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Analytical results for total and partial metal extractions in aquifer material, Pinal Creek, Globe, Arizona

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CONTENTS

Illustrations

Tables

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INTRODUCTION

Acidic water has been found in samples collected from the Pinal Creek aquifer near Globe, Arizona (Eychaner, 1987; Eychaner and Stollenwerk, 1987; and Eychaner, 1988). As the water reacts with the aquifer material some of the acidity is neutralized. Eventually the entire aquifer will become acidic at which time the acid water will emerge at Pinal Creek, a permanent stream that flows northward from the end of the aquifer. In order to assess the effect of the water-rock interaction, samples were collected during well construction at sites X1, 451, and X5 (figs. 1 and 2). A background hole was drilled at site 010 (fig. 1). Hole 452 is located at site 451 and holes 505 and 506 are located at site X5.

SAMPLING METHODS

Each hole was drilled using a split-spoon auger. Samples were collected at random intervals down the hole to represent changes in the aquifer. Samples were collected at about 10-ft intervals in each hole to about 75-80 ft. In some holes, samples were collected at much closer spacing.

EXTRACTION OF METALS

Each sample was sieved through an 80-mesh sieve. The -80 portion of each sample was used in the total metal determination (Lichte and others, 1987) as well as the partial extractions. We extracted each sample according to the scheme described in table 1. These extraction techniques are described in detail by Chao (1984). Results for total-metal analysis are presented in table 2. Results for partial-sequential analysis are presented in table 3. All metal determinations for the partial extractions were made using conventional atomic-absorption spectrophotometry.

The series of partial-sequential extractions described in table 1 are usually done with the analysis of metals as the objective. However, the acid water contains large concentrations of sulfate, which may react with the aquifer material to produce insoluble sulfate compounds. Sulfate was determined from the manganese oxide and amorphous iron-oxide solutions following matrix modification with Dionex Ag cleanup columns. The cleanup columns remove chloride from solution, and the solutions contain sufficient chloride to prevent direct determination by ion chromatography (IC). Following cleanup, sulfate determination was done by conventional IC. Sulfate results are presented in table 3. Total sulfur, expressed as sulfate, was determined using a Leco SC132 sulfur determinator. The carbonate solutoins were diluted one hudred fold prior to direct injection in the IC.

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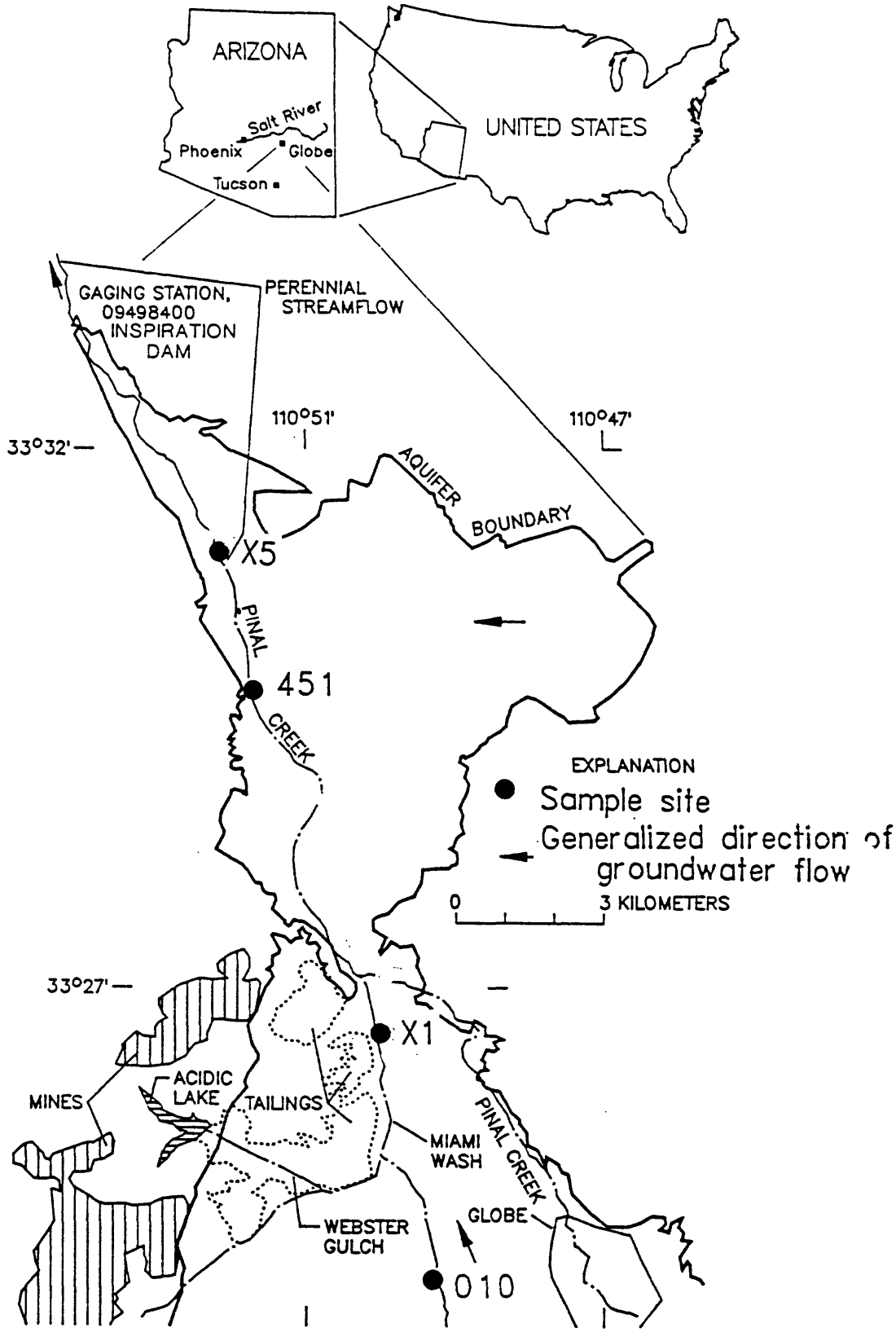

Figure 1. Sample collection sites near Globe, Arizona.

