

The Distribution of MVT-Related Metals in Ground Water of the Ozark Plateaus Region of the United States

By Lopaka Lee *and* Martin B. Goldhaber

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The Distribution of MVT-Related Metals in Ground Water of the Ozark Plateaus Region of the United States

By Lopaka Lee and Martin B. Goldhaber

Introduction

This report is a compilation of figures and tables that show the spatial and statistical distribution of dissolved elemental concentrations of As, Ba, Cd, Co, Cu, Cr, Mo, Ni, Pb, and Zn, in ground water from the Ozark Plateaus region of the United States.

This product is part of a USGS project that is focused on characterizing the effects of Mississippi Valley-type (MVT) mineralization on the background ground water chemistry of the Ozark Plateaus region of the United States (Lee, 2000). The first phase of this parent study involved the investigation of spatial and statistical relationships between MVT-related metals in rocks and groundwater. The figures and tables of this report are a product of this study phase and are centered on characterizing, on a regional level, the spatial and statistical distribution of MVT-related metals in aquifer rocks. A companion report that shows the spatial and statistical distribution of MVT-related metals in acid-insoluble residues of borehole rocks from the Ozark region has been published as a USGS open-file report under the title: *The distribution of MVT-related metals in acid-insoluble residues of Paleozoic rocks in the Ozark Plateaus region of the United States* (Lee and Goldhaber, 2001).

A minimal amount of scientific interpretations are provided within the text. A detailed interpretation of this data, as it relates to the effects of MVT mineralization on the natural-background ground water chemistry of the Ozark region, is currently available in Lee (2000).

Description of the Dataset

The figures and tables of this report are based on a database of 400 ground-water samples from 380 different locations distributed throughout the Ozark region (Figure 1). The entire ground-water dataset, along with instructions on how to obtain digital copies of records, is listed in Appendix A.

All ground-water samples used within this report were

generated during USGS Water-Resources Division (USGS-WRD) programs. Ground-water samples are from both springs and wells. A majority of these water samples are associated with the USGS National Water Quality Assessment (NAWQA) Program – Ozark Plateaus Study Unit (Freiwald, 1991; Peterson, Adamski, and others, 1998). A smaller set of the USGS water data is from water-quality monitoring programs implemented by the USGS-WRD, but not directly associated with the NAWQA program. These samples were obtained by the same office and personnel executing the Ozark NAWQA study and were obtained and analyzed in accordance with standard USGS protocol (see USGS Technical Water Resources Investigations (TWRI) manuals available at (http://oregon.usgs.gov/pubs_dir/twri-list.html)).

All ground-water samples used in this report are full determinations of major elements and field parameters.

Data records for ground-water samples contain information on the principal water-bearing geologic formations of springs and wells, and also well construction information where relevant. Table 1 summarizes the statistical distribution of water samples by water-yielding formation (or geologic unit). The total percentage of groundwater samples representative of the individual aquifer units of the Ozark Aquifer System are: 36% from the Springfield Plateau aquifer unit, 64% from the Ozark aquifer unit, and 0% from the St. Francois aquifer unit. Groundwater samples from the St. Francois aquifer unit were not obtained for use in this report. This aquifer is of minor importance as a drinking water source in the Ozarks (Imes and Emmett, 1994).

Trace elements were determined in 200 ground-water samples (Table 1). The total percentage of groundwater samples with trace element data representative of individual aquifer units of the Ozark aquifer system are: 20% from the Springfield Plateau aquifer unit, and 80% from the Ozark aquifer unit. The lower detection limit for almost all trace metal analyses within the dataset is 1 ug/L. However, for some analyses, detection limits are as high as 6 ug/L. For mapping and plotting purposes, all concentrations of trace elements reported at the lower limits of detection were set to one-half of the reported detection limit.

Table 1. Statistical distribution of ground-water samples by geologic formation and aquifer unit

Hydrologic Unit	Groundwater Analyses (with major ions)	Groundwater Analyses (with trace elements)
Western Int. Plains confining	0	0
Springfield Plateau aquifer	144	40
Ozark confining	0	0
Ozark aquifer	256	160
St. Francois confining	0	0
St. Francois aquifer	0	0
Basement confining	0	0
TOTAL	400	200

Maps of the Concentrations of Dissolved Metals in Ozark Region Ground Water

Figures 2 through 9 show the distribution of dissolved MVT metals in groundwater samples. Over most of the Ozark region, the observed concentrations of MVT-related metals are typically below 100 ug/L for Zn and below 1-5 ug/L for all other MVT metals. However, dissolved concentrations in excess of these limits consistently occur in the southwestern portion of the Ozark region. In this area, concentrations of MVT metals in groundwater are elevated with respect to regional concentrations. Dissolved Zn in this area occurs in concentrations up to 2000 ug/L (Figure 9). Dissolved As, Cd, Co, and Cr, exceed 1 ug/L (Figures 2 through 5). The highest concentrations of dissolved metals occur in a northwest-southeast striking trend that contains the Northern Arkansas mining district. This overall trend is coincident with the Chesapeake Tectonic Zone.

Figure 10 shows the geologic source of ground-water samples that contain at least one trace-metal that is elevated with regard to the typically observed concentrations. Elevated dissolved-metal concentrations in northern Arkansas are predominately associated with groundwater from the Everton Formation and Jefferson City-Cotter Dolomites. Other water samples in northern Arkansas with elevated dissolved metal concentrations are associated with wells producing from multiple formations in the upper Ozark aquifer unit. Figure 10 also shows some correlation with elevated metals and structural features such as fault traces and tectonic-zone trends. Elevated metals are observed in the Boone Formation, Jefferson City-Cotter Dolomite and Everton Formation, the Roubidoux-Gasconade Dolomites, and to a limited extent, the Eminence-Potosi Dolomites.

References Cited

- Freiwald, D.A., 1991, National Water-Quality Assessment Program - Ozark Plateaus: U.S. Geological Survey Open File Report 91-162, 2 p.
- Imes, J.L., and Emmett, L.F., 1994, Geohydrology of the Ozark Plateaus aquifer system in parts of Missouri, Arkansas, Oklahoma, and Kansas: U.S. Geological Survey Professional Paper 1414-D, 127 p.
- Lee, L., and Goldhaber, M.B., 2001, The distribution of MVT-related metals in acid insoluble residues of Paleozoic rocks in the Ozark plateaus region of the United States: U.S. Geological Survey Open File Report 01-0042 (<http://geology.cr.usgs.gov/pub/open-file-reports/ofr-01-0042>), 35 p.
- Lee, R.C.L., 2000, The effect of Mississippi Valley-type mineralization on the natural background chemistry of groundwater in the Ozark Plateaus region of the United States: unpub. Master's thesis, Colorado School of Mines, Golden, CO, 210 p.
- Peterson, J.C., Adamski, J.C., Bell, R.W., Davis, J.V., Femmer, S.R., Freiwald, D.A., and Joseph, R.L., 1998, Water-quality assessment in the Ozark Plateaus, Arkansas, Kansas, Missouri, and Oklahoma, 1992-1995: U.S. Geological Survey Circular 1158, 112 p.

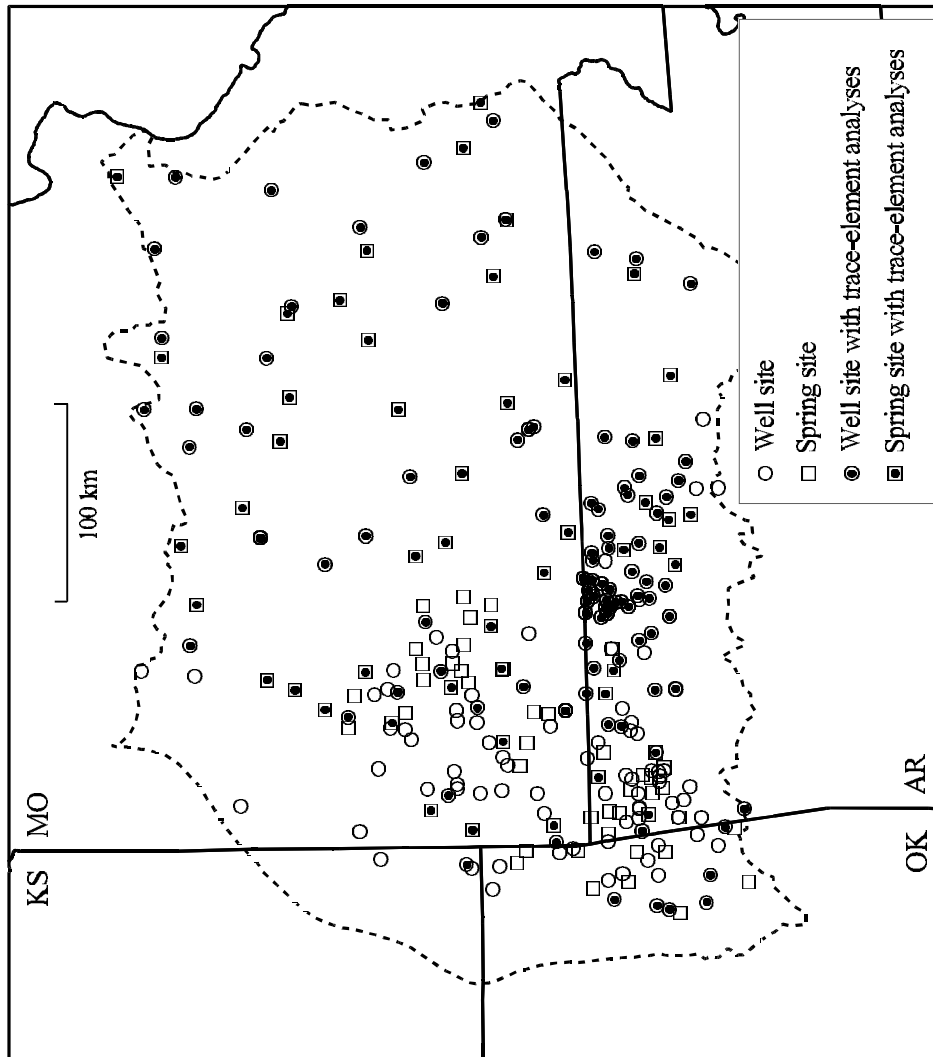


Figure 1. Locations of ground-water sampling sites.

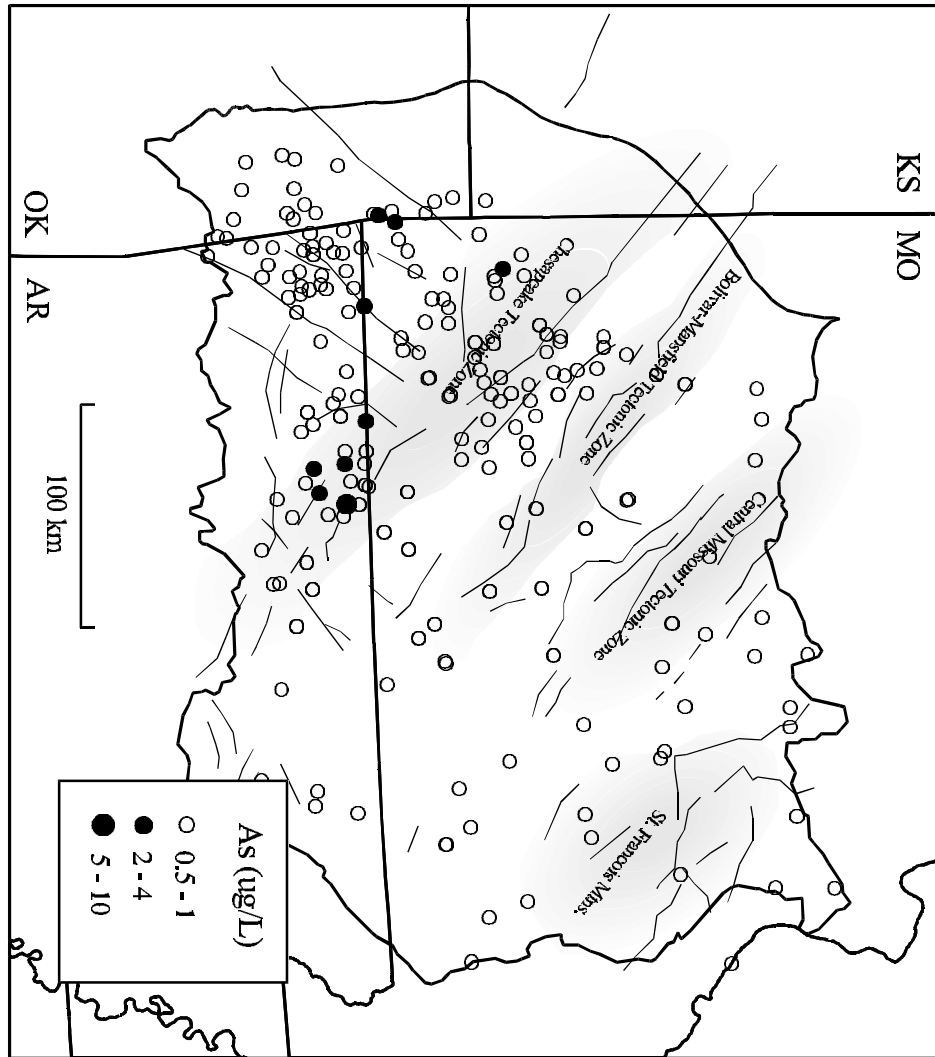


Figure 2. Distribution of dissolved arsenic in ground water samples of the Ozark region

