Molybdenum	Coal-Related	23	71	22.5	55	0.001-0.04	16	0.001-0.15	0.005	0.0193	0.04	0.02
Nickel	Coal-Related	164	585	30.3	408	0.0005-0.05	177	0.00000196-0.56	0.00817	0.0164	0.03	0.0142
Nitrate	Coal-Related	67	372	83.1	63	0.01-2.5	309	0-3.66	0.08	0.1874	0.33	0.4
Nitrite	Coal-Related	9	12	8.3	11	0.05-2.5	1	0.17-0.17	0.17	0.1700	0.475	2.5
Nitrite + Nitrate	Coal-Related	281	2057	64.4	732	0.01-0.2	1325	0-103	0.13	0.5559	0.67	0.73
Orthophosphate	Coal-Related	227	1374	76	330	0.01-2.5	1044	0-23	0.04	0.1890	0.17	0.18
pH (Field)	Coal-Related	49	187	100	0	Inf--Inf	187	5-8.1	7.17	7.17	7.67	7.73
pH (Laboratory)	Coal-Related	98	1474	100	0	Inf--Inf	1474	5.2-11.5	7.4	7.41	7.8	7.8
Phosphate	Coal-Related	0	0		0		0					
Phosphorus	Coal-Related	2	2	100	0		2	0.06-17	8.53	8.5300	15.306	
Potassium	Coal-Related	314	2900	98.9	31	0-12.5	2869	0-48	7	7.9676	14	15
SC (Field)	Coal-Related	72	610	100	0		610	155-21636	2030.5	2300.4570	3796	4130

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 5 continued

Analyte	Stratigraphic Unit	Number of Wells	Total Number of Samples	Detect Freq. (%)	Non-detects		Detects				90th Percentile	BSL
					Number of Samples	Range	Number of Samples	Range	Median	Mean		
Selenium	Coal-Related	280	2405	9.8	2170	0.0001-0.05	235	0-0.05	0.006	0.0081	0.005	0.005
Silica	Coal-Related	32	95	98.9	1	0.05-0.05	94	0-42	16.55	16.880	21.56	23
Silver	Coal-Related	22	58	19	47	0.001-0.01	11	0.003-0.022	0.01	0.0093	0.01	0.011
Sodium	Coal-Related	316	3254	100	0		3254	0-1250	122	167.7999	359.7	383
Strontium	Coal-Related	24	80	100	0		80	0.01479-115.6	7.125	7.7444	12.12	13.8
Sulfate	Coal-Related	317	3244	100	0		3244	0-6390	784.45	1017.8229	1960	2061
TDS	Coal-Related	66	1339	100	0		1339	192-8190	1480	1829.0149	2972	3160
Thallium	Coal-Related	9	26	0	26	0.0003-0.005	0				0.0035	0.005
Tin	Coal-Related	17	25	60	10	0.0005-0.005	15	0.001-1.7	0.35	0.5395	0.79	1.7
Titanium	Coal-Related	13	45	62.2	17	0.001-0.2	28	0.00212-0.043	0.013	0.0167	0.035	0.035
Vanadium	Coal-Related	237	1347	11.9	1187	0.0001-1	160	-0.1-1.21	0.0053	0.0436	1	1
Zinc	Coal-Related	286	2380	86	334	0-0.3	2046	0-8.61	0.09	0.3022	0.711	0.76
Zirconium	Coal-Related	13	45	20	36	0.001-0.1	9	0.005-0.0264	0.017	0.0152	0.08	0.022
Aluminum	SubMcKay	114	879	29.5	620	0.001-2	259	0.001-9.5	0.1	0.2795	0.2	0.2
Ammonia	SubMcKay	25	49	95.9	2	0.05-0.05	47	0.0809-7.8	0.447	1.0659	2.644	4.03
Antimony	SubMcKay	11	48	0	48	0.002-0.15	0				0.15	0.15
Arsenic	SubMcKay	68	328	31.4	225	0-0.3	103	0.0001-0.3	0.0027	0.0116	0.3	0.005
Barium	SubMcKay	21	151	80.8	29	0.001-0.2	122	0-0.3	0.009	0.0226	0.16	0.09
Beryllium	SubMcKay	19	82	0	82	0.0002-0.003	0				0.003	0.003
Boron	SubMcKay	269	3561	98.4	56	0-0.5	3505	0.04-7.89	0.5	0.6824	1.2	1.3
Bromide	SubMcKay	128	792	3.8	762	0.066-10	30	0.067-2	0.136	0.5205	5	5
Cadmium	SubMcKay	117	891	28.7	635	0-0.025	256	0.0000837-0.025	0.002	0.0029	0.005	0.003
Calcium	SubMcKay	270	3621	100	1	1-1	3620	1-525	149	151.9275	308	313
Chloride	SubMcKay	271	3575	99.5	18	1-20	3557	1-150	12	14.3365	24	24
Chromium	SubMcKay	50	217	13.4	188	0.001-0.1	29	0-0.05	0.003	0.0053	0.03	0.1
Cobalt	SubMcKay	16	83	36.1	53	0.00006-0.02	30	0.00006-0.00125	0.00022	0.0004	0.02	0.00066
Copper	SubMcKay	114	786	15.6	663	0.0004-0.05	123	0.00000157-0.38	0.009	0.0174	0.02	0.05
Iron	SubMcKay	141	1445	74.1	374	0.003-0.1	1071	0-27.9	0.59	1.0295	2.28	2.41
Lead	SubMcKay	131	984	17.9	808	0-0.1	176	0.0000494-0.14	0.01	0.0116	0.02	0.01
Lithium	SubMcKay	3	5	100	0		5	0.02-0.055	0.048	0.0422	0.053	
Magnesium	SubMcKay	269	3609	99.4	22	1-3	3587	0-672	109	127.1509	283	289
Manganese	SubMcKay	140	1449	85.5	210	0.002-0.1	1239	0-1.5	0.07	0.1167	0.25	0.27
Mercury	SubMcKay	203	949	2.6	924	0.00005-0.005	25	0-0.004	0.0001	0.0006	0.001	0.001
Molybdenum	SubMcKay	21	90	17.8	74	0.001-0.04	16	0.001-0.032	0.0015	0.0061	0.04	0.004