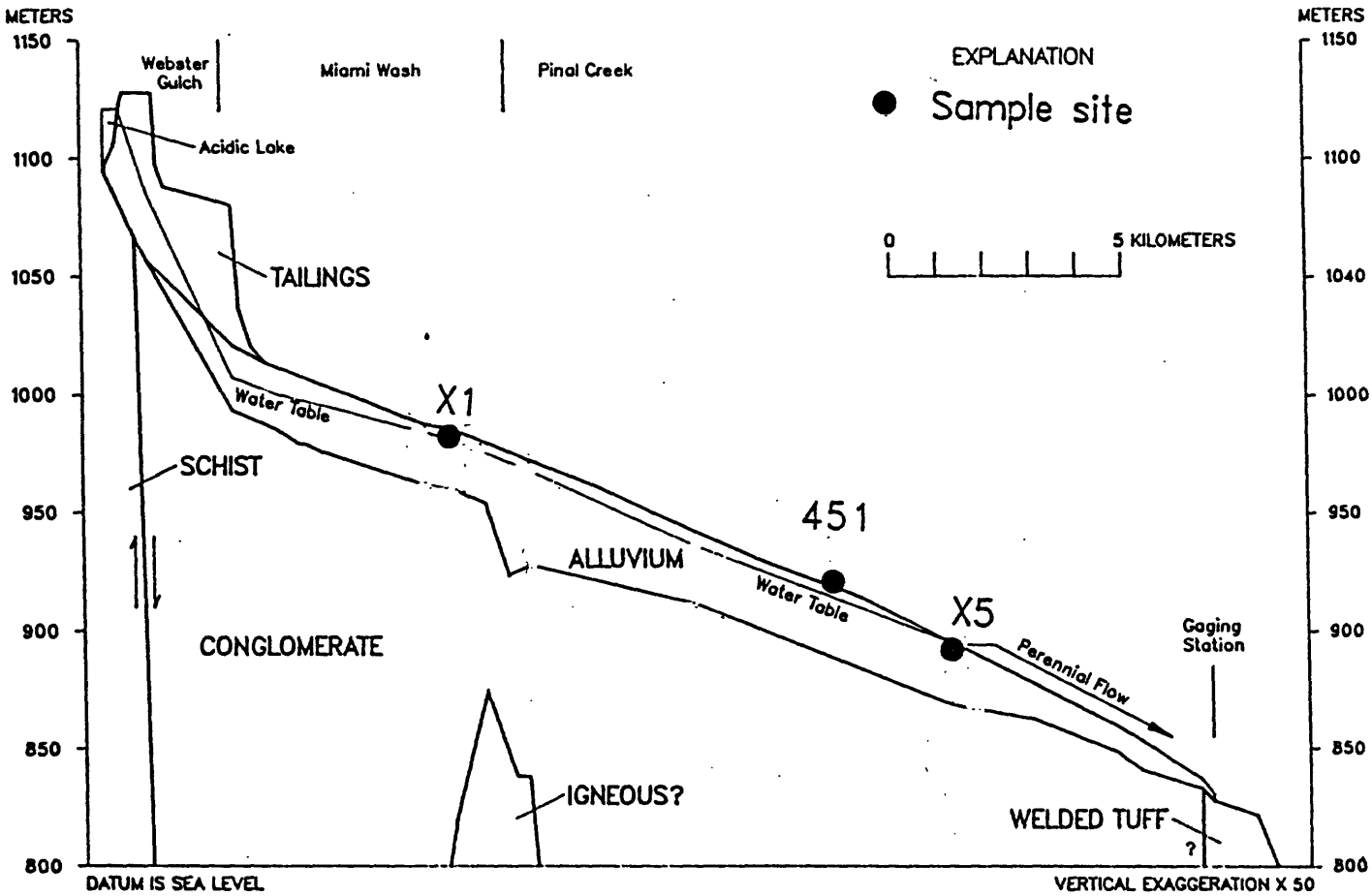

Figure 2. Generalized cross section of Pinal Creek aquifer near Globe, Arizona.

Table 1. Sequential extraction scheme

[g, gram; mL, milliliter; °C, degrees Centigrade]

Step 1.	Dissolution of carbonate and related elements	1 g of sample plus 20 mL of 1.0M acetic acid-sodium acetate buffer pH 5--shake for 4 hrs
Step 2.	Dissolution of manganese oxides and related elements	residue from step 1 plus 25 mL of 0.1N hydroxylamine hydrochloride in 0.01N nitric acid--shake for 30 min
Step 3.	Dissolution of amorphous iron oxides and related elements	residue from step 2 plus 25 mL of 0.25N hydroxylamine hydrochloride in 0.25N hydrochloric acid--heat in 70 °C water bath for 30 min
Step 4.	Dissolution of crystalline iron oxide and related elements	residue from step 3 plus 25 mL of 4.0N and related elements hydrochloric acid--shake in 90 °C water bath for 30 min
Step 5.	Dissolution of residual material	residue from step 4 is digested in hydrofluoric, perchloric and nitric acid and taken up in 25 mL of 0.5N nitric acid

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona

[%, percent; mg/kg, milligrams per killogram]

Sample	Depth (feet)	Al %	Ca %	Fe %	K %	Mg %
X1-107b1	16	7.45	2.61	8.37	1.79	1.1
X1-107b2	17	8.47	2.02	5.12	1.71	1.29
X1-107b3	17.5	7.94	1.78	4.77	2.29	0.98
X1-107b4	18	8.00	1.79	5.19	2.5	0.83
X1-107b5	19 - 24	7.54	1.98	6.54	2.04	0.83
X1-107b6	38 - 39	8.01	1.92	6.27	2.25	1.05
X1-107b7	46 - 47	7.36	1.87	9.64	2.06	0.87
X1-107b8	56 - 57	7.39	1.90	9.42	2.17	0.92
X1-107b9	71 - 72	7.25	2.05	10.7	2.04	0.92
X5-505b1	0.7- 1.1	5.83	2.34	11.0	1.82	1.17
X5-505b2	1.1- 2	5.20	1.83	18.0	1.6	0.92
X5-505b3	9 - 10	7.20	2.51	8.26	2.12	1.42
X5-505b4	10 - 11.5	7.81	2.32	5.83	2.16	1.41
X5-505b5	18 - 21.5	6.46	2.52	11.8	1.8	1.31
X5-505b6	23 - 24.8	6.71	2.66	10.2	1.73	1.44
X5-505b7	58 - 60	7.40	2.26	7.69	2.09	1.33
X5-505b8	60 - 61.5	7.16	2.40	9.16	2.17	1.34
X5-505b9	64 - 65	7.34	3.37	4.75	1.64	1.34
X5-505b10	71 - 73	7.04	4.55	3.03	1.82	1.03
X5-506b1	0.8- 1.2	5.52	2.04	13.2	1.89	1.04
X5-506b2	10.5- 11.5	8.06	2.43	6.77	2.10	1.61
X5-506b3	19 - 22	7.83	2.3	6.32	2.53	1.40
X5-506	23 - 24.8	7.15	2.66	8.19	1.88	1.56
451b1	10.5	7.11	2.57	10.7	1.7	1.48
451b2	11	7.18	2.54	9.5	1.76	1.41
451b3	12	7.52	2.60	9.49	1.84	1.54
451b4	13	7.22	1.97	7.15	1.95	0.74
451	21	7.41	4.00	6.80	2.23	2.51
451b5	30 - 31	6.9	2.56	11.7	1.98	1.46
451b6	32	7.59	2.59	8.45	2.07	1.57
451b7	36	6.41	2.56	13.1	1.49	1.55
451b8	37.5- 38	5.62	2.1	20.7	1.41	1.43
451b9	42.5	7.63	2.55	9.83	2.26	1.67
451	51.8- 52.3	7.40	2.38	6.57	2.51	1.47
451b10	57	5.21	2.21	21.2	1.36	1.33
451b11	70 - 73	5.94	2.35	16.1	1.58	1.36
451b12	76.5- 70	7.15	1.98	11.1	1.98	1.24
452b1	3 - 6	6.43	2.73	13.5	1.66	1.45
452b2	6.5- 7	4.24	2.18	26.2	1.00	1.13