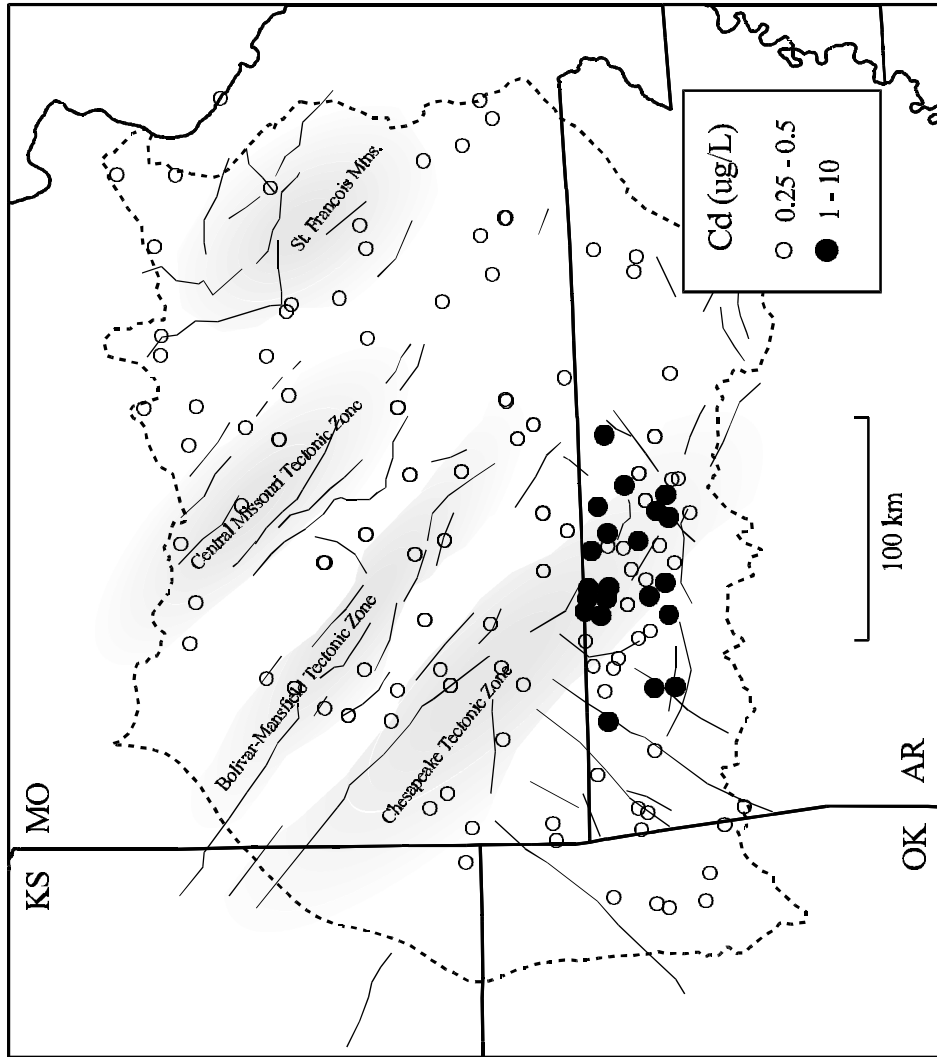


Figure 3. Distribution of dissolved cadmium in ground water samples of the Ozark region

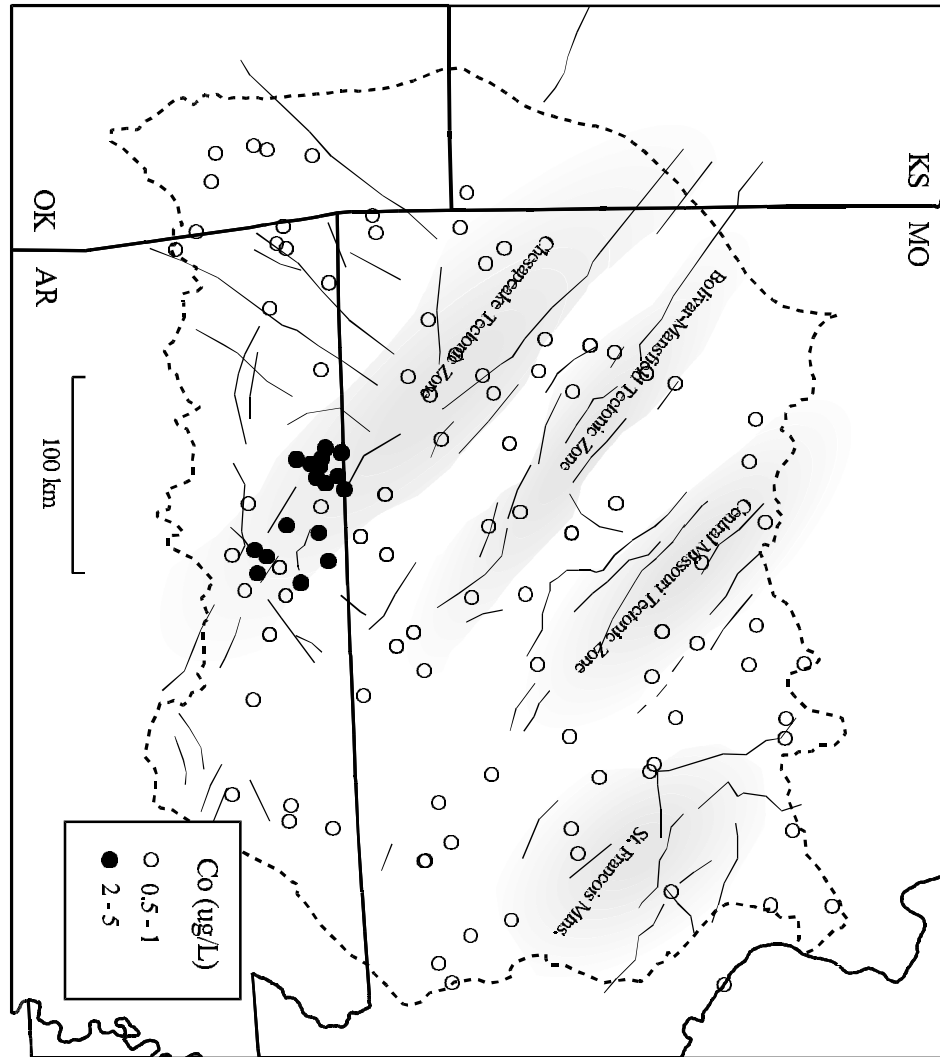


Figure 4. Distribution of dissolved cobalt in ground water samples of the Ozark region

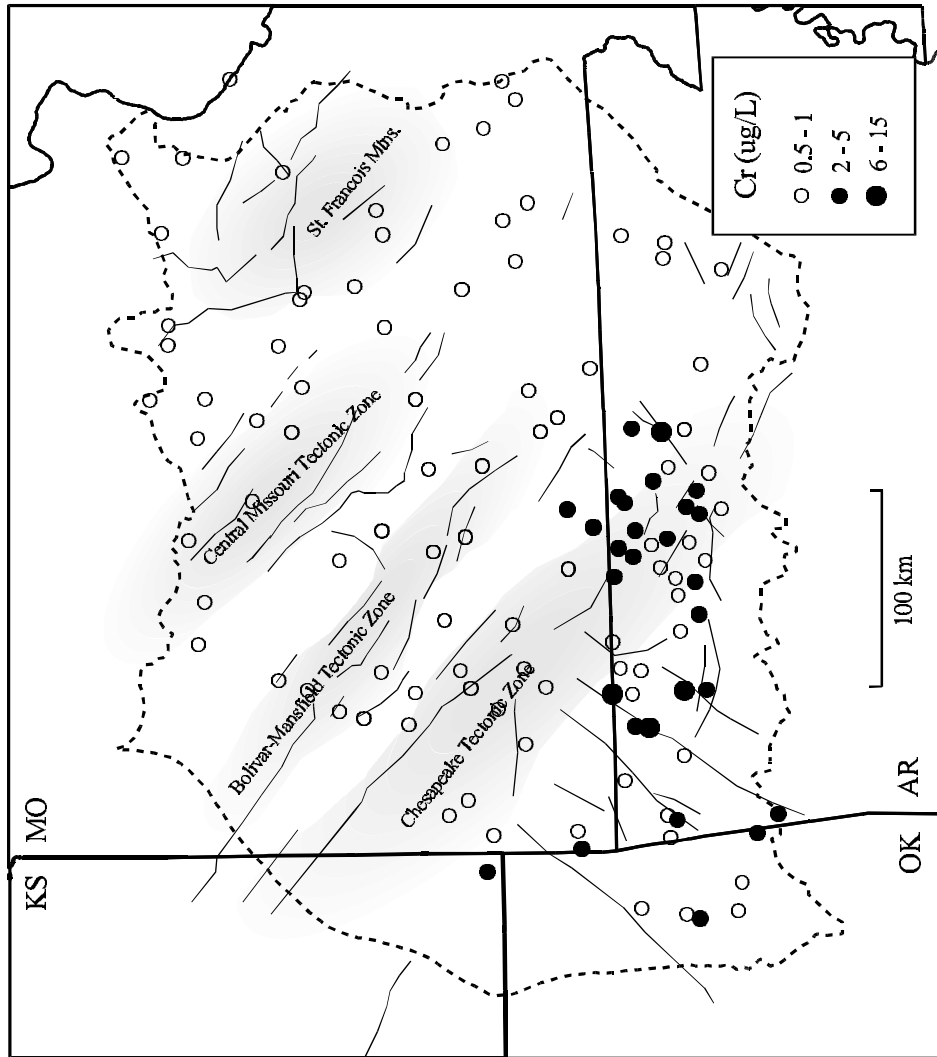


Figure 5. Distribution of dissolved chromium in ground water samples of the Ozark region

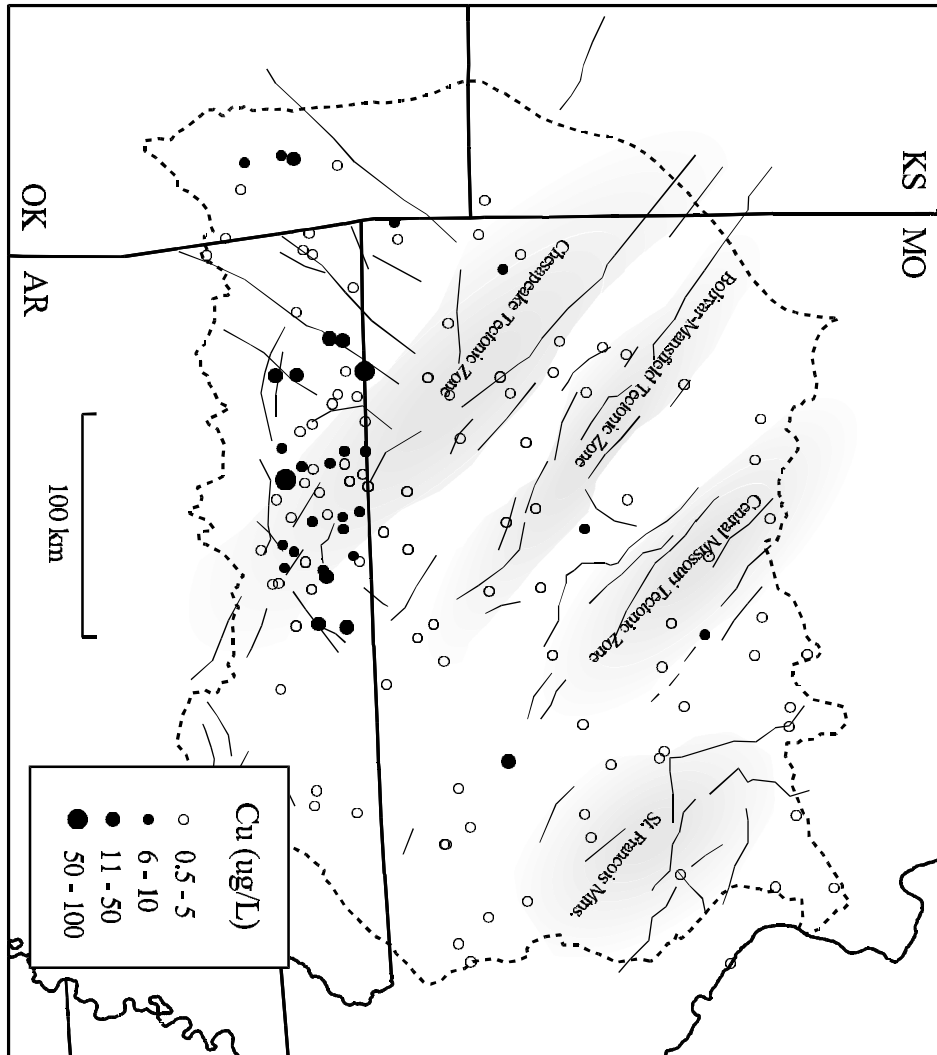


Figure 6. Distribution of dissolved copper in ground water samples of the Ozark region

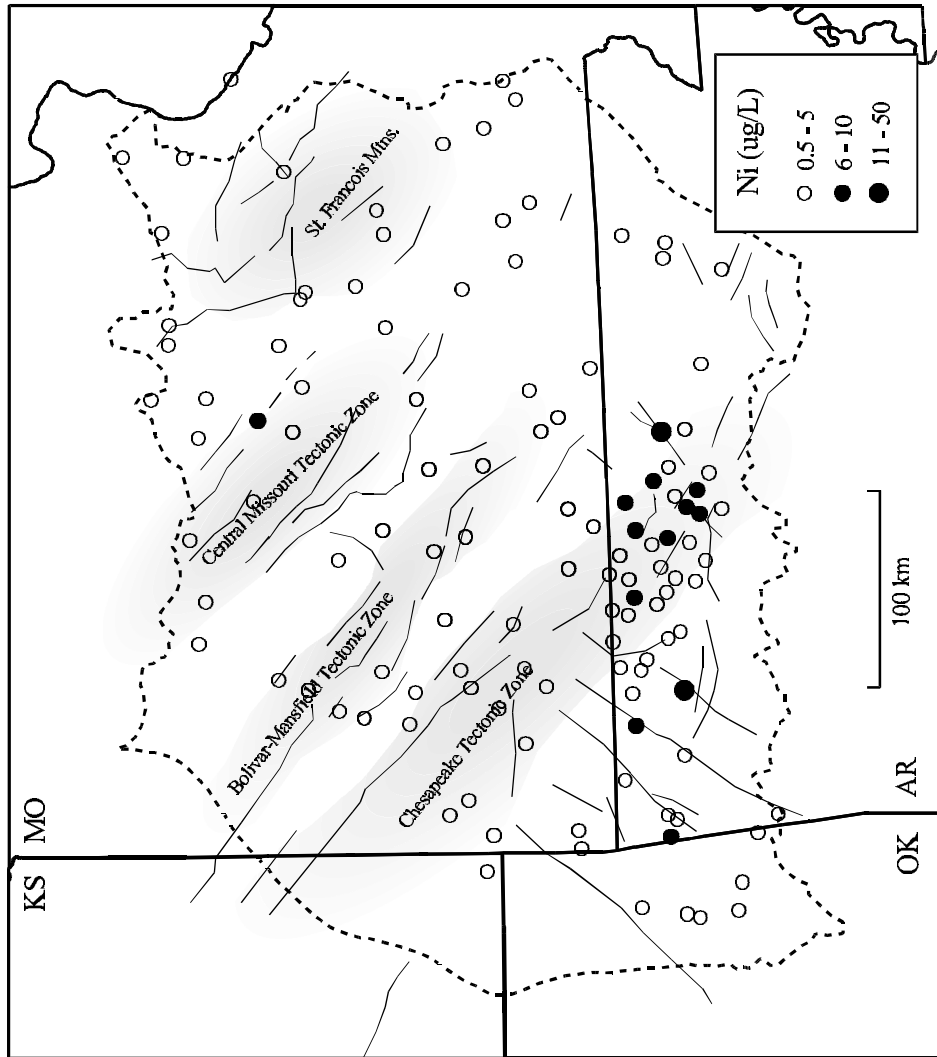


Figure 7. Distribution of dissolved nickel in ground water samples of the Ozark region