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 5 continued

Analyte	Stratigraphic Unit	Number of Wells	Total Number of Samples	Detect Freq. (%)	Non-detects		Detects				90th Percentile	BSL
					Number of Samples	Range	Number of Samples	Range	Median	Mean		
Nitrate	SubMcKay	19	86	30.2	60	0.01-0.5	26	0.05-1.7	0.65	0.6572	0.78	0.87
Nitrite	SubMcKay	17	76	1.3	75	0.01-0.5	1	0.06-0.06	0.06	0.0600	0.05	0.05
Nitrite + Nitrate	SubMcKay	254	1561	45.7	848	0-0.05	713	0-17	0.16	0.3758	0.53	0.58
Orthophosphate	SubMcKay	101	716	57.8	302	0.005-2	414	0-297	0.04	0.8669	0.12	0.11
pH (Field)	SubMcKay	165	489	100	0		489	5.58-10.3	7.24	7.34	8	8.1
pH (Laboratory)	SubMcKay	218	3083	100	0		3083	6.3-12.1	7.5	7.53	8.2	8.2
Phosphate	SubMcKay	10	27	40.7	16	0.4-0.4	11	0.01-3.55	0.49	0.8809	0.722	3.55
Phosphorus	SubMcKay	2	2	0	2	0.4-0.4	0				0.4	
Potassium	SubMcKay	262	2977	99.5	16	1-12.5	2961	0-84	9.71	9.7545	15	15
SC (Field)	SubMcKay	188	1543	100	0		1543	680-9999999	3005	132774.6000	4349.4	4470
SC (Laboratory)	SubMcKay	233	3347	100	0		3347	595-10400	2890	3064.1919	4370	4470
Selenium	SubMcKay	267	3151	9.3	2859	0.0005-0.1	292	0.000409-0.138	0.007	0.0093	0.005	0.005
Silica	SubMcKay	14	104	100	0		104	2.8-23.5	7.54	8.530	16.9	18.1
Silver	SubMcKay	11	47	0	47	0.001-0.03	0				0.03	0.03
Sodium	SubMcKay	270	3618	100	0		3618	8.59-1707	387	429.8600	835	858
Strontium	SubMcKay	20	117	99.1	1	0.002-0.002	116	0.03-6	1.42	1.9223	4.886	5.02
Sulfate	SubMcKay	270	3590	99.7	9	1-10	3581	4-6720	1290	1362.2181	2160	2200
TDS	SubMcKay	225	3262	100	0		3262	448-6310	2340	2473.2962	3680	3710
Thallium	SubMcKay	6	36	0	36	0.0003-0.5	0				0.5	0.5
Tin	SubMcKay	9	43	4.7	41	0.03-0.03	2	0.03-0.04	0.035	0.035	0.03	0.03
Titanium	SubMcKay	12	49	34.7	32	0.001-0.1	17	0-0.015	0.008	0.0084	0.0112	0.013
Vanadium	SubMcKay	113	779	14.2	668	0.0001-1	111	0.25	0.01	0.0352	0.2	1
Zinc	SubMcKay	124	1339	87.8	163	0-1.01	1176	0-5.45	0.08	0.2527	0.582	0.64
Zirconium	SubMcKay	2	4	0	4	0.008-0.02	0	0.000000228-			0.02	

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are μmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 6. Comparison of Data used Across BSL Investigations

Investigations	Maxim (2004)	Arcadis (2007)	Exponent (2011)	Neptune (2016)
Date Range of Data	1979 - 2003	5/23/1974 - 10/26/2005	before 10/1/1983	3/23/1973 - 5/18/2015
Areas Covered	Stage I & II Evaporation Ponds, Plant Site	Stage I & II Evaporation Ponds, Plant Site	Units 3&4 Effluent Holding Ponds	Stage I & II Evaporation Ponds, Plant Site, Units 3&4 Effluent Holding Ponds
	<i># wells (# records)</i>	<i># wells (# records)</i>	<i># wells (# records)</i>	<i># wells (# records)</i>
Alluvium	X	15 (1,621)	15 (877)	198 (31,985)
Shallow	31 (3,939)	X	X	X
Spoils	X	16 (1,203)	26 (2,533)	88 (12,184)
Clinker	X	X	X	7 (1,579)
Coal-Related	X	X	12 (560)	317 (55,546)
SubMcKay	X	X	X	273 (55,578)
Bedrock	X	43 (5,272)	19 (1,051)	X
Total	59 (10,262) ¹	74 (8,096)	72 (5,021)	883 (156,872)