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Al %	Ca %	Fe %	K %	Mg %
452b3	11 - 12	7.99	2.18	5.52	2.28	1.52
452	14.8- 15	8.85	1.62	4.60	2.17	1.51
452b4	18 - 19	7.39	2.53	9.00	2.05	1.45
452b5	19 - 21	6.33	2.78	14.2	1.61	1.55
452b6	23 - 23	6.38	2.33	16.2	1.62	1.34
010b1	5 - 10	7.61	3.22	10.9	1.50	1.38
010b2	15 - 20	7.02	2.40	9.96	1.62	1.05
010b3	23 - 25	8.10	1.88	6.45	2.12	1.14
010b4	29 - 30	7.48	2.77	10.6	1.47	1.29
010b5	37 - 38	7.91	2.22	7.58	1.83	1.25
010b6	45 - 46	7.76	1.97	7.93	2.08	1.1
010b7	50 - 52	7.84	1.5	5.91	2.09	1.01
010b8	57.5- 60	7.64	1.83	5.66	1.88	1.18
010b9	60 - 63	6.1	1.35	3.58	1.75	0.78
010b10	63 - 67	7.82	2.47	4.27	2.03	1.37
010b11	70 - 75	7.66	6.11	3.97	1.65	1.45
010b12	86 - 90	8.13	4.05	4.89	1.60	1.56

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Na %	P %	Ti %	Mn mg/kg	As mg/kg
X1-107b1	16	1.58	0.14	1.00	1,400	<10
X1-107b2	17	1.46	0.13	0.53	1,200	<10
X1-107b3	17.5	1.61	0.13	0.49	23,800	<10
X1-107b4	18	1.93	0.11	0.49	729	<10
X1-107b5	19 - 24	1.87	0.11	0.74	908	<10
X1-107b6	38 - 39	1.72	0.12	0.63	850	10
X1-107b7	46 - 47	1.61	0.13	0.92	1,070	<10
X1-107b8	56 - 57	1.64	0.12	0.98	1,060	<10
X1-107b9	71 - 72	1.48	0.13	0.91	990	<10
X5-505b1	0.7- 1.1	1.27	0.13	2.20	44,600	<10
X5-505b2	1.1- 2	1.24	0.14	3.16	3,070	<10
X5-505b3	9 - 10	1.75	0.15	1.65	2,000	10
X5-505b4	10 - 11.5	1.67	0.14	0.93	5,320	10
X5-505b5	18 - 21.5	1.62	0.16	2.52	2,080	<10
X5-505b6	23 - 24.8	1.49	0.24	2.42	2,010	10
X5-505b7	58 - 60	1.54	0.16	1.33	2,410	10
X5-505b8	60 - 61.5	1.62	0.14	1.66	2,340	10
X5-505b9	64 - 65	1.40	0.09	0.85	1,000	20
X5-505b10	71 - 73	1.58	0.09	0.48	691	10
X5-506b1	0.8- 1.2	1.07	0.14	2.43	30,900	10
X5-506b2	10.5- 11.5	1.57	0.15	1.12	1,170	10
X5-506b3	19 - 22	1.78	0.12	1.11	1,590	<10
X5-506	23 - 24.8	1.57	0.20	1.87	178	10
451b1	10.5	1.56	0.18	2.12	3,510	<10
451b2	11	1.64	0.16	1.87	2,270	<10
451b3	12	1.49	0.19	1.73	2,480	<10
451b4	13	1.8	0.13	0.81	1,380	<10
451	21	1.64	0.11	1.21	1,610	10
451b5	30 - 31	1.61	0.13	2.56	2,160	<10
451b6	32	1.73	0.15	1.57	2,210	<10
451b7	36	1.27	0.23	2.9	2,490	10
451b8	37.5- 38	1.12	0.16	4.11	3,150	<10
451b9	42.5	1.74	0.12	1.99	1,940	10
451	51.8- 52.3	1.78	0.13	1.15	1,400	<10
451b10	57	1.1	0.17	4.12	3,240	10
451b11	70 - 73	1.23	0.15	3.14	2,420	<10
451b12	76.5- 70	1.40	0.14	1.47	1,390	<10
452b1	3 - 6	1.49	0.19	2.28	2,050	10
452b2	6.5- 7	0.98	0.16	4.63	3,530	<10

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Na %	P %	Ti %	Mn mg/kg	As mg/kg
452b3	11 - 12	1.63	0.12	0.79	2,730	<10
452	14.8- 15	1.23	0.08	0.47	1,220	<10
452b4	18 - 19	1.71	0.16	1.76	2,110	<10
452b5	19 - 21	1.42	0.21	3.07	2,750	<10
452b6	23 - 23	1.32	0.16	2.88	2,740	<10
010b1	5 - 10	1.31	0.18	0.81	1,230	<10
010b2	15 - 20	1.36	0.13	0.68	1,040	<10
010b3	23 - 25	1.39	0.11	0.46	815	<10
010b4	29 - 30	1.29	0.15	0.77	1,080	<10
010b5	37 - 38	1.31	0.13	0.56	887	<10
010b6	45 - 46	1.26	0.11	0.57	986	<10
010b7	50 - 52	1.33	0.08	0.38	771	<10
010b8	57.5- 60	1.3	0.13	0.49	741	<10
010b9	60 - 63	1	0.05	0.31	473	<10
010b10	63 - 67	0.89	0.08	0.36	655	<10
010b11	70 - 75	0.87	0.08	0.34	686	<10
010b12	86 - 90	0.84	0.09	0.38	709	<10