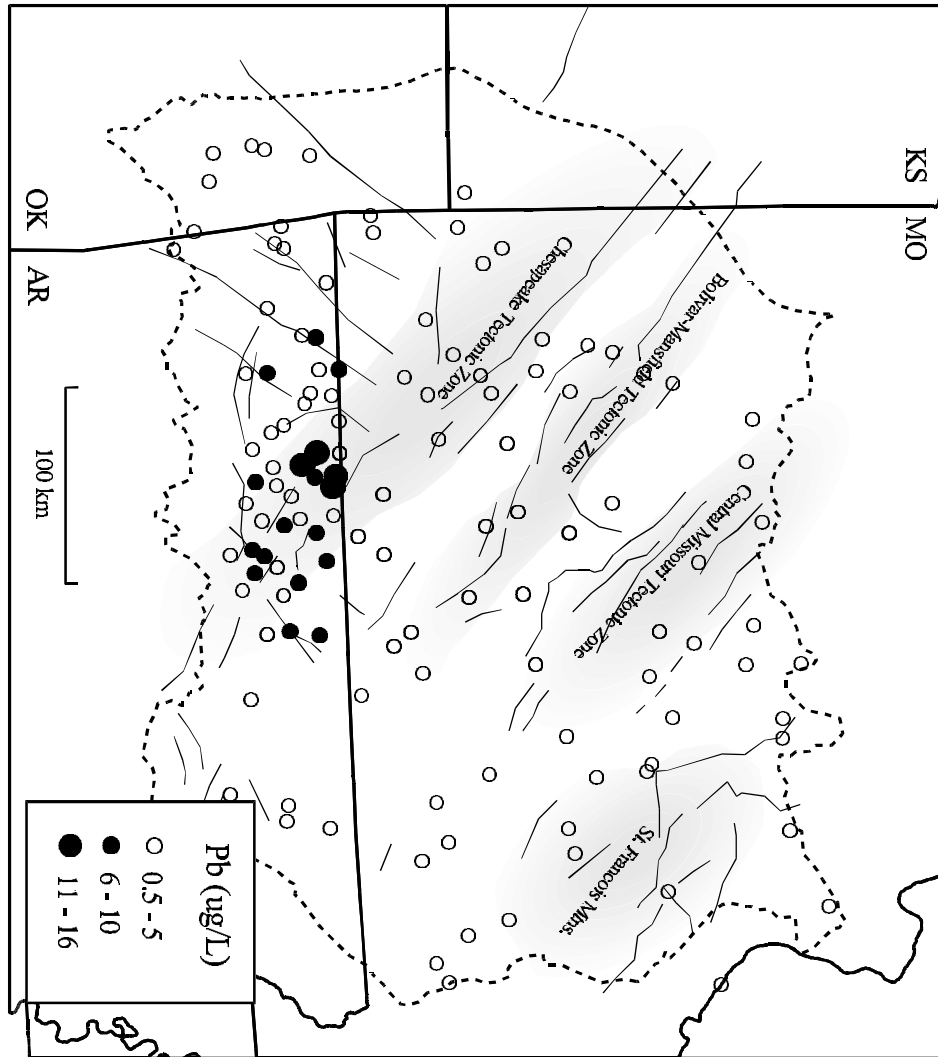


Figure 8. Distribution of dissolved lead in ground water samples of the Ozark region

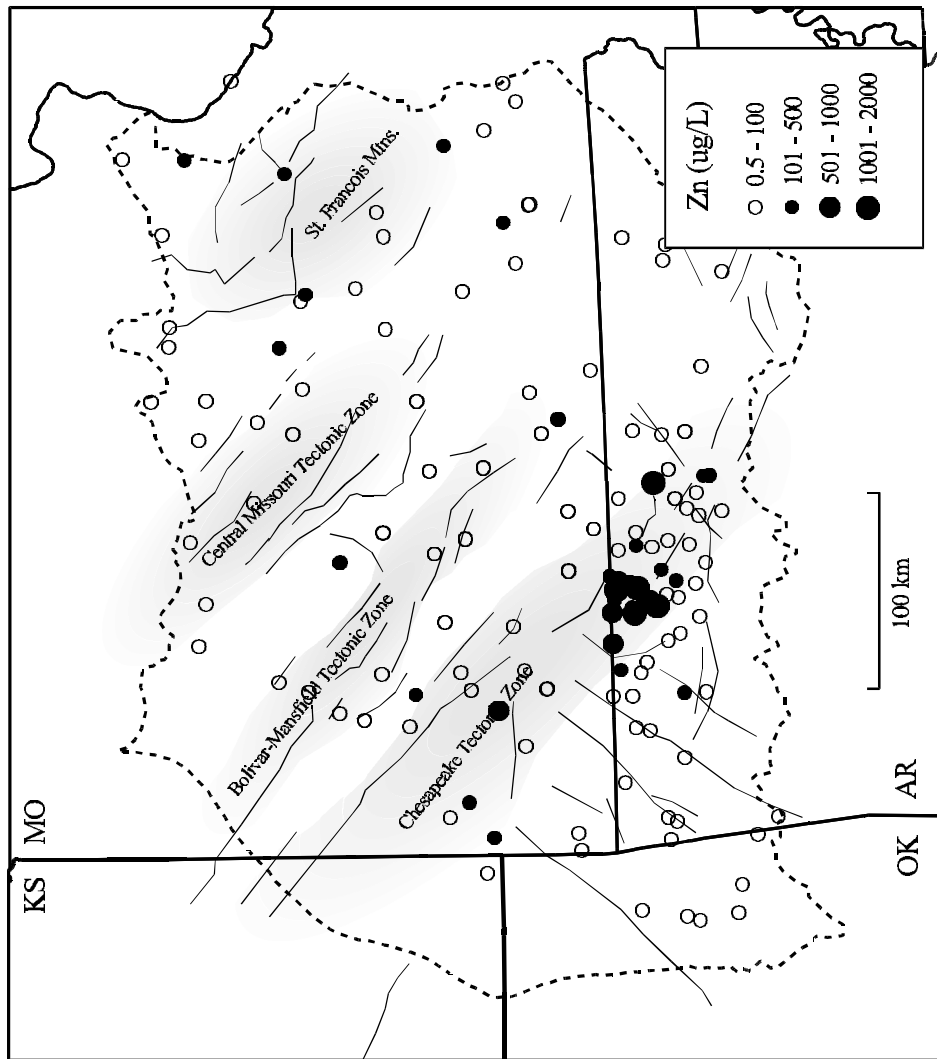


Figure 9. Distribution of dissolved zinc in ground water samples of the Ozark region

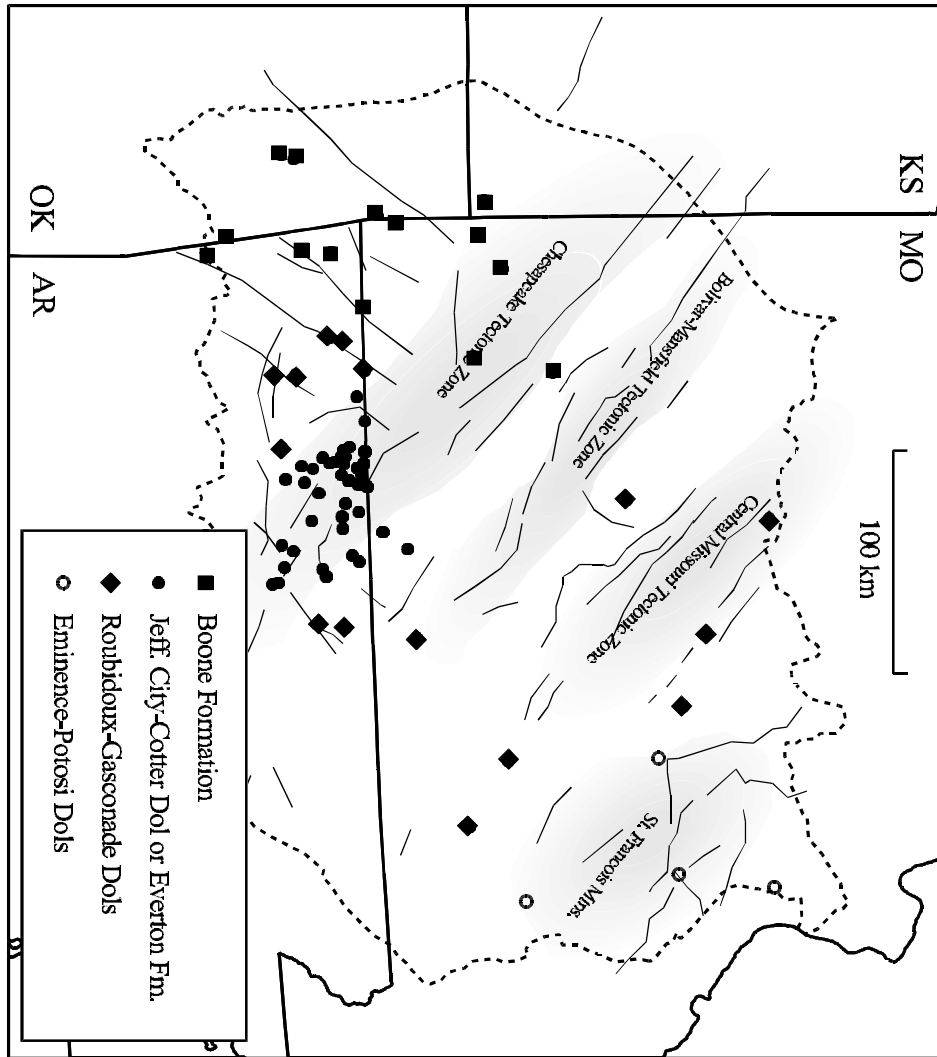


Figure 10. Geologic sources of ground water samples that contain at least one trace element that is elevated in comparison to typically observed concentrations

Appendix A: Tabular Listing of Chemical Analyses of Ground Water Samples

Table A1 lists the dataset used to generate the figures of this report. The listed data records do not contain all of the fields that are available within the USGS Watstore database for each record. Other analyses, not used in this study, may be available at individual sites. Digital copies of this dataset, that contain all available analyses and sample information, may be obtained on-line at <http://water.usgs.gov/owq/data.html>

Figures A1-A5 are provided as a means to identify individual sites and records. Data for individual sampling sites are obtained by using these figures, and their index numbers, to identify station ID numbers. The listed station ID numbers in table A1 are used to identify sites within the USGS Watstore database.