¹ Maxim (2004) calculated baselines for a 'Shallow' category and an 'All' category that also included the 'Shallow' wells

Table 7. Groundwater BSLs Values for Each Analytes and Stratigraphic Unit

Analyte	Alluvium	Spoils	Clinker	Coal-Related	SubMcKay
Aluminum	0.3	0.2	1.2	0.2	0.2
Ammonia	0.415	3.04		1.6	4.03
Antimony	0.15	0.45		0.39	0.15
Arsenic	0.01	0.005		0.005	0.005
Barium	0.022	0.27		0.111	0.09
Beryllium	0.003	0.01		0.005	0.003
Boron	1.6	0.818	4	1.1	1.3
Bromide	5	1	10	10	5
Cadmium	0.005	0.005	0.01	0.002	0.003
Calcium	378	495	367	351	313
Chloride	45	62	34	20	24
Chromium	0.1	0.0215		0.0146	0.1
Cobalt	0.02	0.0232		0.0034	0.00066
Copper	0.02	0.031	0.02	0.03	0.05
Fluoride	0.65	0.4	0.81	0.51	2.1
Iron	0.22	2.608	1.45	1.23	2.41
Lead	0.01	0.05	0.02	0.01	0.01
Lithium	0.092	0.09		0.072	
Magnesium	409	547	524	303	289
Manganese	0.6	2.79	0.67	0.54	0.27
Mercury	0.001	0.005	0.001	0.001	0.001
Molybdenum	0.04	0.048		0.02	0.004
Nickel	0.1	0.08	0.03	0.0142	0.03
Nitrate	4.7	2.92		0.4	0.87
Nitrite	0.92	0.5		2.5	0.05
Nitrite + Nitrate	1.78	5.8	0.53	0.73	0.58
Orthophosphate	0.43	1.3	0.19	0.18	0.11
pH (Field)	7.5	7.16	8.3	7.73	8.1
pH (Laboratory)	7.8	7.88	8.2	7.8	8.2
Phosphate	0.95				3.55
Phosphorus	0.72				
Potassium	16.7	18.5	30	15	15
SC (Field)	4314	4900	4700	4130	4470
SC (Laboratory)	4270	4633	5310	3550	4470
Selenium	0.009	0.0023	0.01	0.005	0.005
Silica	27.2	22		23	18.1
Silver	0.03	0.012		0.011	0.03
Sodium	372	339	586	383	858
Strontium	8.7	15.2		13.8	5.02
Sulfate	2600	3045	3160	2061	2200
TDS	4000	4930	5170	3160	3710
Thallium	0.5	0.05		0.005	0.5
Tin	0.03	0.88		1.7	0.03
Titanium	0.1	0.039		0.035	0.013
Vanadium	1	0.0107	1	1	1
Zinc	0.13	0.44	0.07	0.76	0.64
Zirconium	0.0309	0.1		0.022	

BSL = max non-detect

BSL < 90th percentile

Note: BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 8. Groundwater BSL Comparisons