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Ba mg/kg	Be mg/kg	Ce mg/kg	Co mg/kg	Cr mg/kg
X1-107b1	16	552	2	126	27	149
X1-107b2	17	580	3	79	26	82
X1-107b3	17.5	907	3	97	478	71
X1-107b4	18	748	3	68	16	84
X1-107b5	19 - 24	718	3	87	18	108
X1-107b6	38 - 39	688	3	75	19	100
X1-107b7	46 - 47	631	2	84	22	153
X1-107b8	56 - 57	656	2	88	23	159
X1-107b9	71 - 72	673	2	82	24	198
X5-505b1	0.7- 1.1	541	3	126	40	181
X5-505b2	1.1- 2	431	2	134	36	315
X5-505b3	9 - 10	585	2	78	30	142
X5-505b4	10 - 11.5	1,000	2	79	33	88
X5-505b5	18 - 21.5	509	2	85	33	220
X5-505b6	23 - 24.8	531	2	104	35	192
X5-505b7	58 - 60	710	2	79	29	146
X5-505b8	60 - 61.5	654	2	83	31	158
X5-505b9	64 - 65	753	2	63	19	63
X5-505b10	71 - 73	647	2	56	14	39
X5-506b1	0.8- 1.2	499	3	102	42	226
X5-506b2	10.5- 11.5	570	2	89	27	91
X5-506b3	19 - 22	760	2	69	29	103
X5-506	23 - 24.8	560	2	89	31	148
451b1	10.5	523	2	119	32	186
451b2	11	519	2	90	31	160
451b3	12	628	2	101	32	148
451b4	13	674	3	98	18	124
451	21	624	2	70	31	102
451b5	30 - 31	527	2	59	43	216
451b6	32	596	2	78	50	138
451b7	36	490	2	103	57	253
451b8	37.5- 38	426	2	142	58	398
451b9	42.5	626	2	73	43	171
451	51.8- 52.3	648	2	75	36	107
451b10	57	461	2	121	63	383
451b11	70 - 73	502	2	108	41	302
451b12	76.5- 70	584	2	93	31	199
452b1	3 - 6	457	2	89	36	226
452b2	6.5- 7	311	2	127	53	449
452b3	11 - 12	740	2	83	36	75

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Ba mg/kg	Be mg/kg	Ce mg/kg	Co mg/kg	Cr mg/kg
452	14.8- 15	657	2	76	23	49
452b4	18 - 19	597	2	75	35	162
452b5	19 - 21	495	2	108	45	255
452b6	23 - 23	638	2	64	51	285
010b1	5 - 10	490	2	109	29	214
010b2	15 - 20	498	2	95	27	209
010b3	23 - 25	665	2	95	22	144
010b4	29 - 30	476	2	118	31	208
010b5	37 - 38	565	2	95	23	145
010b6	45 - 46	630	2	96	24	168
010b7	50 - 52	650	2	105	20	122
010b8	57.5- 60	589	2	82	19	119
010b9	60 - 63	546	2	142	15	74
010b10	63 - 67	567	2	93	15	79
010b11	70 - 75	506	2	72	16	67
010b12	86 - 90	515	2	97	17	93

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Cu mg/kg	Eu mg/kg	Ga mg/kg	La mg/kg	Li mg/kg
X1-107b1	16	95	3	22	62	30
X1-107b2	17	299	2	21	40	42
X1-107b3	17.5	2,010	2	21	41	38
X1-107b4	18	320	<2	21	35	29
X1-107b5	19 - 24	292	2	19	43	30
X1-107b6	38 - 39	252	2	21	38	33
X1-107b7	46 - 47	238	2	22	42	29
X1-107b8	56 - 57	211	2	21	43	30
X1-107b9	71 - 72	274	<2	21	42	29
X5-505b1	0.7- 1.1	502	3	10	68	25
X5-505b2	1.1- 2	212	3	21	76	20
X5-505b3	9 - 10	77	2	19	40	31
X5-505b4	10 - 11.5	99	2	21	41	38
X5-505b5	18 - 21.5	57	3	19	48	27
X5-505b6	23 - 24.8	86	3	19	56	35
X5-505b7	58 - 60	79	2	19	40	43
X5-505b8	60 - 61.5	73	2	19	42	36
X5-505b9	64 - 65	44	<2	18	35	41
X5-505b10	71 - 73	34	<2	15	29	33
X5-506b1	0.8- 1.2	577	3	22	56	24
X5-506b2	10.5- 11.5	75	2	20	45	46
X5-506b3	19 - 22	65	2	19	34	35
X5-506	23 - 24.8	96	3	19	46	38
451b1	10.5	74	3	21	62	34
451b2	11	74	3	20	46	32
451b3	12	91	3	22	51	39
451b4	13	283	2	19	49	28
451	21	69	2	19	36	36
451b5	30 - 31	75	2	21	34	33
451b6	32	114	2	20	39	36
451b7	36	89	3	20	57	37
451b8	37.5- 38	181	3	25	70	33
451b9	42.5	152	2	21	38	34
451	51.8- 52.3	227	2	19	40	35
451b10	57	258	3	22	71	29
451b11	70 - 73	192	3	21	62	32
451b12	76.5- 70	246	2	20	48	35
452b1	3 - 6	111	3	20	48	27
452b2	6.5- 7	55	3	26	79	19

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth	Cu mg/kg	Eu mg/kg	Ga mg/kg	La mg/kg	Li mg/kg
452b3	11 - 12	83	2	20	43	39
452	14.8- 15	86	2	22	38	55
452b4	18 - 19	72	2	20	39	34
452b5	19 - 21	83	3	20	60	32
452b6	23 - 23	92	3	22	39	31
010b1	5 - 10	69	3	22	53	26
010b2	15 - 20	50	2	19	47	23
010b3	23 - 25	56	2	21	48	29
010b4	29 - 30	60	3	23	59	26
010b5	37 - 38	57	2	21	47	30
010b6	45 - 46	68	2	21	48	28
010b7	50 - 52	48	2	19	53	29
010b8	57.5- 60	63	<2	19	42	27
010b9	60 - 63	27	2	15	66	21
010b10	63 - 67	36	<2	18	47	31
010b11	70 - 75	43	<2	18	41	32
010b12	86 - 90	44	2	18	50	29