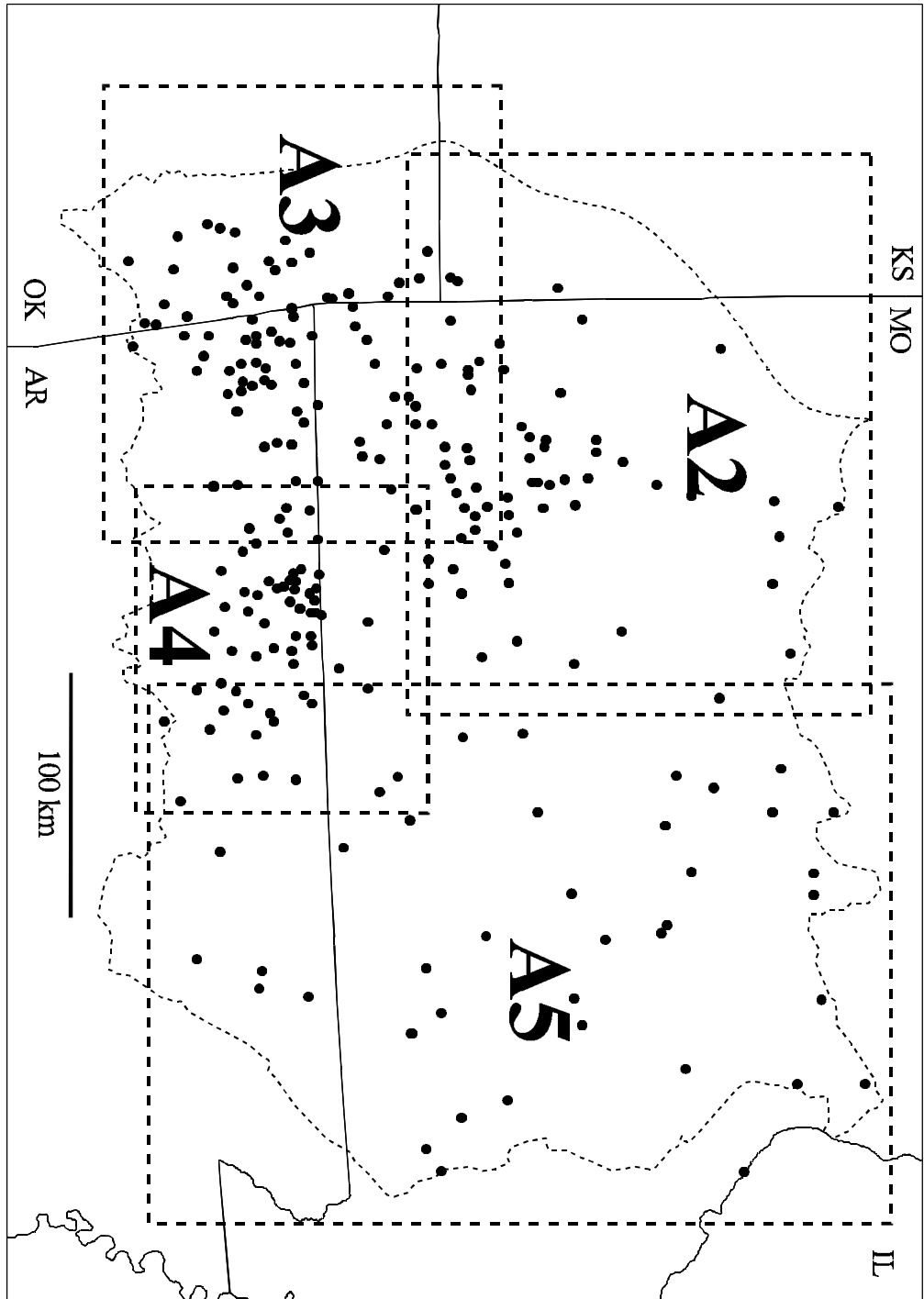


Figure A1. Index for map coverages in figures A2 through A5

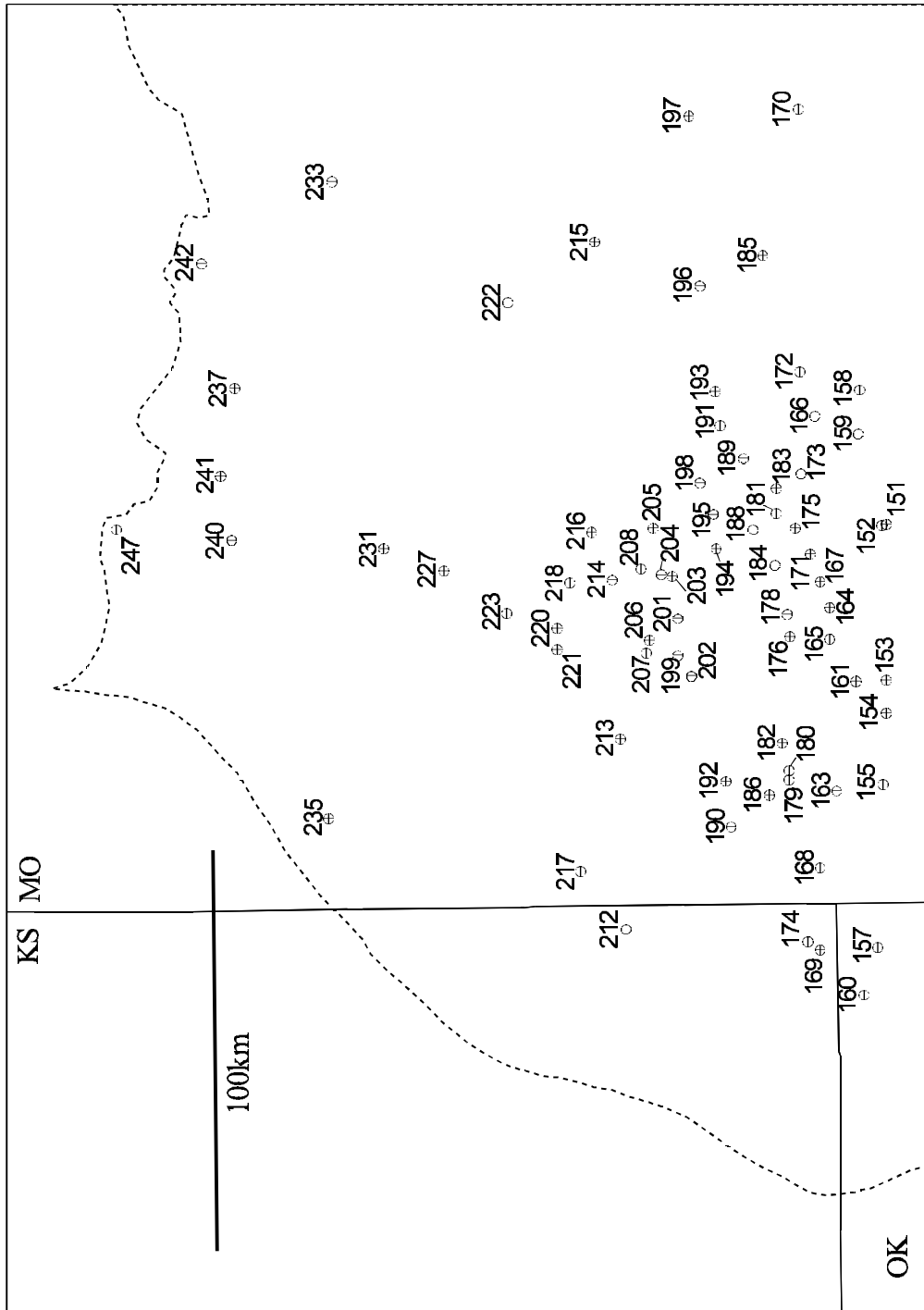


Figure A2. Index numbers for ground water sampling sites in the northwest Ozark region

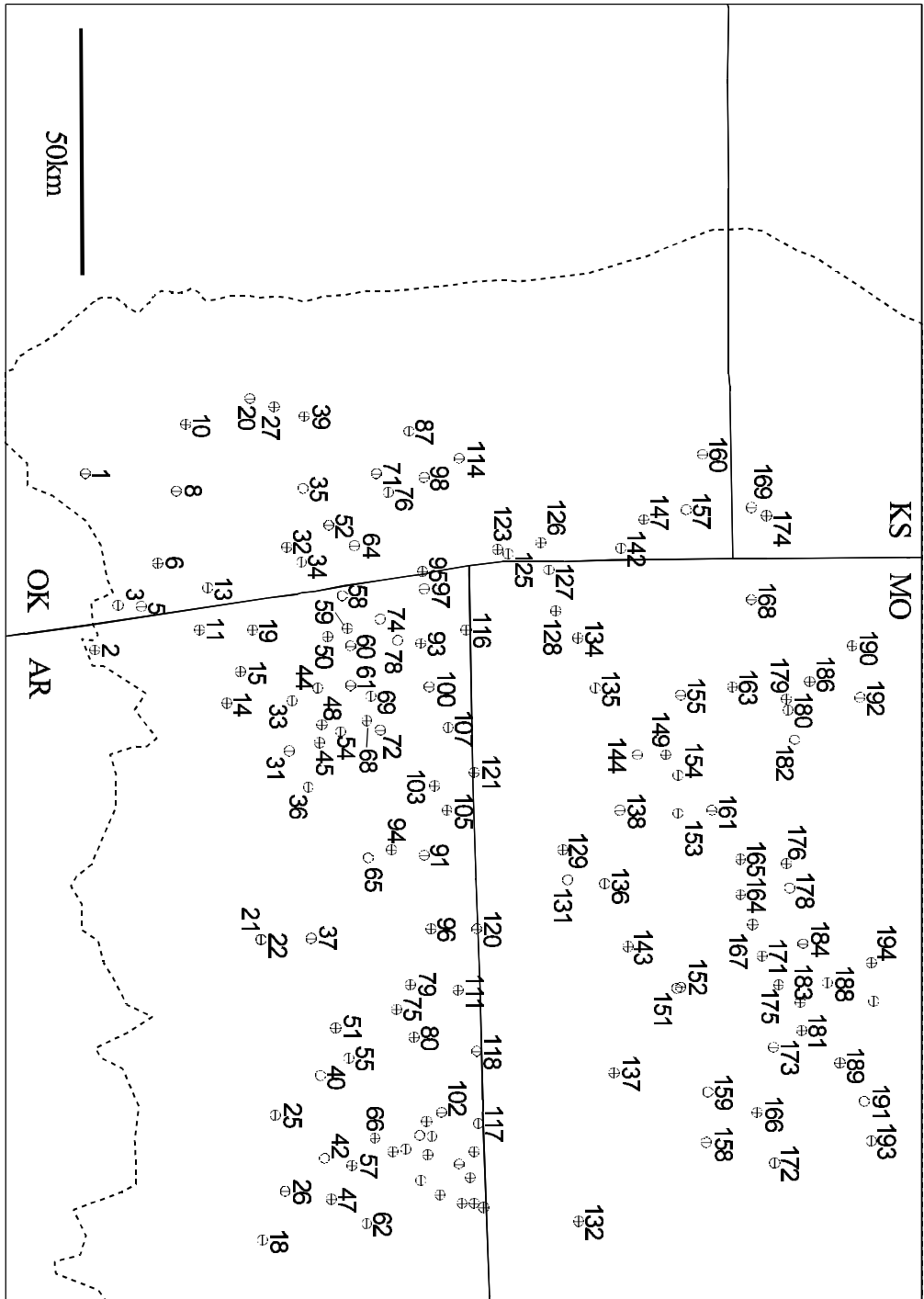


Figure A3. Index numbers for ground water sampling sites in the southwest Ozark region

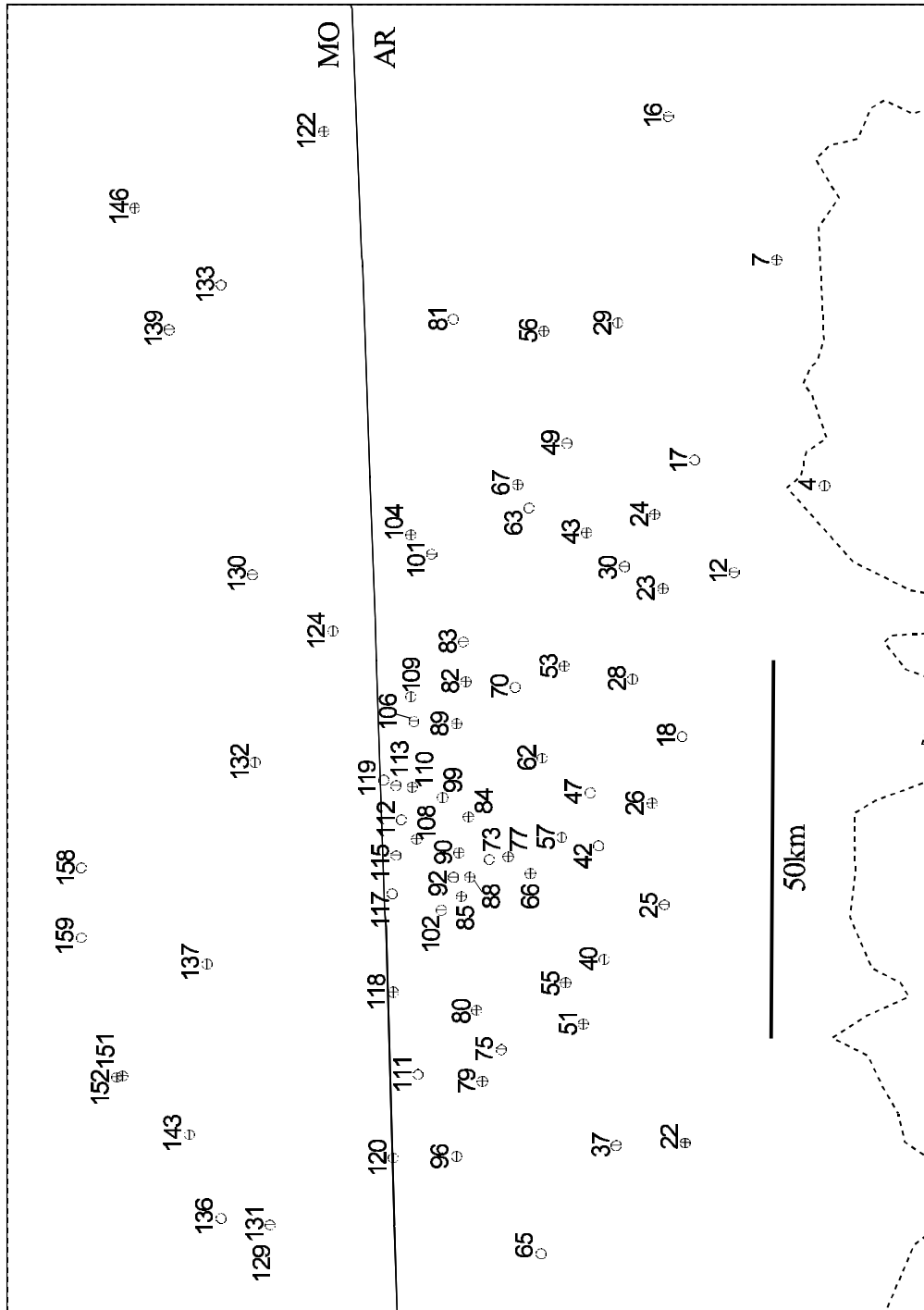


Figure A4. Index numbers for ground water sampling sites in the south-central Ozark region

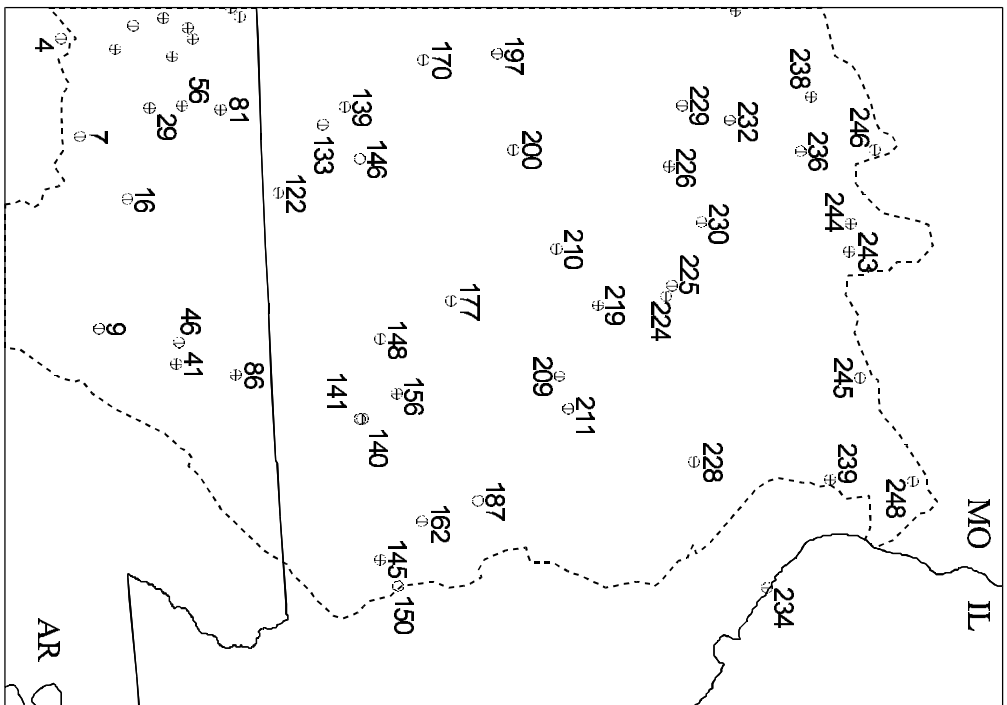


Figure A5. Index numbers for ground water sampling sites in the eastern Ozark region