Analyte	Stratigraphic Unit	90th Percentile	BSL (DL)	BSL (1/2 DL)	BSL (Gehan)	Circular DEQ-7 Human Health Standards (HHS)
Aluminum	Alluvium	0.3	0.3	0.3	0.3	No HHS
Ammonia	Alluvium	0.268	0.415	0.415	0.415	No HHS
Antimony	Alluvium	0.15	0.15	0.075	0.15	6
Arsenic	Alluvium	0.3	0.3	0.15	0.01	0.01
Barium	Alluvium	0.0212	0.024	0.024	0.022	1
Beryllium	Alluvium	0.003	0.003	0.0015	0.003	0.004
Boron	Alluvium	1.6	1.6	1.6	1.6	No HHS
Bromide	Alluvium	4.7	5	2.5	5	No HHS
Cadmium	Alluvium	0.008	0.01	0.01	0.005	0.005
Calcium	Alluvium	374	378	377.9	378	No HHS
Chloride	Alluvium	43.12	46	45	45	No HHS
Chromium	Alluvium	0.03	0.03	0.015	0.1	0.1
Cobalt	Alluvium	0.02	0.02	0.01	0.02	No HHS
Copper	Alluvium	0.02	0.02	0.01	0.02	1.3
Fluoride	Alluvium	0.63	0.662	0.66	0.65	4
Iron	Alluvium	0.17	0.216	0.22	0.22	No HHS
Lead	Alluvium	0.02	0.03	0.03	0.01	0.015
Lithium	Alluvium	0.062	0.092	0.092	0.092	No HHS
Magnesium	Alluvium	397.2	409	409	409	No HHS
Manganese	Alluvium	0.52	0.6	0.6	0.6	No HHS
Mercury	Alluvium	0.001	0.001	0.0005	0.001	0.002
Molybdenum	Alluvium	0.04	0.04	0.02	0.04	No HHS
Nickel	Alluvium	0.03	0.03	0.015	0.1	0.1
Nitrate	Alluvium	1.87	4.792	4.838	4.7	10
Nitrite	Alluvium	0.5	0.878	0.853	0.92	1
Nitrite + Nitrate	Alluvium	1.636	1.78	1.78	1.78	10
Orthophosphate	Alluvium	0.39	0.45	0.436	0.43	No HHS
pH (Field)	Alluvium	7.5	7.5	7.5	7.5	No HHS
pH (Laboratory)	Alluvium	7.7	7.8	7.8	7.8	No HHS
Phosphate	Alluvium	0.881	0.926	0.926	0.95	No HHS
Phosphorus	Alluvium	0.685	0.72	0.72	0.72	No HHS
Potassium	Alluvium	16	16.7	16.7	16.7	No HHS
SC (Field)	Alluvium	4258.3	4314.6	4315.3	4314	No HHS
SC (Laboratory)	Alluvium	4175	4270	4270	4270	No HHS
Selenium	Alluvium	0.009	0.01	0.009	0.009	0.05
Silica	Alluvium	26.42	27.16	27.16	27.2	No HHS
Silver	Alluvium	0.03	0.03	0.015	0.03	100
Sodium	Alluvium	348.2	371.2	371.2	372	No HHS
Strontium	Alluvium	8.198	8.532	8.49	8.7	4
Sulfate	Alluvium	2550	2600	2600	2600	No HHS
TDS	Alluvium	3950	4000	4000	4000	No HHS
Thallium	Alluvium	0.104	0.5	0.25	0.5	0.002
Tin	Alluvium	0.03	0.03	0.015	0.03	No HHS
Titanium	Alluvium	0.012	0.0316	0.0325	0.1	No HHS
Vanadium	Alluvium	0.5	1	0.5	1	No HHS
Zinc	Alluvium	0.12	0.13	0.13	0.13	2
Zirconium	Alluvium	0.02	0.0309	0.0309	0.0309	No HHS

BSL = max non-detect BSL < 90th percentile
 Failed BSL rules (see Section 5.1) DL = Detection Limit

Note: All units are mg/L except SC which are µmhos/cm

Note: The methodology for the 90th percentile and the DL, ½ DL, and Gehan BSLs is explained in section 5.1

Table 8 continued

Analyte	Stratigraphic Unit	90th Percentile	BSL (DL)	BSL (1/2 DL)	BSL (Gehan)	Circular DEQ-7 Human Health Standards (HHS)
Aluminum	Spoils	0.2	0.206	0.2	0.2	No HHS
Ammonia	Spoils	1.793	3.04	2.919	3.04	No HHS
Antimony	Spoils	0.326	0.41	0.432	0.45	6
Arsenic	Spoils	0.005	0.005	0.005	0.005	0.01
Barium	Spoils	0.0988	0.238	0.238	0.27	1
Beryllium	Spoils	0.005	0.01	0.005	0.01	0.004
Boron	Spoils	0.786	0.818	0.818	0.818	No HHS
Bromide	Spoils	2	2.5	2.4	1	No HHS
Cadmium	Spoils	0.006	0.008	0.005	0.005	0.005
Calcium	Spoils	478.2	495	495	495	No HHS
Chloride	Spoils	54.09	61.9	61.9	62	No HHS
Chromium	Spoils	0.02	0.021	0.0215	0.0215	0.1
Cobalt	Spoils	0.02152	0.02266	0.02266	0.0232	No HHS
Copper	Spoils	0.025	0.03	0.0303	0.031	1.3
Fluoride	Spoils	0.399	0.419	0.409	0.4	4
Iron	Spoils	1.714	2.5664	2.5664	2.608	No HHS
Lead	Spoils	0.053	0.083	0.05	0.05	0.015
Lithium	Spoils	0.089	0.092	0.09	0.09	No HHS
Magnesium	Spoils	488	547	547	547	No HHS
Manganese	Spoils	2.308	2.77	2.77	2.79	No HHS
Mercury	Spoils	0.001	0.001	0.0005	0.005	0.002
Molybdenum	Spoils	0.04	0.05	0.05	0.048	No HHS
Nickel	Spoils	0.0622	0.0793	0.0793	0.08	0.1
Nitrate	Spoils	1.822	2.7208	2.7208	2.92	10
Nitrite	Spoils	0.325	0.5	0.25	0.5	1
Nitrite + Nitrate	Spoils	2.988	5.69	5.69	5.8	10
Orthophosphate	Spoils	1	1.42	1.285	1.3	No HHS
pH (Field)	Spoils	7.08	7.159	7.159	7.16	No HHS
pH (Laboratory)	Spoils	7.8	7.88	7.88	7.88	No HHS
Phosphate	Spoils					No HHS
Phosphorus	Spoils					No HHS
Potassium	Spoils	17.64	18.2	18.2	18.5	No HHS
SC (Field)	Spoils	4500	4900	4900	4900	No HHS
SC (Laboratory)	Spoils	4470	4633	4633	4633	No HHS
Selenium	Spoils	0.005	0.005	0.00462	0.0023	0.05
Silica	Spoils	20.8	21.9	21.9	22	No HHS
Silver	Spoils	0.01	0.0118	0.0114	0.012	100
Sodium	Spoils	301	339	339	339	No HHS
Strontium	Spoils	13.86	15.13	15.2	15.2	4
Sulfate	Spoils	2830	3043.5	3042.6	3045	No HHS
TDS	Spoils	4640	4926	4920	4930	No HHS
Thallium	Spoils	0.025	0.05	0.025	0.05	0.002
Tin	Spoils	0.716	0.88	0.88	0.88	No HHS
Titanium	Spoils	0.0492	0.1	0.05	0.039	No HHS
Vanadium	Spoils	0.2	0.2	0.1	0.0107	No HHS
Zinc	Spoils	0.35	0.44	0.448	0.44	2
Zirconium	Spoils	0.05	0.05	0.025	0.1	No HHS