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth	Mo mg/kg	Nb mg/kg	Nd mg/kg	Ni mg/kg	Pb mg/kg
X1-107b1	16	<2	12	60	48	23
X1-107b2	17	<2	8	40	47	23
X1-107b3	17.5	22	10	41	109	25
X1-107b4	18	2	8	33	31	28
X1-107b5	19 - 24	<2	12	43	32	22
X1-107b6	38 - 39	3	9	39	36	31
X1-107b7	46 - 47	<2	13	44	38	23
X1-107b8	56 - 57	<2	13	44	39	30
X1-107b9	71 - 72	2	12	43	41	40
X5-505b1	0.7- 1.1	16	17	64	163	47
X5-505b2	1.1- 2	6	22	69	73	45
X5-505b3	9 - 10	<2	13	40	47	27
X5-505b4	10 - 11.5	4	10	39	58	29
X5-505b5	18 - 21.5	<2	19	47	50	27
X5-505b6	23 - 24.8	<2	19	59	53	28
X5-505b7	58 - 60	<2	13	40	51	29
X5-505b8	60 - 61.5	<2	13	41	52	32
X5-505b9	64 - 65	<2	10	32	35	26
X5-505b10	71 - 73	<2	7	25	27	20
X5-506b1	0.8- 1.2	21	18	53	200	37
X5-506b2	10.5- 11.5	<2	11	47	48	32
X5-506b3	19 - 22	<2	11	36	49	29
X5-506	23 - 24.8	<2	16	49	54	29
451b1	10.5	<2	15	58	66	31
451b2	11	<2	15	48	55	29
451b3	12	2	15	53	58	36
451b4	13	<2	11	44	34	20
451	21	<2	8	38	52	26
451b5	30 - 31	<2	19	36	58	29
451b6	32	<2	12	40	60	33
451b7	36	<2	20	59	66	36
451b8	37.5- 38	<2	26	69	73	43
451b9	42.5	<2	14	37	58	42
451	51.8- 52.3	<2	10	38	49	31
451b10	57	<2	27	71	70	32
451b11	70 - 73	<2	24	59	62	27
451b12	76.5- 70	<2	13	50	53	26
452b1	3 - 6	<2	17	52	54	44
452b2	6.5- 7	<2	28	79	65	28
452b3	11 - 12	<2	9	43	54	37

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Mo mg/kg	Nb mg/kg	Nd mg/kg	Ni mg/kg	Pb mg/kg
452	14.8- 15	<2	8	36	53	30
452b4	18 - 19	<2	14	42	57	29
452b5	19 - 21	<2	22	62	65	39
452b6	23 - 23	<2	21	44	64	27
010b1	5 - 10	<2	8	58	59	24
010b2	15 - 20	<2	8	49	68	19
010b3	23 - 25	3	15	47	86	23
010b4	29 - 30	<2	8	61	59	20
010b5	37 - 38	<2	7	48	54	23
010b6	45 - 46	2	8	49	70	26
010b7	50 - 52	4	6	49	102	22
010b8	57.5- 60	<2	7	40	59	20
010b9	60 - 63	<2	6	73	25	19
010b10	63 - 67	<2	5	46	41	31
010b11	70 - 75	<2	5	35	38	21
010b12	86 - 90	<2	5	46	42	23

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Sc mg/kg	Sr mg/kg	Th mg/kg	V mg/kg	Y mg/kg
X1-107b1	16	24	339	14	223	32
X1-107b2	17	18	283	10	119	28
X1-107b3	17.5	16	298	17	119	31
X1-107b4	18	14	325	10	123	24
X1-107b5	19 - 24	17	335	10	162	28
X1-107b6	38 - 39	17	310	12	148	28
X1-107b7	46 - 47	17	301	14	232	30
X1-107b8	56 - 57	18	308	20	242	28
X1-107b9	71 - 72	16	279	11	263	24
X5-505b1	0.7- 1.1	18	260	30	334	30
X5-505b2	1.1- 2	19	230	17	551	28
X5-505b3	9 - 10	18	270	11	251	26
X5-505b4	10 - 11.5	18	301	11	156	28
X5-505b5	18 - 21.5	21	282	11	383	28
X5-505b6	23 - 24.8	22	279	22	330	41
X5-505b7	58 - 60	18	272	18	219	31
X5-505b8	60 - 61.5	18	264	27	281	29
X5-505b9	64 - 65	16	610	8	121	25
X5-505b10	71 - 73	10	643	7	70	18
X5-506b1	0.8- 1.2	18	225	35	405	30
X5-506b2	10.5- 11.5	20	271	33	178	33
X5-506b3	19 - 22	18	283	19	179	27
X5-506	23 - 24.8	22	288	18	251	36
451b1	10.5	22	275	16	329	34
451b2	11	20	284	13	282	33
451b3	12	21	281	12	266	33
451b4	13	17	334	11	178	30
451	21	18	265	11	195	24
451b5	30-31	20	262	9	403	26
451b6	32	20	289	9	247	27
451b7	36	22	239	19	412	39
451b8	37.5- 38	24	206	30	684	39
451b9	42.5	22	279	9	323	27
451	51.8- 52.3	18	282	9	189	26
451b10	57	25	223	25	713	36
451b11	70 - 73	24	248	20	529	33
451b12	76.5- 70	17	245	12	304	30
452b1	3 - 6	20	258	17	410	35
452b2	6.5- 7	24	193	41	845	36
452b3	11 - 12	17	277	20	136	28

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Sc mg/kg	Sr mg/kg	Th mg/kg	V mg/kg	Y mg/kg
452	14.8- 15	19	231	10	97	23
452b4	18 - 19	20	278	10	283	27
452b5	19 - 21	24	270	28	464	37
452b6	23 - 23	21	262	11	506	29
010b1	5 - 10	26	330	12	273	34
010b2	15 - 20	21	286	11	245	26
010b3	23 - 25	17	248	14	149	23
010b4	29 - 30	24	316	14	271	33
010b5	37 - 38	20	274	12	189	27
010b6	45 - 46	21	249	11	193	25
010b7	50 - 52	16	223	15	120	20
010b8	57.5- 60	16	226	11	133	22
010b9	60 - 63	11	184	18	88	21
010b10	63 - 67	13	162	11	93	20
010b11	70 - 75	13	188	8	92	19
010b12	86 - 90	14	196	9	114	22