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO3-/L)	Ca(mg/L)	Mg(mg/L)
1	3545410945045	35.76138889	-94.84583333	Spring	330BOON	SPRA	6.1	6.95	265.7856	88	1.1
2	3546300942523	35.775	-94.42305556	Well	326ATOK	WPC	0.01	7.29	224.3328	59	6.2
3	3549180943149	35.82166667	-94.53027778	Spring	331BOON	SPRA	6.8	7	187.7568	61	1.6
4	3551270923401	35.8575	-92.56694444	Well	367GNTR	OZKA	0.05	7.01	331.6224	39	15
5	3551550943127	35.86527778	-94.52416667	Well	331BOON	SPRA	3.5	6.81	208.4832	70	1.6
6	3553560943744	35.89888889	-94.62888889	Well	331BOON	SPRA	0.18	7	147.5232	50	1.7
7	3554450921000	35.9125	-92.16666667	Well	367CTTR	OZKA	5.9	7.06	243.84	82	3.8
8	3556120944802	35.93666667	-94.80055556	Well	331BOON	SPRA	5.8	7.72	71.9328	23	0.76
9	3556390912256	35.94416667	-91.38222222	Well	364EVRN	OZKA	6.2	6.9	164.592	32	14
10	3557210945733	35.95583333	-94.95916667	Well	331BOON	SPRA	7.1	6.1	37.7952	12	0.54
11	3558340942808	35.97611111	-94.46888889	Well	330BOON	SPRA	0.61	6.98	221.8944	56	5.8
12	3559200924250	35.98888889	-92.71388889	Spring	350SCLR	OZKA	8.08	7.58	147.5232	84	1.3
13	3559310943400	35.99194444	-94.56666667	Well	367RBDX	OZKA	0	7.42	496.2144	11	4.8
13	3559310943400	35.99194444	-94.56666667	Well	367RBDX	OZKA	0	7.69	502.3104	11	4.6
14	3601290941728	36.02472222	-94.29111111	Well	330BOON	SPRA	4.23	7.04	236.5248	71	1.3
15	3603130942157	36.05361111	-94.36583333	Well	330BOON	SPRA	8.55	7.16	167.0304	55	0.62
16	3603220915417	36.05611111	-91.90472222	Spring	364EVRN	OZKA	7.18	6.99	260.9088	65	14
17	3604000923100	36.06666667	-92.51666667	Well	360ODVC	OZKA	2.4	7.4	195.072	46	13
17	3604000923100	36.03833333	-92.51472222	Well	360ODVC	OZKA	2.4	7.4	195.072	46	13
18	3604080930008	36.06888889	-93.00222222	Spring	330BOON	SPRA	9.64	7.05	260.9088	83	3.6
19	3604350942755	36.07638889	-94.46527778	Spring	330BOON	SPRA	8.88	5.95	115.824	43	2.1
20	3604400950113	36.07777778	-95.02027778	Spring	330BOON	SPRA	7.9	6.78	99.9744	31	0.97
21	3604530934321	36.08138889	-93.7225	Well	367GNTR	OZKA	0.14	7.22	292.608	11	5.7
22	3604540934319	36.08166667	-93.72194444	Well	367GNTR	OZKA	0.14	7.84	316.992	11	5.7
23	3605270924420	36.09083333	-92.73888889	Spring	364EVRN	OZKA	0.14	6.9	188.976	43	10
24	3605490923630	36.09694444	-92.60833333	Well	364EVRN	OZKA	0.14	7.4	97.536	18	9.9
25	3606070931802	36.10194444	-93.30055556	Well	367GNTR	OZKA	0.01	7.33	135.3312	24	9.1
25	3606070931802	36.10194444	-93.30055556	Well	367GNTR	OZKA	0.01	7.42	148.1328	24	9.1
26	3606560930706	36.11555556	-93.11833333	Well	367GNTR	OZKA	0.01	7.7	185.3184	37.36	17.64
27	3607320945953	36.12555556	-94.99805556	Well	331BOON	SPRA	5.75	7.22	145.0848	42	2.2
28	3608120925355	36.13666667	-92.89861111	Spring	364EVRN	OZKA	9.4	7.2	269.4432	75	9.3
29	3608210921559	36.13916667	-92.26638889	Spring	368PWLL	OZKA	9.4	7.02	293.8272	50	27
30	3608370924158	36.14361111	-92.69944444	Well	364EVRN	OZKA	9.49	7.99	209.7024	63	1.9
31	3608390941028	36.14416667	-94.17444444	Spring	330BOON	SPRA	9.49	6.8	158.496	55	1.8
32	3608410943947	36.14472222	-94.66305556	Spring	331BOON	SPRA	9.71	7.14	79.248	18	0.67

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO ₃ -/L)	Ca(mg/L)	Mg(mg/L)
33	3609050941734	36.15138889	-94.29277778	Spring	330BOON	SPRA	7.8	6.72	114.6048	15	3
34	3610220943740	36.17277778	-94.62777778	Well	331BOON	SPRA	7.1	6.45	104.8512	31	0.82
35	3610360944809	36.17666667	-94.8025	Well	331BOON	SPRA	7.5	6	71.9328	22	0.6
35	3610360944809	36.17666667	-94.8025	Well	331BOON	SPRA	7.8	6.39	58.5216	17	0.96
36	3610390940505	36.1775	-94.08472222	Well	367GNTN	OZKA	0	7.46	235.3056	22	9.6
37	3610410934326	36.17805556	-93.72388889	Well	367GNTN	OZKA		8.1	170.688	33.6	18.6
38	3610560940512	36.18222222	-94.08666667	Spring	330BOON	SPRA	7.96	6.63	230.4288	84	3.9
38	3610560940512	36.18222222	-94.08666667	Spring	330BOON	SPRA	9.21	7.1	217.0176	77	3.4
39	3610560945831	36.18277778	-94.97527778	Well	331BOON	SPRA	5	5.2	20.7264	21	1.7
40	3611180932339	36.18833333	-93.39416667	Well	367CTTR	OZKA	4	6.97	257.2512	140	5.8
41	3611190911308	36.18861111	-91.21888889	Well	367CRJF	OZKA	5.6	7.1	460.8576	82	47
42	3611320931135	36.19222222	-93.19305556	Well	364EVRN	OZKA		7.62	225.552		
43	3611420923810	36.195	-92.63611111	Spring	364EVRN	OZKA	6.9	7.07	268.224	62.99	25.12
44	3611560941921	36.19888889	-94.3225	Spring	330BOON	SPRA	7.75	6.49	107.2896	40	1.9
45	3612020941128	36.20055556	-94.19111111	Well	330BOON	SPRA	1.11	7.3	214.5792	63	3.6
46	3612070911825	36.20194444	-91.30694444	Spring	368PWLL	OZKA	6.04	7.67	181.6608	33	18
47	3612090930546	36.2025	-93.09611111	Well	367CTTR	OZKA		7.7	225.552	78	4.3
48	3612210941405	36.20583333	-94.23472222	Spring	330BOON	SPRA	6.68	6.28	74.3712	31	2
48	3612210941405	36.20583333	-94.23472222	Spring	330BOON	SPRA	7.15	6.95	135.3312	46	1.7
49	3613060922837	36.21833333	-92.47694444	Well	367CTTR	OZKA	3.2	7.08	273.1008	75	41
49	3613060922837	36.21833333	-92.47694444	Well	367CTTR	OZKA	3.2	8.1	273.1008	75	41
50	3613110942645	36.21972222	-94.44583333	Spring	330BOON	SPRA	7.87	6.6	140.208	48	1.2
51	3613140933025	36.22055556	-93.50694444	Well	368PWLL	OZKA	1.29	7.43	206.0448	49	15
51	3613140933025	36.22055556	-93.50694444	Well	368PWLL	OZKA	1.29	7.62	206.0448	49	15
52	3613310944244	36.22527778	-94.71222222	Well	331BOON	SPRA	3.4	5.46	23.1648	9	0.87
53	3613570925216	36.2325	-92.87111111	Well	364EVRN	OZKA		7.22	307.2384	98	1.9
54	3614300941257	36.24166667	-94.21583333	Spring	330BOON	SPRA	7.9	6.37	254.8128	72	13
55	3614360932603	36.24333333	-93.43416667	Well	367RBDX	OZKA	0.5	7.42	252.3744	48	25
56	3614370921632	36.24361111	-92.27555556	Well	367RBDX	OZKA		8.04	241.4016	50.8	21
57	3614380931029	36.24388889	-93.17472222	Well	368PWLL	OZKA		8.8	290.1696	4.4	2.1
58	3614590943232	36.24972222	-94.54222222	Well	330BOON	SPRA	0.01	7.38	220.6752	100	1.6
59	3615360942758	36.26	-94.46611111	Well	330BOON	SPRA	7	7.39	226.7712	73	1.2
60	3615450942515	36.2625	-94.42083333	Spring	330BOON	SPRA	5.47	6.78	93.8784	29	1.5
60	3615450942515	36.2625	-94.42083333	Spring	330BOON	SPRA	4.87	7.07	99.9744	31	1.5
60	3615450942515	36.2625	-94.42083333	Spring	330BOON	SPRA	4.72	6.81	98.7552	32	1.6

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO3-/L)	Ca(mg/L)	Mg(mg/L)
60	3615450942515	36.2625	-94.42083333	Spring	330BOON	SPRA	3.92	6.85	109.728	36	1.7
61	3615460941935	36.26277778	-94.32638889	Well	330BOON	SPRA	9.87	6.8	45.1104	14	0.28
62	3616040930202	36.26777778	-93.03388889	Well	367CTTR	OZKA		7.7	214.5792	42	19
63	3616300923518	36.275	-92.58833333	Well	367RBDX	OZKA		7.61	410.8704		
64	3616320943945	36.27555556	-94.6625	Spring	330BOON	SPRA	7.7	5.99	35.3568	14	0.74
65	3617200935413	36.28888889	-93.91194444	Well	330BOON	SPRA	10.3	8.1	157.2768	57	2.3
66	3617220931414	36.28944444	-93.23722222	Well	367CTTR	OZKA		7.85	309.6768	74	19.2
66	3617220931414	36.28944444	-93.23722222	Well	367CTTR	OZKA		8.35	299.9232	75	18.4
67	3617230923246	36.28972222	-92.54611111	Well	368JFRC	OZKA		6.9	393.8016	67	42
68	3617330941433	36.2925	-94.2425	Well	330BOON	SPRA	0.11	7	240.1824	77	2
69	3618010941758	36.30027778	-94.29944444	Spring	330BOON	SPRA	8.72	6.37	136.5504	48	1.5
70	3618120925421	36.30333333	-92.90583333	Spring	364EVRN	OZKA		8.04	186.5376	58	2.1
71	3619020945011	36.31722222	-94.83638889	Spring	330BOON	SPRA	6.4	6.85	154.8384	54	1.2
72	3619070941305	36.31861111	-94.21805556	Well	330BOON	SPRA	1.49	7.1	186.5376	44	9.8
73	3619150931220	36.32083333	-93.20555556	Well	367CTTR	OZKA		7.61	299.9232	92	7.8
73	3619150931220	36.32083333	-93.20555556	Well	367CTTR	OZKA		8	285.2928	65	11.2
74	3619170942910	36.32138889	-94.48611111	Well	330BOON	SPRA	8.48	6.88	260.9088	86	0.84
75	3620160933257	36.33777778	-93.54916667	Well	367CTTR	OZKA	0.4	8.15	238.9632	49	24
76	3620260944723	36.34055556	-94.78972222	Well	331BOON	SPRA	4.6	6.52	242.6208	78	0.69
77	3620530931238	36.34805556	-93.21055556	Well	367CTTR	OZKA		7.66	219.456	40	20
77	3620530931238	36.34805556	-93.21055556	Well	367CTTR	OZKA		8.35	214.5792	40	20.8
77	3620530931238	36.34805556	-93.21055556	Well	367CTTR	OZKA		7.3	219.456	40	20
77	3620530931238	36.34805556	-93.21055556	Well	367CTTR	OZKA		7.3	214.5792	40	20.8
78	3621150942558	36.35416667	-94.43277778	Spring	330BOON	SPRA	10.12	7.27	131.6736	46	1.3
79	3621560933617	36.36555556	-93.60472222	Spring	367CTTR	OZKA	5	8.8	301.1424	56	31
80	3622120932843	36.37	-93.47861111	Spring	367CTTR	OZKA	5.83	6.69	197.5104	39	18
80	3622120932843	36.37	-93.47861111	Spring	367CTTR	OZKA	5.83	8.1	197.5104	39	18
81	3622160921454	36.37111111	-92.24833333	Well	367RBDX	OZKA		8	46.475904		
82	3622210925332	36.3725	-92.89222222	Well	367CTTR	OZKA		7.8	384.048	70	39
82	3622210925332	36.3725	-92.89222222	Well	367CTTR	OZKA		7.2	384.048	70	39
83	3622250924917	36.37361111	-92.82138889	Well	367CTTR	OZKA		7.03	403.5552	70	39
84	3622270930804	36.37416667	-93.13444444	Well	367CTTR	OZKA		7.3	319.4304	62	29.6
84	3622270930804	36.37416667	-93.13444444	Well	367CTTR	OZKA		7.6	309.6768	59	31.2
85	3622310931429	36.37527778	-93.24138889	Well	367CTTR	OZKA		7.3	219.456	54	18
85	3622310931429	36.37527778	-93.24138889	Well	367CTTR	OZKA		7.2	187.7568	42	18.4

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO ₃ -/L)	Ca(mg/L)	Mg(mg/L)
86	3622480911000	36.38	-91.16666667	Well	367CTTR	OZKA	4.05	7.25	313.3344	65	35
87	3622510945615	36.38083333	-94.9375	Well	367CTTR	OZKA	5.7	6.85	366.9792	63	36
88	3623180931627	36.38833333	-93.27416667	Well	367CTTR	OZKA		8.2	271.8816	47	24
88	3623180931627	36.38833333	-93.27416667	Well	367CTTR	OZKA		7.5	259.6896	42	24.7
88	3623180931627	36.38833333	-93.27416667	Well	367CTTR	OZKA		7.3	240.1824	43	22
88	3623180931627	36.38833333	-93.27416667	Well	367CTTR	OZKA		7.2	251.1552	44	24.8
89	3623190925801	36.38861111	-92.96694444	Well	367GNTR	OZKA		7.7	218.2368	41	20
89	3623190925801	36.38861111	-92.96694444	Well	367GNTR	OZKA		7.3	221.8944	42	19
90	3623190931150	36.38861111	-93.19722222	Well	367CTTR	OZKA		7.6	280.416	59	28
90	3623190931150	36.38861111	-93.19722222	Well	367CTTR	OZKA		7.6	269.4432	60	30.8
90	3623190931150	36.38861111	-93.19722222	Well	367CTTR	OZKA		7	268.224	60	30.4
91	3623440935500	36.39555556	-93.91666667	Well	367GNTR	OZKA		7.85	191.4144	37.2	18.2
92	3623510931421	36.3975	-93.23916667	Well	367CTTR	OZKA		7.2	199.9488	46	18.8
92	3623510931421	36.3975	-93.23916667	Well	367CTTR	OZKA		7.3	199.9488	42	19.6
92	3623510931421	36.3975	-93.23916667	Well	367CTTR	OZKA		7.2	199.9488	46	18.8
93	3623550942530	36.39861111	-94.425	Spring	330BOON	SPRA	9.3	6.65	147.5232	49	1.2
94	3624050935413	36.33444444	-93.93111111	Well	367RBDX	OZKA		8.15	319.4304	43.2	1
95	3624120943557	36.40333333	-94.59916667	Well	330BOON	SPRA	0.1	7.3	152.4	59	2
96	3624190934415	36.40527778	-93.7375	Spring	330BOON	SPRA	10.9	7.31	95.0976	34	3.8
97	3624230943326	36.40638889	-94.55722222	Spring	330BOON	SPRA	7.8	6.7	158.496	52	1
98	3624270944930	36.4075	-94.825	Well	367RBDX	OZKA		7.64	165.8112	24	9.3
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		7.6	405.9936	69	42
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		7.2	399.8976	64.7	42.3
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		6.8	409.6512	77	46.8
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		6.9	412.0896	73	49.6
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		7.6	405.9936	69	42
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		7.2	399.8976	64.7	42.3
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		6.8	409.6512	77	46.8
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		6.9	412.0896	73	49.6
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		7.2	405.9936	69	42
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		6.8	409.6512	77	46.8
99	3624360930553	36.41	-93.09805556	Well	367CTTR	OZKA		6.9	412.0896	73	49.6
100	3624510941911	36.41416667	-94.31972222	Well	330BOON	SPRA	7.42	6.77	156.0576	52	1.1
101	3624520923952	36.41444444	-92.66444444	Well	368JFRC	OZKA		7.1	423.0624	69	42
102	3625000931750	36.41666667	-93.29722222	Well	367CTTR	OZKA		7.5	234.0864	59	18.4
102	3625000931750	36.41666667	-93.29722222	Well	367CTTR	OZKA		7	246.2784	58	18.8
103	3625130940454	36.42027778	-94.08166667	Spring	330BOON	SPRA	9.45	7.26	156.0576	54	1.1
104	3626360923742	36.44333333	-92.62833333	Well	367RBDX	OZKA		7.66	431.5968	79.2	