BSL = max non-detect
 Failed BSL rules (see Section 5.1)

BSL < 90th percentile
 DL = Detection Limit

Note: All units are mg/L except SC which are $\mu\text{mhos/cm}$

Note: The methodology for the 90th percentile and the DL, 1/2 DL, and Gehan BSLs is explained in section 5.1

Table 8 continued

Analyte	Stratigraphic Unit	90th Percentile	BSL (DL)	BSL (1/2 DL)	BSL (Gehan)	Circular DEQ-7 Human Health Standards (HHS)
Aluminum	Clinker	0.74	1.16	1.18	1.2	No HHS
Ammonia	Clinker					No HHS
Antimony	Clinker					6
Arsenic	Clinker					0.01
Barium	Clinker					1
Beryllium	Clinker					0.004
Boron	Clinker	3.6	3.93	3.93	4	No HHS
Bromide	Clinker	5.5	10	5	10	No HHS
Cadmium	Clinker	0.0068	0.0097	0.0097	0.01	0.005
Calcium	Clinker	338	365.2	365.2	367	No HHS
Chloride	Clinker	26	34	32	34	No HHS
Chromium	Clinker					0.1
Cobalt	Clinker					No HHS
Copper	Clinker	0.02	0.02	0.019	0.02	1.3
Fluoride	Clinker	0.64	0.76	0.76	0.81	4
Iron	Clinker	0.39	1.102	1.102	1.45	No HHS
Lead	Clinker	0.02	0.02	0.01	0.02	0.015
Lithium	Clinker					No HHS
Magnesium	Clinker	491.2	524	524	524	No HHS
Manganese	Clinker	0.36	0.67	0.67	0.67	No HHS
Mercury	Clinker	0.001	0.001	0.0005	0.001	0.002
Molybdenum	Clinker					No HHS
Nickel	Clinker	0.03	0.03	0.015	0.03	0.1
Nitrate	Clinker					10
Nitrite	Clinker					1
Nitrite + Nitrate	Clinker	0.2	0.601	0.601	0.53	10
Orthophosphate	Clinker	0.05	0.19	0.19	0.19	No HHS
pH (Field)	Clinker	8	8.3	8.3	8.3	No HHS
pH (Laboratory)	Clinker	8.2	8.2	8.2	8.2	No HHS
Phosphate	Clinker					No HHS
Phosphorus	Clinker					No HHS
Potassium	Clinker	27	29.7	29.7	30	No HHS
SC (Field)	Clinker	4366	4670	4670	4700	No HHS
SC (Laboratory)	Clinker	4944	5310	5310	5310	No HHS
Selenium	Clinker	0.008	0.01	0.01	0.01	0.05
Silica	Clinker					No HHS
Silver	Clinker					100
Sodium	Clinker	562.5	610	589	586	No HHS
Strontium	Clinker					4
Sulfate	Clinker	3030	3160	3160	3160	No HHS
TDS	Clinker	4848	5170	5170	5170	No HHS
Thallium	Clinker					0.002
Tin	Clinker					No HHS
Titanium	Clinker					No HHS
Vanadium	Clinker	0.1	0.91	0.456	1	No HHS
Zinc	Clinker	0.04	0.06	0.06	0.07	2
Zirconium	Clinker					No HHS

BSL = max non-detect BSL < 90th percentile
Failed BSL rules (see Section 5.1) DL = Detection Limit

Note: All units are mg/L except SC which are $\mu\text{mhos/cm}$

Note: The methodology for the 90th percentile and the DL, 1/2 DL, and Gehan BSLs is explained in section 5.1