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Yb mg/kg	Zn mg/kg
X1-107b1	16	4	101
X1-107b2	17	3	123
X1-107b3	17.5	3	163
X1-107b4	18	3	80
X1-107b5	19 - 24	3	88
X1-107b6	38 - 39	3	103
X1-107b7	46 - 47	3	107
X1-107b8	56 - 57	4	105
X1-107b9	71 - 72	3	117
X5-505b1	0.7- 1.1	4	306
X5-505b2	1.1- 2	4	231
X5-505b3	9 - 10	4	141
X5-505b4	10 - 11.5	4	130
X5-505b5	18 - 21.5	4	158
X5-505b6	23 - 24.8	5	162
X5-505b7	58 - 60	4	129
X5-505b8	60 - 61.5	4	142
X5-505b9	64 - 65	3	88
X5-505b10	71 - 73	2	61
X5-506b1	0.8- 1.2	4	322
X5-506b2	10.5- 11.5	4	146
X5-506b3	19 - 22	4	131
X5-506	23 - 24.8	5	159
451b1	10.5	5	182
451b2	11	4	165
451b3	12	4	177
451b4	13	3	87
451	21	3	173
451b5	30 - 31	3	225
451b6	32	4	207
451b7	36	5	293
451b8	37.5- 38	5	286
451b9	42.5	4	215
451	51.8- 52.3	3	152
451b10	57	5	262
451b11	70 - 73	5	204
451b12	76.5- 70	3	155
452b1	3 - 6	4	172
452b2	6.5- 7	5	239
452b3	11 - 12	3	156

Table 2. Analytical results for total metal concentration of -80 fraction of samples from holes in the Pinal Creek aquifer, Globe, Arizona--(Continued)

Sample	Depth (feet)	Yb mg/kg	Zn mg/kg
452	14.8- 15	3	140
452b4	18 - 19	4	179
452b5	19 - 21	5	230
452b6	23 - 23	4	224
010b1	5 - 10	4	121
010b2	15 - 20	3	101
010b3	23 - 25	3	108
010b4	29 - 30	3	97
010b5	37 - 38	3	106
010b6	45 - 46	3	116
010b7	50 - 52	2	98
010b8	57.5- 60	2	102
010b9	60 - 63	2	55
010b10	63 - 67	2	89
010b11	70 - 75	2	98
010b12	86 - 90	2	100

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material.

[--, no data available; Cu(carb), Zn(carb), etc. represents the result for the carbonate extraction; Cu(MnO), Zn(MnO), etc. the result for the manganese oxide extraction; Cu(amfe), Zn (amfe), etc. the result for the amorphous iron oxide extraction; Cu(cryfe) the result for the crystalline iron oxide extraction; and Cu(res) the result for the residual digestion]

Sample	Depth (feet)	Cu(carb) mg/kg	Cu(MnO) mg/kg	Cu(amfe) mg/kg	Cu(cryfe) mg/kg	Cu(res) mg/kg
X1-107b1	16	7.5	3.1	18	17	39
X1-107b2	17	73	2.5	106	69	48
X1-107b3	17.5	536	780	311	31	67
X1-107b4	18	108	4.1	104	50	72
X1-107b5	19 -24	94	9.2	66	28	53
X1-107b6	38 -39	60	1.4	36	85	43
X1-107b7	46 -47	83	1.7	29	32	98
X1-107b8	56 -57	55	1.9	21	81	37
X1-107b9	71 -72	93	2.6	22	75	64
X5-505b1	0.7- 1.1	15	165	159	49	50
X5-505b2	1.1- 2	20	26	53	50	59
X5-505b3	9 -10	8.8	4.2	18	18	17
X5-505b4	10 -11.5	9.0	10	20	22	22
X5-505b5	18 -21.5	4.5	1.5	10	20	17
X5-505b6	23 -24.8	4.5	1.8	20	27	27
X5-505b7	58 -60	8.0	5.2	20	18	26
X5-505b8	60 -61.5	6.4	4.0	15	21	23
X5-505b9	64 -65	3.9	0.9	5	15	18
X5-505b10	71 -73	4.3	0.3	3	11	12
X5-506b1	0.8- 1.2	13	166	187	34	86
X5-506b2	10.5-11.5	3.9	1.8	15	11	38
X5-506b3	19 -22	17	2.4	18	40	17
X5-506	23 -24.8	9.2	2.9	16	32	29
451b1	10.5	3.8	2.8	12	14	36
451b2	11	7.8	0.5	14	29	25
451b3	12	4.1	0.9	15	20	40
451b4	13	72	13	55	26	65
451	21	5.0	0.9	12	30	24
451b5	30 -31	7.9	1.2	13	25	25
451b6	32	15	12	21	14	40
451b7	36	7.7	0.5	13	34	25
451b8	37.5-38	49	8.3	36	16	46
451b9	42.5	43	5.6	37	34	20
451	51.8-52.3	80	18	61	18	27
451b10	57	118	13	66	31	19

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Cu(carb) mg/kg	Cu(MnO) mg/kg	Cu(amfe) mg/kg	Cu(cryfe) mg/kg	Cu(res) mg/kg
451b11	70 -73	73	3.0	42	40	29
451b12	76.5-70	95	2.2	35	60	25
452b1	3 - 6	19	1.5	30	30	29
452b2	6.5- 7	2.3	0.6	5.6	17	26
452b3	11 -12	5.2	0.8	15	26	32
452	14.8-15	5.6	0.7	15	41	28
452b4	18 -19	3.1	0.7	11	26	24
452b5	19 -21	4.0	0.6	13	25	32
452b6	23 -23	11	1.1	11	38	31
010b1	5 -10	4.9	0.3	9.5	13	48
010b2	15 -20	8.0	0.6	7.5	8.9	34
010b3	23 -25	7.3	0.8	16	23	15
010b4	29 -30	5.4	0.3	9.4	14	45
010b5	37 -38	5.1	0.3	10	31	19
010b6	45 -46	8.5	0.9	16	32	16
010b7	50 -52	8.9	0.8	9.4	20	16
010b8	57.5-60	9.0	0.5	15	24	17
010b9	60 -63	7.8	0.3	9.2	20	9.2
010b10	63 -67	4.2	0.3	4.2	18	18
010b11	70 -75	4.7	0.3	3.8	21	23
010b12	86 -90	4.9	0.4	4.7	20	25