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO3-/L)	Ca(mg/L)	Mg(mg/L)
105	3626360940126	36.44333333	-94.02388889	Well	367GNTR	OZKA	0.56	7.34	213.36	3	2.7
106	3626480925738	36.44666667	-92.96055556	Well	367CTTR	OZKA		7.3	373.0752	70	35
106	3626480925738	36.44666667	-92.96055556	Well	367CTTR	OZKA		7.3	382.8288	70	35
107	3626490941323	36.44694444	-94.22305556	Spring	330BOON	SPRA	10.58	7.34	101.1936	31	1.3
108	3626540931016	36.44833333	-93.17111111	Well	367CTTR	OZKA		7.1	319.4304	74	34
108	3626540931016	36.44833333	-93.17111111	Well	367CTTR	OZKA		6.9	325.5264	73	36
109	3627020925503	36.45055556	-92.9175	Well	371POTS	OZKA		8.1	151.1808		
110	3627060930435	36.45166667	-93.07638889	Well	367CTTR	OZKA		7.2	330.4032	63	35.2
110	3627060930435	36.45166667	-93.07638889	Well	367CTTR	OZKA		7.1	321.8688	61	32.8
111	3627220933520	36.45611111	-93.58888889	Well	368JFRC	OZKA	0.6	7.86	303.5808	58	29
112	3628070930811	36.46861111	-93.13638889	Well	367CTTR	OZKA		7.2	299.9232	60	32
112	3628070930811	36.46861111	-93.13638889	Well	367CTTR	OZKA		7.2	304.8	56	34
113	3628310930430	36.47527778	-93.075	Well	367CTTR	OZKA	0.01	7.37	381.6096	67	36
114	3628400945212	36.47777778	-94.87	Spring	330BOON	SPRA	8.2	7.24	163.3728	59	1.7
115	3628410931151	36.47805556	-93.1975	Well	367CTTR	OZKA		7.9	169.4688	37	19
115	3628410931151	36.47805556	-93.1975	Well	367CTTR	OZKA		7.9	159.7152	37	20
115	3628410931151	36.47805556	-93.1975	Well	367CTTR	OZKA		7.2	134.112	38	20.8
116	3629030942728	36.48416667	-94.45777778	Spring	367CRJF	OZKA	7.6	7.29	234.0864	67	11
117	3629110931602	36.48638889	-93.26722222	Well	367CTTR	OZKA		7.5	208.4832	39	21
117	3629110931602	36.48638889	-93.26722222	Well	367CTTR	OZKA		7.5	199.9488	40	21.6
117	3629110931602	36.48638889	-93.26722222	Well	367CTTR	OZKA		7.2	187.7568	40	21.2
118	3629190932634	36.48861111	-93.44277778	Well	367CTTR	OZKA	0.55	7.41	280.416	53	24
119	3629350930345	36.49305556	-93.0625	Well	367CTTR	OZKA		6.8	364.5408	70	40
119	3629350930345	36.49305556	-93.0625	Well	367CTTR	OZKA		6.8	359.664	66.6	39.3
119	3629350930345	36.49305556	-93.0625	Well	367CTTR	OZKA		7	362.1024	72	47.2
119	3629350930345	36.49305556	-93.0625	Well	367CTTR	OZKA		6.8	364.5408	70	40
119	3629350930345	36.49305556	-93.0625	Well	367CTTR	OZKA		6.8	359.664	66.6	39.3
119	3629350930345	36.49305556	-93.0625	Well	367CTTR	OZKA		7	362.1024	72	47.2
120	3629370934411	36.49361111	-93.73638889	Well	367GNTR	OZKA		8.35	270.6624		
121	3629480940645	36.49666667	-94.1125	Well	330BOON	SPRA	2.71	7.02	201.168	70	1.4
122	3632400915415	36.54444444	-91.90416667	Spring	367CRJF	OZKA	5.98	6.88	325.5264	58	33
123	3632460943859	36.54611111	-94.64972222	Spring	331BOON	SPRA	6.3	6.65	176.784	61	0.93
124	3633280924741	36.55777778	-92.79472222	Spring	368JFRC	OZKA	8.82	6.93	320.6496	56	31
125	3633590943826	36.56638889	-94.64055556	Well	331BOON	SPRA	1.9	6.89	319.4304	100	1.2
126	3637450943950	36.62916667	-94.66388889	Well	331BOON	SPRA	6.2	7.28	212.1408	73	1.3

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO ₃ -/L)	Ca(mg/L)	Mg(mg/L)
127	3638400943558	36.644444444	-94.599444444	Well	338OSGE	SPRA	7	7.16	273.1008	94	1
128	3639250943002	36.656944444	-94.500555556	Spring	338KKB	SPRA	8.45	6.7	71.9328	25	1.2
129	3639390935523	36.660833333	-93.923055556	Well	338OSGE	SPRA	9.47	7.04	181.6608	58	1.7
130	3640040924126	36.667777778	-92.690555556	Well	367CRJF	OZKA	5.45	7.55	334.0608	64	34
130	3640040924126	36.667777778	-92.689166667	Well	367CRJF	OZKA	5.45	7.55	334.0608	64	34
131	3640090935101	36.669166667	-93.850277778	Spring	338OSGE	SPRA	6.62	6.93	169.4688	56	1.3
132	3640210930133	36.6725	-93.025833333	Spring	368JFRC	OZKA	5.83	7.1	376.7328	65	37
132	3640210930133	36.673333333	-93.025555556	Spring	368JFRC	OZKA	5.83	7.1	376.7328	65	37
133	3641500921015	36.697222222	-92.170833333	Well	367GSCD	OZKA	9.29	7.4	282.8544	53	28
134	3641550942557	36.698611111	-94.4325	Well	338OSGE	SPRA	3.2	6.97	217.0176	72	2.7
135	3643470941844	36.729722222	-94.312222222	Well	338OSGE	SPRA	9.7	6.7	184.0992	63	1.6
136	3644220935010	36.739444444	-93.836111111	Spring	338OSGE	SPRA	7.85	6.9	156.0576	52	1.3
137	3645000932250	36.75	-93.380555556	Well	367RBDX	OZKA	1.1	7.23	231.648	43	21
138	3646220940051	36.772777778	-94.014166667	Spring	338OSGE	SPRA	6.62	6.78	160.9344	53	3.5
139	3646250921445	36.773611111	-92.245833333	Well	367RBDX	OZKA	8.26	7.13	243.84	43	24
140	3646350905719	36.776388889	-90.955277778	Spring	367GSCD	OZKA	7.63	7.21	203.6064	34	19
141	3646580905722	36.782777778	-90.956111111	Well	367GSCD	OZKA	5.44	7.27	267.0048	45	25
142	3647000943853	36.783333333	-94.648055556	Spring	331BOON	SPRA	9.5	7.2	99.9744	33	1.5
143	3647090934114	36.785833333	-93.687222222	Well	368JFRC	OZKA	2.51	7.1	331.6224	64	39
143	3647090934114	36.781388889	-93.685833333	Well	368JFRC	OZKA	2.51	7.1	331.6224	64	39
144	3648250940857	36.806944444	-94.149166667	Spring	338OSGE	SPRA	6.8	6.67	129.2352	45	1.7
145	3648500902222	36.813888889	-90.372777778	Well	367RBDX	OZKA	1.02	7.36	306.0192	57	33
146	3649100920046	36.819444444	-92.012777778	Spring	367RBDX	OZKA	1.73	7.5	310.896	51	30
146	3649100920046	36.814444444	-92.026111111	Spring	367RBDX	OZKA	1.73	7.5	310.896	51	30
147	3649390944300	36.8275	-94.716666667	Spring	331BOON	SPRA	5.23	6.94	134.112	44	14
148	3651100911650	36.852777778	-91.280555556	Spring	367GSCD	OZKA	7.1	7.45	195.072	31	18
149	3651420940849	36.861666667	-94.146944444	Well	338OSGE	SPRA	6.7	7.2	152.4	35	8.8
150	3651590901546	36.866388889	-90.262777778	Spring	367RBDX	OZKA	5.4	6.71	154.8384	28	15
151	3652250933441	36.873611111	-93.578055556	Spring	338OSGE	SPRA	8.27	7.13	143.8656	46	1.5
152	3652530933452	36.881388889	-93.581111111	Spring	338KKB	SPRA	7.4	7.27	227.9904	73	3.2
153	3652580940019	36.882777778	-94.005277778	Spring	338KKB	SPRA	8.16	6.77	198.7296	67	1.2
154	3653020940549	36.883888889	-94.096944444	Well	338OSGE	SPRA	1.2	7.59	181.6608	51	8.2
155	3653350941726	36.893055556	-94.290555556	Well	338OSGE	SPRA	0.1	7.32	259.6896	62	14
156	3653540910259	36.898333333	-91.049722222	Well	367RBDX	OZKA	6.9	7.41	246.2784	41	23
157	3654280944417	36.907777778	-94.738055556	Well	331BOON	SPRA	2.94	7.07	195.072	72	2.8

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO ₃ -/L)	Ca(mg/L)	Mg(mg/L)
158	3655220931214	36.92277778	-93.20388889	Spring	338OSGE	SPRA	10.08	7.37	181.6608	63	1.2
159	3655350931939	36.92638889	-93.3275	Spring	338OSGE	SPRA	9.4	6.9	240.1824	79	2
160	3656270945221	36.94083333	-94.8725	Well	367RBDX	OZKA	0.01	7.68	147.5232	31	14
161	3656500940030	36.94722222	-94.00833333	Well	367GSCD	OZKA	0.49	7.63	204.8256	41	18
162	3657350903111	36.95972222	-90.51972222	Spring	367GSCD	OZKA	8.33	7.16	262.128	42	25
163	3659300941830	36.99166667	-94.30833333	Well	367GNTR	OZKA	0.03	7.61	193.8528	32	15
164	3659550934813	36.99861111	-93.80361111	Well	338OSGE	SPRA	4.7	7.22	218.2368	75	8
165	3700030935320	37.00083333	-93.88888889	Well	360ODVC	OZKA	0	7.38	240.1824	64	24
166	3701130931623	37.02027778	-93.27305556	Spring	338OSGE	SPRA	7.51	7.21	249.936	83	1.5
167	3701140934348	37.02055556	-93.73	Well	338OSGE	SPRA	8.67	7.3	225.552	62	7.5
168	3701490943112	37.03027778	-94.52	Spring	338OSGE	SPRA	5.6	6.6	148.7424	50	3.2
169	3702050944438	37.03472222	-94.74388889	Well	360ODVC	OZKA	0.07	7.02	197.5104	56	24
170	3702110922538	37.03638889	-92.42722222	Spring	368JFRC	OZKA	9.57	7.48	271.8816	48	27
171	3702150933913	37.0375	-93.65361111	Spring	338OSGE	SPRA	7.54	6.9	248.7168	85	2.4
172	3703020930904	37.05055556	-93.15111111	Spring	338OSGE	SPRA	10.29	7.51	185.3184	60	2.3
173	3703170932552	37.05472222	-93.43111111	Spring	338OSGE	SPRA	5.75	6.96	262.128	89	1.5
174	3703400944315	37.06111111	-94.72083333	Well	338OSGE	SPRA	0.25	6.91	303.5808	130	16
175	3704070933500	37.06861111	-93.58333333	Spring	338OSGE	SPRA	7.73	7.03	169.4688	55	2.8
176	3705170935241	37.08805556	-93.87805556	Well	360ODVC	OZKA	0.03	8.02	160.9344	30	15
177	3705330912530	37.0925	-91.425	Well	367GSCD	OZKA	7.6	7.24	369.4176	62	37
178	3705350934901	37.09305556	-93.81694444	Well	360ODVC	OZKA	0	7.6	207.264	35	21
179	3705430941630	37.09527778	-94.275	Well	338OSGE	SPRA	4.96	7.15	190.1952	59	3.7
180	3705500941502	37.09722222	-94.25055556	Well	333MRMC	SPRA	6.67	7.8	196.2912	48	10
181	3706300932815	37.10833333	-93.47083333	Well	360ODVC	OZKA	0.02	7.72	181.6608	35	16
182	3706320941030	37.10888889	-94.175	Well	333MRMC	SPRA	4.35	7.1	246.2784	86	2.1
183	3706340933225	37.10944444	-93.54027778	Spring	338OSGE	SPRA	9.02	7.01	196.2912	67	1.6
184	3707020934051	37.11722222	-93.68083333	Spring	367CTTR	OZKA	7.8	7	203.6064	46	14
185	3707240924940	37.12333333	-92.82777778	Spring	367CTTR	OZKA	9.2	7.4	263.3472	64	21
186	3708220941901	37.13944444	-94.31694444	Well	338OSGE	SPRA	3.75	7.93	313.3344	91	7.7
187	3708350903545	37.14305556	-90.59583333	Well	371EMNC	OZKA	6.9	7.48	254.8128	41	24
188	3709430933500	37.16194444	-93.58333333	Well	338OSGE	SPRA	4.43	7.83	157.2768	83	1.8
189	3710460932311	37.17944444	-93.38638889	Well	338OSGE	SPRA	9.52	7.38	292.608	60	23
190	3713190942404	37.22194444	-94.40111111	Spring	333MRMC	SPRA	7.5	7	268.224	89	2.3
191	3713330931735	37.22583333	-93.29305556	Well	368CNDN	OZKA	0.1	7.62	169.4688	33	16
192	3714030941634	37.23416667	-94.27611111	Well	360ODVC	OZKA	0.35	7.58	265.7856	54	17