Table 8 continued

Analyte	Stratigraphic Unit	90th Percentile	BSL (DL)	BSL (1/2 DL)	BSL (Gehan)	Circular DEQ-7 Human Health Standards (HHS)
Aluminum	Coal-Related	0.2	0.2	0.2	0.2	No HHS
Ammonia	Coal-Related	1.2	1.6	1.6	1.6	No HHS
Antimony	Coal-Related	0.2	0.333	0.303	0.39	6
Arsenic	Coal-Related	0.005	0.005	0.005	0.005	0.01
Barium	Coal-Related	0.1	0.111	0.111	0.111	1
Beryllium	Coal-Related	0.005	0.005	0.0025	0.005	0.004
Boron	Coal-Related	1.1	1.1	1.1	1.1	No HHS
Bromide	Coal-Related	1.52	5	2.5	10	No HHS
Cadmium	Coal-Related	0.005	0.005	0.0025	0.002	0.005
Calcium	Coal-Related	338	351	351	351	No HHS
Chloride	Coal-Related	19	20	20	20	No HHS
Chromium	Coal-Related	0.02	0.02	0.013	0.0146	0.1
Cobalt	Coal-Related	0.0034	0.00357	0.0034	0.0034	No HHS
Copper	Coal-Related	0.03	0.03	0.03	0.03	1.3
Fluoride	Coal-Related	0.5	0.52	0.516	0.51	4
Iron	Coal-Related	1.13	1.23	1.23	1.23	No HHS
Lead	Coal-Related	0.02	0.02	0.01	0.01	0.015
Lithium	Coal-Related	0.0696	0.074	0.074	0.072	No HHS
Magnesium	Coal-Related	286	302.6	303	303	No HHS
Manganese	Coal-Related	0.485	0.535	0.535	0.54	No HHS
Mercury	Coal-Related	0.001	0.001	0.0005	0.001	0.002
Molybdenum	Coal-Related	0.04	0.04	0.02	0.02	No HHS
Nickel	Coal-Related	0.03	0.03	0.01948	0.0142	0.1
Nitrate	Coal-Related	0.33	0.4	0.4	0.4	10
Nitrite	Coal-Related	0.475	2.5	1.25	2.5	1
Nitrite + Nitrate	Coal-Related	0.67	0.73	0.73	0.73	10
Orthophosphate	Coal-Related	0.17	0.2	0.19	0.18	No HHS
pH (Field)	Coal-Related	7.67	7.712	7.712	7.73	No HHS
pH (Laboratory)	Coal-Related	7.8	7.8	7.8	7.8	No HHS
Phosphate	Coal-Related					No HHS
Phosphorus	Coal-Related	15.306				No HHS
Potassium	Coal-Related	14	15	15	15	No HHS
SC (Field)	Coal-Related	3796	4130	4130	4130	No HHS
SC (Laboratory)	Coal-Related	3280.8	3551	3555	3550	No HHS
Selenium	Coal-Related	0.005	0.005	0.0025	0.005	0.05
Silica	Coal-Related	21.56	22.84	22.84	23	No HHS
Silver	Coal-Related	0.01	0.0103	0.0103	0.011	100
Sodium	Coal-Related	359.7	383	383.4	383	No HHS
Strontium	Coal-Related	12.12	13.8	13.8	13.8	4
Sulfate	Coal-Related	1960	2060.7	2060.7	2061	No HHS
TDS	Coal-Related	2972	3150	3150	3160	No HHS
Thallium	Coal-Related	0.0035	0.005	0.0025	0.005	0.002
Tin	Coal-Related	0.79	1.536	1.536	1.7	No HHS
Titanium	Coal-Related	0.035	0.043	0.043	0.035	No HHS
Vanadium	Coal-Related	1	1	0.5	1	No HHS
Zinc	Coal-Related	0.711	0.76	0.76	0.76	2
Zirconium	Coal-Related	0.08	0.1	0.05	0.022	No HHS

BSL = max non-detect
 Failed BSL rules (see Section 5.1)
 BSL < 90th percentile
 DL = Detection Limit

Note: All units are mg/L except SC which are µmhos/cm

Note: The methodology for the 90th percentile and the DL, 1/2 DL, and Gehan BSLs is explained in section 5.1