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Zn(carb) mg/kg	Zn(MnO) mg/kg	Zn(amfe) mg/kg	Zn(cryfe) mg/kg	Zn(res) mg/kg
X1-107b1	16	7.2	2.8	15	22	65
X1-107b2	17	8.5	1.4	27	46	33
X1-107b3	17.5	20	34	22	18	59
X1-107b4	18	7.4	0.3	16	29	60
X1-107b5	19 -24	6.9	0.7	11	24	53
X1-107b6	38 -39	8.0	0.3	8	40	46
X1-107b7	46 -47	8.0	0.3	12	14	96
X1-107b8	56 -57	6.7	0.6	14	52	61
X1-107b9	71 -72	15	1.4	9	31	66
X5-505b1	0.7- 1.1	20	150	38	37	69
X5-505b2	1.1- 2	10.0	13	17	28	128
X5-505b3	9 -10	3.4	3.0	13	31	62
X5-505b4	10 -11.5	3.8	6.1	18	38	47
X5-505b5	18 -21.5	2.1	2.2	13	31	99
X5-505b6	23 -24.8	3.9	1.9	21	37	80
X5-505b7	58 -60	2.8	2.8	17	26	73
X5-505b8	60 -61.5	2.5	2.5	16	33	85
X5-505b9	64 -65	2.1	2.7	7.9	21	63
X5-505b10	71 -73	1.5	1.0	4.5	18	27
X5-506b1	0.8- 1.2	5.2	116	36	27	126
X5-506b2	10.5-11.5	4.9	1.5	20	25	95
X5-506b3	19 -22	9.0	3.2	14	48	63
X5-506	23 -24.8	5.2	2.1	11	33	76
451b1	10.5	9.0	5.6	20	36	106
451b2	11	5.6	2.5	17	48	70
451b3	12	5.4	3.9	24	40	86
451b4	13	5.6	1.2	8.2	15	59
451	21	14	3.7	22	56	57
451b5	30 -3?	18	3.7	28	42	111
451b6	32	22	8.1	34	29	101
451b7	36	42	4.6	62	51	108
451b8	37.5-38	18	5.3	26	24	161
451b9	42.5	11	24.6	14	59	112
451	51.8-52.3	12	3.4	26	34	69
451b10	57	11	2.0	18	30	111
451b11	70 -73	10	0.5	15	35	114
451b12	76.5-70	9.8	0.8	15	45	77
452b1	3 - 6	9.5	3.1	10	32	118
452b2	6.5- 7	1.4	1.5	6.5	26	167
452b3	11 -12	5.2	4.3	20	46	71

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Zn(carb) mg/kg	Zn(MnO) mg/kg	Zn(amfe) mg/kg	Zn(cryfe) mg/kg	Zn(res) mg/kg
452	14.8-15	6.1	0.7	22	78	48
452b4	18 -19	8.0	3.1	18	44	63
452b5	19 -21	12	3.1	24	37	106
452b6	23 -23	12	4.1	20	50	134
010b1	5 -10	15	1.9	17	28	81
010b2	15 -20	54	2.2	13	13	61
010b3	23 -25	13	1.3	20	41	27
010b4	29 -30	4.5	0.9	51	30	74
010b5	37 -38	8.0	0.8	11	43	33
010b6	45 -46	23	1.8	16	41	29
010b7	50 -52	13	1.9	11	28	33
010b8	57.5-60	12	1.3	22	37	27
010b9	60 -63	5.2	1.4	8	22	65
010b10	63 -67	12	0.7	9	39	28
010b11	70 -75	25	2.0	24	55	35
010b12	86 -90	28	2.2	8	38	22

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Mn(carb) mg/kg	Mn(MnO) mg/kg	Mn(amfe) mg/kg	Mn(cryfe) mg/kg	Mn(res) mg/kg
X1-107b1	16	22	292	83	59	800
X1-107b2	17	27	393	210	163	449
X1-107b3	17.5	88	18,700	6,300	67	430
X1-107b4	18	93	16.5	46	30	549
X1-107b5	19 -24	84	6.6	53	46	620
X1-107b6	38 -39	99	5.7	32	138	459
X1-107b7	46 -47	68	2.8	28	22	1,079
X1-107b8	56 -57	58	5.6	28	128	722
X1-107b9	71 -72	57	7.1	21	88	904
X5-505b1	0.7- 1.1	13	45,600	1,390	89	760
X5-505b2	1.1- 2	26	1,120	118	64	1,470
X5-505b3	9 -10	57	485	86	77	730
X5-505b4	10 -11.5	163	3,200	548	104	490
X5-505b5	18 -21.5	84	173	59	80	1,360
X5-505b6	23 -24.8	89	155	73	82	1,200
X5-505b7	58 -60	183	868	243	69	690
X5-505b8	60 -61.5	153	740	164	89	650
X5-505b9	64 -65	15	228	119	71	370
X5-505b10	71 -73	22	215	97	100	210
X5-506b1	0.8- 1.2	4	26,000	1,090	53	1,010
X5-506b2	10.5-11.5	112	125	91	43	730
X5-506b3	19 -22	107	389	134	134	578
X5-506	23 -24.8	101	253	79	116	1,230
451b1	10.5	45	1,531	275	59	1,060
451b2	11	33	588	168	120	890
451b3	12	98	730	240	79	910
451b4	13	66	203	68	29	560
451	21	232	304	97	136	570
451b5	30 -31	192	160	74	102	1,360
451b6	32	225	516	168	57	890
451b7	36	324	142	121	108	1,340
451b8	37.5-38	228	152	107	57	1,780
451b9	42.5	159	227	97	140	1,122
451	51.8-52.3	235	154	89	82	720
451b10	57	174	209	76	85	1,294
451b11	70 -73	174	14	41	100	1,520
451b12	76.5-70	224	17	39	117	1,000
452b1	3 - 6	10	191	64	88	1,804
452b2	6.5- 7	9.4	259	57	74	2,140
452b3	11 -12	100	1,440.2	385	125	540

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Mn(carb) mg/kg	Mn(MnO) mg/kg	Mn(amfe) mg/kg	Mn(cryfe) mg/kg	Mn(res) mg/kg
452	14.8-15	250	296	216	79	200
452b4	18 -19	159	376	129	112	920
452b5	19 -21	180	275	113	97	1,190
452b6	23 -23	193	334	121	140	2,022
010b1	5 -10	57	108	57	38	978
010b2	15 -20	105	31	31	25	1,000
010b3	23 -25	92	70	81	180	380
010b4	29 -30	77	85	60	40	965
010b5	37 -38	39	114	69	169	560
010b6	45 -46	64	123	74	168	500
010b7	50 -52	136	31	58	141	440
010b8	57.5-60	56	48	81	169	380
010b9	60 -63	20	24	57	100	220
010b10	63 -67	25	56	118	191	280
010b11	70 -75	26	107	64	197	170
010b12	86 -90	40	91	69	185	360