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO ₃ -/L)	Ca(mg/L)	Mg(mg/L)
193	3714080931155	37.23555556	-93.19861111	Spring	338OSGE	SPRA	8.72	7.23	267.0048	99	2.1
194	3714390933755	37.24416667	-93.63194444	Spring	338OSGE	SPRA	6.94	7.08	212.1408	44	1.7
195	3714520933217	37.24777778	-93.53805556	Spring	338OSGE	SPRA	4.45	7.08	212.1408	73	1.6
196	3715480925416	37.26333333	-92.90444444	Spring	367CTTR	OZKA	9.07	6.88	164.592	32	1.7
197	3716280922611	37.27444444	-92.43638889	Well	367RBDX	OZKA	1	7.76	192.6336	35	1.8
198	3716310932659	37.27527778	-93.44972222	Spring	338OSGE	SPRA	7.72	7.25	240.1824	73	5.7
199	3718090935900	37.3025	-93.98333333	Well	360ODVC	OZKA	0.11	7.74	187.7568	36	1.6
200	3719000920212	37.31666667	-92.03666667	Spring	367RBDX	OZKA	8.16	7.01	270.6624	46	2.7
201	3719460934930	37.32944444	-93.825	Spring	338OSGE	SPRA	9.8	7.52	219.456	77	2.1
202	3719540935535	37.33166667	-93.92638889	Well	360ODVC	OZKA	0.11	7.86	159.7152	29	1.4
203	3720270934213	37.34083333	-93.70361111	Well	367GSCD	OZKA	0.29	7.54	235.3056	37	1.5
204	3721460934202	37.36277778	-93.70055556	Well	338OSGE	SPRA	6.95	7.38	267.0048	63	2.2
205	3722450933420	37.37916667	-93.57222222	Well	360ODVC	OZKA	0.11	7.35	340.1568	63	3.0
206	3723360935251	37.39333333	-93.88083333	Spring	333WRSW	SPRA	6.9	7.05	186.5376	61	2.7
207	3723540935455	37.39833333	-93.91527778	Well	338OSGE	SPRA	1.68	7.02	345.0336	120	4.2
208	3724290934100	37.40805556	-93.68333333	Well	338OSGE	SPRA	3.83	7.3	288.9504	61	2.1
209	3725430910534	37.42861111	-91.09277778	Spring	371EMNC	OZKA	6.59	7.36	236.5248	38	2.3
210	3726280913712	37.44111111	-91.62	Spring	367GSCD	OZKA	6.8	7.07	373.0752	59	3.5
211	3727110905716	37.45305556	-90.95444444	Well	371POTS	OZKA	9.86	8.2	232.8672	39	2.2
212	3727210944058	37.45583333	-94.68277778	Well	360ODVC	OZKA	0.01	7.19	275.5392	54	2.4
213	3727310940907	37.45861111	-94.15194444	Well	333MRMC	SPRA	2.63	6.8	315.7728	230	8.3
214	3728100934240	37.46944444	-93.71111111	Well	338OSGE	SPRA	1.33	7.37	230.4288	45	2.1
215	37291509224630	37.4875	-92.775	Well	367RBDX	OZKA	20.5	7.28	315.7728	58	3.3
215	37291509224630	37.48777778	-92.77555556	Well	367RBDX	OZKA	20.5	7.28	315.7728	58	3.3
216	3730390933436	37.51083333	-93.57666667	Spring	338KKB	SPRA	8.65	6.94	356.0064	120	7.7
217	3733000943115	37.55	-94.52083333	Well	367RBDX	OZKA	0	6.91	252.3744	40	1.9
218	3733390934305	37.56083333	-93.71805556	Spring	338OSGE	SPRA	9.63	7.16	316.992	74	2.2
219	3733520912239	37.56444444	-91.3775	Spring	367RBDX	OZKA	5.78	7.03	324.3072	57	3.1
220	3735340935032	37.59227778	-93.84222222	Well	367CRJF	OZKA	0.5	7.15	292.608	54	2.4
220	3735340935032	37.5925	-93.84222222	Well	367CRJF	OZKA	0.5	7.15	292.608	54	2.4
221	3735370935417	37.59361111	-93.90472222	Spring	333MRMC	SPRA	7.88	7.1	160.9344	55	1.7
222	3741150925615	37.6875	-92.9375	Well	367GSCD	OZKA	7.26	7.32	334.0608	63	3.4
222	3741150925615	37.68	-92.935	Well	367GSCD	OZKA	7.26	7.32	334.0608	63	3.4
223	3741590934744	37.69972222	-93.79555556	Spring	338KKB	SPRA	8.97	6.88	232.8672	64	1.4
224	3747130912400	37.78694444	-91.4	Well	371EMCP	OZKA	2.33	7.14	314.5536	60	3.5

Table A1. Tabular listing of ground-water analyses

Index#	StationID	Lat(DD)	Lon(DD)	TypeOfSite	AquiferCode	Aquifer	D.O.(mg/L)	pH	ALK(mgHCO3-/L)	Ca(mg/L)	Mg(mg/L)
225	3748320912625	37.80888889	-91.44027778	Spring	371POTS	OZKA	8.37	6.78	162.1536	28	16
226	3749030915624	37.8175	-91.94	Spring	367GSCD	OZKA	7.45	7	182.88	30	17
227	3750090934023	37.83583333	-93.67305556	Spring	367CTTR	OZKA	2.47	7.12	312.1152	55	32
228	3751120904221	37.85333333	-90.70583333	Well	371POTS	OZKA	1.89	6.98	410.8704	69	41
229	3752090921146	37.86916667	-92.19611111	Spring	367GSCD	OZKA	7.34	6.74	192.6336	32	19
229	3752090921146	37.86888889	-92.19611111	Spring	367GSCD	OZKA	7.34	6.74	192.6336	32	19
230	3754460914157	37.91277778	-91.69916667	Well	367RBDX	OZKA	4.16	7.11	340.1568	58	35
231	3757510933639	37.96416667	-93.61083333	Spring	338KKB	SPRA	8.2	7.04	229.2096	74	2.3
231	3757510933639	37.96416667	-93.61083333	Spring	338KKB	SPRA	8.66	7.14	202.3872	67	2.1
232	3801180920714	38.02166667	-92.12055556	Well	367RBDX	OZKA	0.57	7.13	340.1568	85	58
233	3803110923456	38.05305556	-92.58222222	Spring	367GSCD	OZKA	8.32	7.18	315.7728	54	30
234	3803430900930	38.06194444	-90.15833333	Spring	371POTS	OZKA	6.7	7.38	291.3888	51	29
235	3805400942130	38.09444444	-94.35833333	Well	367RBDX	OZKA	0	6.79	588.8736	130	49
236	3814430915903	38.24527778	-91.98416667	Well	367RBDX	OZKA	4.3	7.39	474.2688	72	51
237	3816440930904	38.27888889	-93.15111111	Spring	367RBDX	OZKA	5.5	7.32	360.8832	61	35
238	3817100921231	38.28611111	-92.20861111	Well	367GSCD	OZKA	7.7	6.96	435.2544	78	42
239	3817230903551	38.28972222	-90.5975	Well	367CRJF	OZKA	2.83	7.04	449.8848	82	48
240	3817390933432	38.29416667	-93.57555556	Well	320PSLV	WPC	4.62	5.49	20.7264	39	10
241	3818470932337	38.31305556	-93.39361111	Well	367RBDX	OZKA	0.5	7.21	297.4848	76	35
242	3820270924748	38.34083333	-92.79666667	Spring	367GSCD	OZKA	8.85	7.33	331.6224	69	42
243	3823290913307	38.39138889	-91.55194444	Well	367RBDX	OZKA	1	7.43	293.8272	45	31
244	3823540914004	38.39833333	-91.66777778	Spring	367GSCD	OZKA	5.25	7.01	318.2112	54	33
245	3824130910105	38.40361111	-91.01805556	Well	367RBDX	OZKA	6.02	7.38	319.4304	59	31
246	3829150915835	38.4875	-91.97638889	Well	368JFRC	OZKA	0.69	7.26	364.5408	69	37
247	3832320933213	38.54222222	-93.53694444	Well	360ODVC	OZKA	0	7.51	364.5408	71	28
248	3833310903424	38.55861111	-90.57333333	Spring	360ODVC	OZKA	7.81	7.3	252.3744	78	12

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
1	3.7	0.9	7.8	7.6	10								
2	4	0.8	1.2	2.1	9.3	0.5	0.5	2	0.5	0.5	4	0.5	68
3	1.7	0.6	1.5	9.7	7.6	0.5							
4	61	3.1	19	0.2	13								
5	2	0.3	1.7	6.6	9.8	0.5	0.5	3	0.5	0.5	2	0.5	1
6	3.8	1.5	6.1	2	10	0.5							
7	2.4	1	5.4	6.4	9.9								
8	2.1	0.6	1.7	2.7	8.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1
9	2.4	0.7	4.4	1	13	0.5	0.5	0.5	0.5	3	0.5	0.5	39
10	2.6	0.6			8.5	0.5	0.5	0.5	0.5	7	0.5	0.5	60
11	20	0.7	5.7	13	9.3	1							
12	2.3	1.2	4.3	4.5	9.6	0.5	0.5	1	0.5	1	3	0.5	1
13	370	4.4	300	6.7	9.7								
13	340	4.3	310	5.8	9.4								
14	4.8	0.4	3.9	5.6	7.5	0.5							
15	1.1	0.7	1.6	0.8	8.9	0.5							
16	2.4	1.2	3.2	6.4	9.5	0.5	0.5	1	0.5	1	2	0.5	12
17	1.9	1.1	2.2	19	8.8	0.5	0.5	0.5	0.5	3	0.5	1	281
17	1.9	1.1	2.2	19	8.8	0.5	0.5	0.5	0.5	3	0.5	1	281
18	1.8	0.9	2	11	8	0.5	0.5	0.5	0.5	0.5	2	0.5	0.5
19	3.7	2.1	9	5.4	9.2								
20	6.3	0.5	9.3	2.7	8.9								
21			113	49			1	5		30		5	60
22	96	4	6.9	0.4	8.4								
23	2	0.8	3.7	3.7	8.8		1	5	3	10	10	10	4
24	1.5	0.8	2	11	7.7		1	5	3	10	10	10	2
25	8.9	2.3	3.2	7.5	11								
25			3.6	28			1	5		10		5	10
26			30	25			10	3		100	2	10	70
27	2.6	0.6	0.9	2.1	8.5	0.5	0.5	3	0.5	7	2	0.5	12
28	2	1	6	4.5	9.6	0.5	0.5	0.5		1	1	0.5	6
29	1	1	0.9	3.8	9.9	0.5	0.5	0.5	0.5	1	0.5	0.5	7
30	3.9	0.3	5.7	2.5	9.6		1	5	3	10	10	10	23
31	7.3	2	8.6	4	9.4	0.5							
32	1.8	0.8	2.2	3.6	8.4	0.5							

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
33	41	4.5	28	4.1	19	0.5							
34	2.9	0.8	4	4.3	9.2	0.5							
35	5.2	0.3	5.6	2.2	9.6								
35	5.1	0.6	5.1	2.6	9.9	0.5							
36	93	4.3	61	8.3	10								
37			3	20		10	10	10		50	50	10	300
38	17	1.7	20	31	13	0.5	0.5	0.5	0.5	0.5	4	0.5	6
38	15	1.4	16	29	12	0.5							
39	7.5	0.4	39	0.9	9.4	0.5	0.5	0.5	0.5	26	1	3	7
40	6.3	1.2	46	12	8.2	0.5	0.5	0.5		1	0.5	1	59
41	3.9	0.9	2.5	7.8	15	0.5	0.5	0.5	0.5	2	2	0.5	15
42			6	11		1	1	1		10		1	100
43	3.124	0.72	5.3	4	11.47	0.5	0.5	0.5	0.5	0.5	1	0.5	1
44	4	1.1	6.8	2.6	11	0.5							
45	4.7	0.1	2.6	5.4	8.7	0.5							
46	5.4	0.8	12	5.5	9.7	0.5	0.5	0.5	0.5	0.5	1	0.5	13
47	2.8	0.4	7.2	3.5	9	0.5	0.5	1		1	0.5	0.5	310
48	4.7	3	7.2	4.5	9.2	0.5							
48	6.1	1.6	7.3	1.8	9.8								
49	2.9	1.1	2.2	19	12	0.5	0.5	0.5	0.5	5	1	0.5	12
49	2.9	1.1	2.2	19	12	0.5	0.5	0.5	0.5	5	1	0.5	12
50	5.3	1	10	2.1	10	0.5	0.5	2	0.5	0.5	0.5	0.5	2
51	1.6	2	1.6	14	8.7	0.5							
51	1.6	2	1.6	14	8.7	0.5							
52	4.6	0.7	8.3	1.2	8.1	0.5							
53	7.3	0.1	9.2	9.3	9.7	1	1	5	3	10	10	10	15
54	5.7	1.3	8.2	33	12	0.5	0.5	0.5					
55	1.8	1.2	2.7	13	8.9	0.5	0.5	0.5					
56			10	7									
57	120	1.9	5.2	27	8.8	4	0.5	0.5		3	0.5	0.5	46
58	4.1	0.2	1.7	90	7.6	0.5	0.5	0.5		50	50	10	100
59	4.9	0.3	12	1.3	9.2	0.5	0.5	0.5	0.5	1	0.5	2	30
60	3.6	2.3	5.4	3	8.8	0.5	0.5	0.5		4	5	0.5	13
60	3.9	2.3	6.3	2.8	9.1	0.5	0.5	0.5	0.5	0.5	2	0.5	8
60	3.8	2.5	6.4	2.4	9.5	0.5							

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
60	4.2	2.6	6.8	2.3	9.7								
61	2.4	0.2	1.4	0.7	9.3								
62	1.5	2.7	3.7	17	8.3	3	0.5	0.5		0.5	1	0.5	280
63			7	8						10			380
64	2.3	1.2	3.2	3.2	9.1	0.5							
65	5.3	0.4	7.9	2.6	10	0.5	0.6		2	3	3	4	930
66	11	1.3	8	28			0.25		2	1	2.5	1	1005
66	17	1.3	8.9	33			1	5	3	40	10	10	1100
67	4.6	1	11	7.7	14								
68	2.7	0.2	1.2	8.4	7.5	0.5							
69	3.9	1.2	5.9	2.2	8.8	0.5							
70	1.5	0.7	3.5	2.5	9.4	0.5	0.5	0.5		2	1	0.5	23
71	3.7	1.1	8.3	5.2	10								
72	7.2	0.2	3.6	7.4	8	0.5							
73	12	3	4.5	18.5			0.6		4	6	3	16	713
73	24	6.3	5.9	20.8			0.25		2	1	2.5	1	129
74	3.3	0.6	4.5	3	8	0.5							
75	1.3	1.5	0.3	12	8.8	0.5	0.5	0.5		0.5	0.5	0.5	14
76	3.4	0.5	5.5	1.4	8.4								
77	15.5	5.1	3	20.7			0.3		2	1.5	3	4	607
77	15	5.4	3.5	20.8			0.25		2	1.5	3	4	607
77	15.5	5.1	3	20.7			0.3		2	1.5	3	4	607
77	15	5.4	3.5	20.8			0.25		2	1	2.5	1	174
77	15	5.4	3.5	20.8									
78	6.3	1.7	7.9	2.9	9.6	1				0.5	0.5	0.5	10
79	3.8	1.8	8.4	12	9.6	0.5	0.5	0.5					
80	3.6	1.3	5.7	11	9.7	0.5							
80	3.6	1.3	5.7	11	9.7	0.5							
80	3.6	1.3	5.7	11	9.7	0.5							
81			2	13			1	5		20	2	7	5
82	2.7	1.3	8	19	12	0.5	0.5	0.5		7	2	1	110
82	2.7	1.3	8	19	12	0.5	0.5	0.5		7	2	1	110
83	1.4	1.3	1.6	14	8.1		1	5	3	10	10	10	52
84	1.6	1.3	0.5	17.5			0.3		2	1.5	3	10	1140
84	1.6	1.3	0.5	17.5			0.3		2	1.5	3	10	1140
84	1.6	1.3	0.5	17.5			0.3		2	1.5	3	10	1140
84	1.6	1.3	0.5	17.5			0.3		2	1.5	3	10	1140
85	4.4	1.5	4.3	31			1		2	3	3	2	297
85	4.4	1.5	4.3	31			0.3		2	3	3	10	1292
85	2.6	2.7	4.15	17.3			0.25		2	1	2.5	1	258