Table 8 continued

Analyte	Stratigraphic Unit	90th Percentile	BSL (DL)	BSL (1/2 DL)	BSL (Gehan)	Circular DEQ-7 Human Health Standards (HHS)
Aluminum	SubMcKay	0.2	0.204	0.2	0.2	No HHS
Ammonia	SubMcKay	2.644	3.54	3.54	4.03	No HHS
Antimony	SubMcKay	0.15	0.15	0.075	0.15	6
Arsenic	SubMcKay	0.3	0.3	0.15	0.005	0.01
Barium	SubMcKay	0.16	0.2	0.1	0.09	1
Beryllium	SubMcKay	0.003	0.003	0.0015	0.003	0.004
Boron	SubMcKay	1.2	1.3	1.3	1.3	No HHS
Bromide	SubMcKay	5	5	2.5	5	No HHS
Cadmium	SubMcKay	0.005	0.006	0.006	0.003	0.005
Calcium	SubMcKay	308	313	313	313	No HHS
Chloride	SubMcKay	24	24	24	24	No HHS
Chromium	SubMcKay	0.03	0.03	0.015	0.1	0.1
Cobalt	SubMcKay	0.02	0.02	0.01	0.00066	No HHS
Copper	SubMcKay	0.02	0.02	0.01	0.05	1.3
Fluoride	SubMcKay	2.1	2.3	2.1	2.1	4
Iron	SubMcKay	2.28	2.41	2.41	2.41	No HHS
Lead	SubMcKay	0.02	0.02	0.02	0.01	0.015
Lithium	SubMcKay	0.053				No HHS
Magnesium	SubMcKay	283	289	289	289	No HHS
Manganese	SubMcKay	0.25	0.27	0.27	0.27	No HHS
Mercury	SubMcKay	0.001	0.001	0.0005	0.001	0.002
Molybdenum	SubMcKay	0.04	0.04	0.02	0.004	No HHS
Nickel	SubMcKay	0.03	0.03	0.015	0.03	0.1
Nitrate	SubMcKay	0.78	0.87	0.87	0.87	10
Nitrite	SubMcKay	0.05	0.05	0.025	0.05	1
Nitrite + Nitrate	SubMcKay	0.53	0.58	0.58	0.58	10
Orthophosphate	SubMcKay	0.12	0.135	0.135	0.11	No HHS
pH (Field)	SubMcKay	8	8.06	8.06	8.1	No HHS
pH (Laboratory)	SubMcKay	8.2	8.2	8.2	8.2	No HHS
Phosphate	SubMcKay	0.722	2.464	2.464	3.55	No HHS
Phosphorus	SubMcKay	0.4				No HHS
Potassium	SubMcKay	15	15	15	15	No HHS
SC (Field)	SubMcKay	4349.4	4466	4466	4470	No HHS
SC (Laboratory)	SubMcKay	4370	4464	4460	4470	No HHS
Selenium	SubMcKay	0.005	0.005	0.0025	0.005	0.05
Silica	SubMcKay	16.9	18.07	18.07	18.1	No HHS
Silver	SubMcKay	0.03	0.03	0.015	0.03	100
Sodium	SubMcKay	835	858	858	858	No HHS
Strontium	SubMcKay	4.886	5.02	5.02	5.02	4
Sulfate	SubMcKay	2160	2200	2200	2200	No HHS
TDS	SubMcKay	3680	3710	3710	3710	No HHS
Thallium	SubMcKay	0.5	0.5	0.25	0.5	0.002
Tin	SubMcKay	0.03	0.03	0.027	0.03	No HHS
Titanium	SubMcKay	0.0112	0.0288	0.015	0.013	No HHS
Vanadium	SubMcKay	0.2	0.2	0.1	1	No HHS
Zinc	SubMcKay	0.582	0.644	0.642	0.64	2
Zirconium	SubMcKay	0.02				No HHS

BSL = max non-detect
 Failed BSL rules (see Section 5.1)

BSL < 90th percentile
 DL = Detection Limit

Note: All units are mg/L except SC which are $\mu\text{mhos/cm}$

Note: The methodology for the 90th percentile and the DL, 1/2 DL, and Gehan BSLs is explained in section 5.1

Table 9. Surface Water Data and Analysis: Summary Statistics, 90th Percentiles, and BSLs

Analyte	Number of Sites	Total Number of Samples	Detect Freq. (%)	Non-Detects		Detects				90th Percentile	BSL
				Number of Samples	Range	Number of Samples	Range	Median	Mean		
Aluminum	4	96	84.4	15	0.004-0.1	81	1.68e-05-309	0.3	7.895368	10.85	34.3
Ammonia	2	11	36.4	7	0.05-0.05	4	0.06-0.433	0.2225	0.2345	0.301	0.433
Arsenic	3	28	100	0		28	7.5e-07-0.017	0.001055	0.001915	0.002351	0.017
Barium	1	2	100	0		2	0.52-0.62	0.57	0.57	0.61	
Beryllium	1	6	0	6	2e-04-0.002	0				0.002	
Boron	4	85	72.9	23	0.1-0.2	62	0.0771-1.2	0.39	0.425063	0.72	0.88
Bromide	1	4	25	3	0.5-1	1	1-Jan	1	1	1	
Cadmium	4	90	30	63	3e-05-0.005	27	0-0.004	0.001	0.001093	0.005	0.002
Calcium	4	54	100	0		54	3-396	43.95	120.5722	308.1	369
Chloride	4	53	92.5	4	1-Jan	49	1-293	7	57.36388	167.2	228
Chromium	4	84	44	47	5e-04-0.02	37	0-0.41	0.01	0.025873	0.02	0.05
Cobalt	1	2	100	0		2	0.0041-0.0058	0.00495	0.00495	0.00563	
Copper	4	97	57.7	41	5e-04-0.02	56	1.35e-06-0.86	0.0105	0.044916	0.044	0.1
Fluoride	4	46	78.3	10	0.1-1	36	0.04-0.41	0.15	0.166556	0.31	0.32
Iron	4	100	93	7	0.05-0.1	93	1e-05-344	0.41	9.080361	13.75	31
Lead	4	94	41.5	55	1e-04-0.02	39	0-0.24	0.01	0.030882	0.037	0.06
Lithium	1	2	100	0		2	0.12-0.14	0.13	0.13	0.138	
Magnesium	4	54	98.1	1	1-Jan	53	1-586	18	145.6717	395.4	495
Manganese	4	73	79.5	15	0.005-0.02	58	0.01-2.6	0.2355	0.479878	1.156	1.6
Mercury	4	86	16.3	72	5e-05-0.001	14	2e-04-0.001	0.001	0.000657	0.001	0.001
Molybdenum	1	2	0	2	0.01-0.01	0				0.01	
Nickel	3	29	79.3	6	0.002-0.002	23	0-0.0217	0.00227	0.004222	0.01184	0.0217
Nitrite + Nitrate	4	50	82	9	0.01-0.01	41	0.01-7.48	0.29	0.622293	1.493	1.87
Orthophosphate	3	40	82.5	7	0.02-0.02	33	0.0051-2.02	0.13	0.222767	0.402	0.62
pH (Field)	1	6	100	0		6	7-7.8	7.555	7.4483	7.79	
pH (Laboratory)	1	5	100	0		5	7.6-8	7.7	7.78	8	
Phosphorus	1	1	100	0		1	0.02-0.02	0.02	0.02	0.02	
Potassium	4	54	100	0		54	27-Jan	6.5	8.987037	16.62	17.3
SC (Field)	1	6	100	0		6	3320-5520	3878.5	4237	5390	
SC (Laboratory)	1	6	100	0		6	3620-5580	4130	4495	5570	
Selenium	4	102	34.3	67	5e-04-0.005	35	0-0.01	0.004	0.004443	0.005	0.01

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

Table 9 continued

Analyte	Number of Sites	Total Number of Samples	Detect Freq. (%)	Non-Detects		Detects				90th Percentile	BSL
				Number of Samples	Range	Number of Samples	Range	Median	Mean		
Sodium	4	54	90.7	5	1-Jan	49	1-348	25	87.99592	230.5	234
Strontium	1	6	100	0		6	6.23-11.5	7.74	8.21	10.61	
Sulfate	4	53	100	0		53	Feb-30	109	756.0377	2082	2260
TDS	1	6	100	0		6	3350-5480	3775	4215	5360	
Thallium	1	6	0	6	3e-04-0.001	0				0.00075	
Vanadium	4	94	40.4	56	1e-04-1	38	9.35e-07-0.1	0.05	0.046832	1	0.1
Zinc	4	95	65.3	33	0.005-0.02	62	7.36e-06-0.99	0.045	0.103025	0.166	0.29
Zirconium	1	2	0	2	0.05-0.05	0				0.05	

Failed BSL rules (see Section 5.1)

BSL = max non-detect

BSL < 90th percentile

Note: All units are mg/L except SC which are µmhos/cm

¹ BSL values adjacent to yellow cells are generated from data containing non-detects in the top 20%. BSL values in non-colored cells are valid according to the criteria outlined in Section 5.1.

Table 10. Surface Water BSL Comparisons

Analyte	90th Percentile	BSL (DL)	BSL (1/2 DL)	BSL (Gehan)	Circular DEQ-7 Human Health Standards (HHS)
Aluminum	10.85	24.65	24.65	34.3	No HHS
Ammonia	0.301	0.433	0.433	0.433	No HHS
Arsenic	0.002351	0.0079	0.0079	0.017	0.01
Barium	0.61				1
Beryllium	0.002				0.004
Boron	0.72	0.84	0.84	0.88	No HHS
Bromide	1				No HHS
Cadmium	0.005	0.005	0.0025	0.002	0.005
Calcium	308.1	354.3	354.3	369	No HHS
Chloride	167.2	227.2	227.2	228	No HHS
Chromium	0.02	0.05	0.05	0.05	0.1
Cobalt	0.00563				No HHS
Copper	0.044	0.094	0.094	0.1	1.3
Fluoride	0.31	0.41	0.4	0.32	No HHS
Iron	13.75	31.87	31.87	31	No HHS
Lead	0.037	0.06	0.06	0.06	0.015
Lithium	0.138				No HHS
Magnesium	395.4	474	474	495	No HHS
Manganese	1.156	1.6	1.6	1.6	No HHS
Mercury	0.001	0.001	0.001	0.001	0.00005
Molybdenum	0.01				No HHS
Nickel	0.01184	0.01394	0.01474	0.0217	0.1
Nitrite + Nitrate	1.493	1.87	1.87	1.87	10
Orthophosphate	0.402	0.62	0.62	0.62	No HHS
pH (Field)	7.79				No HHS
pH (Laboratory)	8				No HHS
Phosphorus	0.02				No HHS
Potassium	16.62	17.21	17.21	17.3	No HHS
SC (Field)	5390				No HHS
SC (Laboratory)	5570				No HHS
Selenium	0.005	0.01	0.01	0.01	0.05
Sodium	230.5	234	234	234	No HHS
Strontium	10.61				4
Sulfate	2082	2238	2238	2260	No HHS
TDS	5360				No HHS
Thallium	0.00075				0.00024
Vanadium	1	1	0.5	0.1	No HHS
Zinc	0.166	0.29	0.29	0.29	2
Zirconium	0.05				No HHS
	BSL = max non-detect			BSL < 90th percentile	
	Failed BSL rules (see Section 5.1)			DL = Detection Limit	