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
86	1.3	0.6	1.2	5.3	12	0.5	0.5	0.5	0.5	2	1	0.5	11
87	11	1.3	15	15	13	0.5	0.5	0.5	0.5	1	2	4	19
88	8.9	5.4	2.9	18	8.8	1	0.5	0.5	0.5	9	2	2.5	1500
88	8.2	5.6	2.1	17.5			0.25		0.5	6	1.5	13	1085
88	10	6.2	1.5	19.5			0.3		2	3	3	16	878
88	8.4	6	2.5	18.8			0.25		2	1	2.5	1	520
89	5.1	1.6	2.8	7.7	8.5	5		5					
89	3.3	1.7	2.3	11	8.8	4		4	1				
90	2.4	1.6	5.5	35	10	4	1		0.5	1	4	2.5	310
90	1.9	1.6	4.5	33			0.3		2	1.5	3	4	438
90	2.4	2.5	6.5	36.5			1		2	1	5	2	220
91			7.5	16			5	3		50	6	10	20
92	2.9	3.8	1.5	22			0.6		4	1.5	3	4	568
92	2.9	3.7	1.5	19			0.25		2	1	2.5	1	278
92	2.9	3.8	1.5	22			0.6		4	1.5	3	4	568
93	11	0.9	12	5.4	13	0.5				15		2	60
94			4	18				14					
95	4.7	0.9	4.7	18	7.6								
96	6.1	3.2	12	12	8.3	0.5	0.5	0.5	0.5	0.5	2	0.5	4
97	4.4	1	5.6	3.3	9.5	0.5							
98	46	1.7	35	9.8	11								
99	6.5	0.8	9.9	9.3	14	0.5	0.5		0.5	4	0.5	2.5	110
99	6.9	1.15	7.5	13.5			0.25		0.5	1	1.5	5	138
99	3.2	1	3.25	25.5			0.3		2	1.5	3	2	164
99	2.8	1.4	4.5	22.5			0.25		2	1	2.5	1	120
99	6.5	0.8	9.9	9.3	14	0.5	0.5		0.5	4	0.5	2.5	110
99	6.9	1.15	7.5	13.5			0.25		0.5	1	1.5	5	138
99	3.2	1	3.25	25.5			0.3		2	1.5	3	2	164
99	2.8	1.4	4.5	22.5			0.25		2	1	2.5	1	120
100	11	0.6	12	4.7	11	0.5							
101	2	2.1	2.3	17	10		1	5	3	10	10	10	50
102	6.1	3.5	6	16.8			0.3		2	1.5	3	10	628
102	6.4	3.9	8.7	17.5			1		2	1	2.5	1	288
103	4.2	1.3	7.3	2.3	11	0.5							
104			10					2		2		3	3.23

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
105	75	10	8.3	12	8.9								
106	1.7	5.1	4.1	25	8.5	0.5	0.5	0.5		1	1	1	35
106	1.7	5.1	4.1	25	8.5	0.5	0.5	0.5		1	1	1	35
107	3.1	1.2	4.5	2.9	8.6	0.5	0.5	0.5	0.5	1	1	0.5	13
108	1.6	3	2	52			0.3		2	1.5	3	10	1890
108	1.8	3.8	3.15	68			0.25		2	1	2.5	1	1099
109			2.5	21			4	5	2	10		1	10
110	1.8	3.3	1	18.3			0.6		2	1.5	3	16	129
110	1.6	5.6	1.5	18.8			0.25		2	1	2.5	1	67
111	1.6	1.9	0.4	22	8.4	0.5	0.5	0.5	2	0.5	0.5	0.5	180
112	2.6	5.5	0.5	42			2		2	1.5	3	16	1723
112	2.2	6.1	1.65	55			2		2	1	2.5	1	1439
113	1.3	1.9	1.6	24	9.5	0.5	0.5	5	0.5	0.5	3	0.5	6
114	6.7	2.4	13	6.2	10								
115	1.4	2.2	1.1	38	8.7	0.5	0.5		0.5	4	0.5	2.5	410
115	1.9	2.3	1.25	35.5			2		2	1.5	3	2	386
115	1.4	2.4	1.15	36.5			0.25		2	1	2.5	1	183
116	10	1.2	13	24	11	0.5							
117	1.8	1.1	2.6	16	10	0.5	1		0.5	8	0.5	2.5	620
117	1.5	1	2.5	14.4			0.3		4	6	3	4	628
117	1.6	1.2	2.75	14.6			0.25		2	1	2.5	2	268
118	9.6	1.4	4.9	12	8.5	2	0.5	0.5		0.5	0.5	0.5	510
119	1.9	2.6	3.5	34	9.4	0.5	0.5		0.5	3	3	2.5	190
119	2.6	3	2	29.2			0.5		0.5	2	1.5	2	176
119	5	3.7	5.75	72			0.25		2	1	2.5	1	138
119	1.9	2.6	3.5	34	9.4	0.5	0.5		0.5	3	3	2.5	190
119	2.6	3	2	29.2			0.5		0.5	2	1.5	2	176
119	5	3.7	5.75	72			0.25		2	1	2.5	1	138
120			2.8	11				10	2	100		10	100
121	4.3	0.5	9.2	1.9	8.4	2							
122	1.7	2.1	5.1	2.8	12	0.5	0.5	0.5	0.5	0.5	3	0.5	8
123	1.8	0.7	3.7	6.2	11	0.5							
124	2.9	1.3	7	5.7	11	0.5	0.5	2	0.5	1	2	0.5	4
125	4.3	0.3	5.7	7.4	8.9	2							
126	2.1	0.9	3.1	7.4	12	0.5							

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
158	3.1	1.2	10	3.2	10	0.5							
159	3.1	2.5	15	3	11	0.5	0.5	0.5	0.5	3	4	0.5	59
160	16	2	22	20	9.5								
161	2.2	1.1	1.7	11	9.2								
162	1.2	0.4	1.4	2.6	9.5	0.5	0.5	0.5	0.5	0.5	2	0.5	8
163	2.8	1.7	1.2	13	9.1								
164	6.2	3.9	3.1	11	9.4	0.5	0.5	0.5	0.5	2	4	1	777
165	7.7	1.1	16	34	7.5	0.5							
166	2.6	0.9	5.1	3	11	0.5							
167	4	0.5	3.4	4	9.5	0.5							
168	5.7	1.3	12	12	9.7	0.5	0.5	1	0.5	2	2	0.5	149
169	43	2.9	65	80	8.8								
170	1.7	1.4	5.9	2.8	11	0.5	0.5	1	0.5	0.5	2	0.5	16
171	3.8	1.1	10	2.7	11	0.5							
172	7	1	8.3	3.6	11	0.5							
173	7.7	0.4	23	3.4	10	0.5							
174	25	1.8	9.2	180	8.8	0.5	0.5	3	0.5	3	3	0.5	4
175	2.7	1.4	6.1	2.7	11	0.5							
176	2.7	2.2	1.4	13	8.3	0.5							
177	1.5	0.3	1.2	1.7	7.5	0.5	0.5	0.5	0.5	14	1	0.5	21
178	2.3	0.9	1.9	8.9	9.1								
179	3.1	0.3	4.4	6.7	9.3	0.5							
180	2.7	0.2	1.8	2.7	8.5	0.5							
181	2.3	1.6	1.4	12	9.1								
182	6	0.9	18	11	8	0.5							
183	2.4	1.1	8	3.7	10	0.5							
184	4.2	1.3	7.7	3.3	10	0.5	0.5	0.5	0.5	0.5	1	0.5	2
185	3.5	0.9	26	4.9	10	0.5	0.5	0.5	0.5	0.5	2	0.5	2
186	7.8	7.6	3.4	23	14	2	0.5	0.5	0.5	7	2	0.5	163
187	3.3	0.3	5	1.6	8.7	0.5	0.5	0.5	0.5	2	0.5	0.5	210
188	5.2	0.7	6.3	2.4	10	0.5	0.5	0.5	0.5	2	2	0.5	49
189	1.8	0.3	3.2	2	8.4	0.5							
190	4.1	1	8.3	17	10	0.5	0.5	1	0.5	0.5	1	0.5	4
191	1.8	1.2	1.8	15	8.9	0.5	0.5	0.5	0.5	1	0.5	2	4
192	4.5	0.5	1.4	3.7	8.2	0.5							

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
193	6.2	4	15	13	9.6	0.5							
194	3.5	0.5	6.8	6.7	9.3	0.5							
195	2.7	1.1	6.9	10	8.8	0.5							
196	5.2	2.5	13	11	11	0.5	0.5	0.5	0.5	0.5	2	0.5	7
197	1.3	0.9	1.7	11	8.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	40
198	7.3	0.9	16	4.1	10	0.5							
199	2.4	2.7	1.8	11	8.4	0.5							
200	2.2	0.8	6.5	7.2	8.7	0.5	0.5	0.5	0.5	0.5	1	0.5	1
201	2.2	0.5	7.8	9.3	8	0.5							
202	1.9	1.4	1.4	8.5	9.2	0.5							
203	2.4	1.3	2.3	11	9.3	0.5							
204	3.6	0.7	3.7	31	8.7	0.5	0.5	0.5	0.5	3	4	0.5	229
205	4	1.6	6.4	13	8.1	0.5							
206	8.4	0.5	9.1	16	7.5	0.5	0.5	0.5	0.5	0.5	1	0.5	2
207	6.4	2.8	8.3	36	11	0.5							
208	5.1	3.1	2.5	10	8.9	0.5							
209	1.9	0.3	1.4	1.7	8.3	0.5	0.5	1	0.5	1	1	0.5	0.5
210	1	0.5	0.6	5.7	8.8	0.5	0.5	0.5	0.5	0.5	2	0.5	2
211	1.6	0.4	1.6	1.2	9.4	0.5	0.5	1	0.5	2	2	0.5	18
212	99	4.8	150	26	10								
213	53	6.3	220	76	11	0.5							
214	2.7	1.2	2.8	15	8.5	0.5							
215	3.4	2.9			9.3	0.5	0.5	0.5	0.5	7	3	0.5	62
215	3.4	2.9			9.3	0.5	0.5	0.5	0.5	7	3	0.5	62
216	5.5	1.5		13	12	0.5	0.5	0.5	0.5	0.5	2	0.5	2
217	74	4	100	18	9.1								
218	5.2	0.8	11	12	11	0.5							
219	3.3	0.3	6.6	3.9	11	0.5	0.5	0.5	0.5	1	2	0.5	4
220	5.1	0.8	1.5	5.4	9.7	0.5	0.5	0.5	0.5	0.5	2	0.5	17
220	5.1	0.8	1.5	5.4	9.7	0.5	0.5	0.5	0.5	0.5	2	0.5	17
221	2.2	1.6	5.3	6.7	8.9	0.5							
222	2.1	0.8	2.9	2.4	9.7	0.5	0.5	0.5	0.5	4	2	2	231
222	2.1	0.8	2.9	2.4	9.7	0.5	0.5	0.5	0.5	4	2	2	231
223	6	2	7.2	13	11	0.5	0.5	0.5	0.5	2	1	0.5	5
224	5.2	1	11	6.2	9.6	0.5	0.5	0.5	0.5	3	2	0.5	167

Table A1. Tabular listing of ground-water analyses

Index#	Na(mg/L)	K(mg/L)	Cl(mg/L)	SO4(mg/L)	SiO2(mg/L)	As(ug/L)	Cd(ug/L)	Cr(ug/L)	Co(ug/L)	Cu(ug/L)	Ni(ug/L)	Pb(ug/L)	Zn(ug/L)
225	1.1	1.2	1.4	4.8	9.2	0.5	0.5	0.5	0.5	2	1	0.5	3
226	2.1	0.9	2.7	3.4	8.8	0.5	0.5	1	0.5	3	2	0.5	6
227	2.5	1.1	2.1	17	9.8	0.5	0.5	0.5	0.5	3	2	0.5	37
228	7.3	0.6	8	15	11	0.5	0.5	0.5	0.5	5	3	0.5	201
229	1.6	1			11	0.5	0.5	0.5	0.5	1	1	0.5	2
229	1.6	1			11	0.5	0.5	0.5	0.5	1	1	0.5	2
230	4.3	0.7	9.1	20	11	0.5	0.5	1	0.5	3	2	1	238
231	5.4	1.1	6.1	3.6	12	0.5	0.5	0.5	0.5	0.5	2	0.5	6
231	4.7	2.1	6.7	2.9	12	0.5	0.5	0.5	0.5	0.5	2	0.5	6
232	4.6	2.7	2.9	190	8.4	0.5	0.5	0.5	0.5	7	8	0.5	8
233	2.7	1	3.5	6.1	11	0.5	0.5	1	0.5	2	2	0.5	6
234	3.8	0.6	4.3	7.4	13	0.5	0.5	0.5	0.5	1	2	0.5	14
235	230	9.8	320	170	17								
236	7.6	1.7	11	9	9.3	0.5	0.5	0.5	0.5	4	3	0.5	55
237	2.8	0.8	1.5	5.7	9.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1
238	3.2	1	8.6	5.6	11	0.5	0.5	0.5	0.5	5	3	0.5	9
239	7.3	1.7	17	24	11	0.5	0.5	0.5	0.5	2	3	11	123
240	22	3.7	4.6	170	21	0.5	0.5	0.5	0.5	2	3	11	123
241	2.7	2.1	1.2	55	8.3	0.5	0.5	0.5	0.5	0.5	2	0.5	5
242	2.5	0.5	1.6	8.1	10	15	0.5	0.5	0.5	1	2	0.5	22
243	5.4	1.5	1.9	18	8.1	0.5	0.5	1	0.5	1	2	0.5	2
244	3.1	1.4	4	11	12	0.5	0.5	1	0.5	2	1	0.5	32
245	4.2	0.9	8.8	3.8	13	0.5	0.5	0.5	0.5	5	2	5	75
246	1.9	1.9	1.5	34	8.4	0.5	0.5	0.5	0.5	2	4	0.5	20
247	22	4.1	5.9	56	9.3								
248	23	2.4	38	36	14	0.5	0.5	0.5	0.5	1	3	0.5	2