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Fe(carb) mg/kg	Fe(MnO) mg/kg	Fe(amfe) mg/kg	Fe(cryfe) mg/kg	Fe(res) mg/kg
1-107b1	16	111	110	5,200	13,900	60,400
X1-107b2	17	27	37	2,470	24,157	19,662
X1-107b3	17.5	187	600	6,300	10,000	33,300
X1-107b4	18	269	85	2,939	4,505	42,857
X1-107b5	19 -24	184	98	4,900	13,200	40,800
X1-107b6	38 -39	275	83	1,520	21,300	34,482
X1-107b7	46 -47	494	79	1,676	4,261	72,727
X1-107b8	56 -57	513	72	2,190	26,700	55,555
X1-107b9	71 -72	950	98	1,260	19,500	70,476
X5-505b1	0.7- 1.1	50	411	5,400	11,100	39,900
X5-505b2	1.1- 2	270	280	5,360	12,800	66,700
X5-505b3	9 -10	210	240	3,750	16,700	39,300
X5-505b4	10 -11.5	77	244	4,300	13,500	26,800
X5-505b5	18 -21.5	95	123	3,100	15,400	53,100
X5-505b6	23 -24.8	97	158	5,200	19,600	47,500
X5-505b7	58 -60	220	277	4,270	10,300	40,300
X5-505b8	60 -61.5	150	247	3,870	14,200	46,900
X5-505b9	64 -65	49	61	980	7,600	29,900
X5-505b10	71 -73	50	35	870	13,900	13,900
X5-506b1	0.8- 1.2	20	328	5,100	12,600	73,700
X5-506b2	10.5-11.5	73	91	4,900	9,100	49,400
X5-506b3	19 -22	55	53	2,580	20,500	34,736
X5-506	23 -24.8	87	181	1,800	17,750	47,100
451b1	10.5	50	94	3,100	12,500	75,000
451b2	11	33	35	2,090	16,500	59,500
451b3	12	49	91	3,400	12,200	59,800
451b4	13	140	88	3,200	8,800	52,900
451	21	52	54	1,900	18,800	40,300
451b5	30 -31	96	55	2,190	15,400	93,800
451b6	32	76	158	4,430	12,900	57,600
451b7	36	41	43	4,030	24,700	82,300
451b8	37.5-38	95	89	4,500	17,900	108,000
451b9	42.5	41	51	2,500	21,400	64,285
451	51.8-52.3	110	171	5,500	17,100	43,800
451b10	57	26	47	2,000	14,700	89,411
451b11	70 -73	260	81	2,720	19,600	125,000
451b12	76.5-70	240	64	1,360	27,200	68,888
452b1	3 - 6	23	28	695	17,500	92,783
452b2	6.5- 7	17	24	1,400	12,500	149,000

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Fe(carb) mg/kg	Fe(MnO) mg/kg	Fe(amfe) mg/kg	Fe(cryfe) mg/kg	Fe(res) mg/kg
452b3	11 -12	20	57	2,170	6,800	39,700
452	14.8-15	13	19	2,310	25,500	23,100
452b4	18 -19	39	51	2,060	14,100	65,000
452b5	19 -21	30	47	2,410	22,500	85,600
452b6	23 -23	36	42	730	34,100	101,123
010b1	5 -10	76	87	1,521	6,250	26,087
010b2	15 -20	308	670	1,700	4,170	83,300
010b3	23 -25	217	545	4,270	29,600	22,600
010b4	29 -30	80	91	2,100	6,600	85,200
010b5	37 -38	69	92	1,690	36,600	37,200
010b6	45 -46	132	220	2,380	31,100	34,400
010b7	50 -52	460	670	3,030	14,400	51,700
010b8	57.5-60	133	126	4,060	28,000	18,300
010b9	60 -63	80	64	1,520	10,900	18,500
010b10	63 -67	47	17	101	21,500	16,700
010b11	70 -75	37	81	523	20,300	14,500
010b12	86 -90	81	127	101	23,200	18,800

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	SO_4(carb) mg/kg	SO_4(MnO) mg/kg	SO_4(amfe) mg/kg	SO_4(tot) mg/kg
X1-107b1	16	917	101	45	<1,500
X1-107b2	17	1,690	147	75	1,500
X1-107b3	17.5	1,770	117	234	1,800
X1-107b4	18	1,169	150	78	1,500
X1-107b5	19 -24	812	74	360	<1,500
X1-107b6	38 -39	1,611	120	105	2,100
X1-107b7	46 -47	2,372	150	92	2,400
X1-107b8	56 -57	1,598	136	105	3,000
X1-107b9	71 -72	1,1000	406	144	13,800
X5-505b1	0.7- 1.1	792	101	245	1,500
X5-505b2	1.1- 2	419	43	223	<1,500
X5-505b3	9 -10	1,562	84	50	1,800
X5-505b4	10 -11.5	1,991	117	159	2,400
X5-505b5	18 -21.5	1,185	63	237	1,800
X5-505b6	23 -24.8	1,586	956	78	2,100
X5-505b7	58 -60	1,566	177	67	1,800
X5-505b8	60 -61.5	1,313	131	55	1,500
X5-505b9	64 -65	758	138	40	<1,500
X5-505b10	71 -73	834	150	51	<1,500
X5-506b1	0.8- 1.2	419	59	278	<1,500
X5-506b2	10.5-11.5	3,199	85	41	3,000
X5-506b3	19 -22	<50	76	61	1,500
X5-506	23 -24.8	2,000	188	65	1,800
451b1	10.5	522	81	<50	<1,500
451b2	11	832	131	59	<1,500
451b3	12	4,746	112	100	5,700
451b4	13	4,900	120	100	<1,500
451	21	2,024	122	80	1,500
451b5	30 -31	6,713	266	48	38,900
451b6	32	1,911	68	63	1,800
451b7	36	4,590	164	72	<1,500
451b8	37.5-38	1,660	106	<50	1,800
451b9	42.5	718	76	<50	<1,500
451	51.8-52.3	2,968	92	75	1,500
451b10	57	1,437	235	57	1,500
451b11	70 -73	4,589	218	83	5,100
451b12	76.5-70	2,582	123	84	2,700
452b1	3 - 6	360	38	<50	<1,500
452b2	6.5- 7	<40	114	<50	<1,500

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	SO_4(carb) mg/kg	SO_4(MnO) mg/kg	SO_4(amfe) mg/kg	SO_4(tot) mg/kg
452b3	11 -12	1,443	166	81.0	2,100
452	14.8-15	707	168	43.0	<1,500
452b4	18 -19	1,940	6,274	72.0	3,000
452b5	19 -21	3,147	228	70.0	3,000
452b6	23 -23	3,058	213	84.0	2,700
010b1	5 -10	276	<50	<50	<1,500
010b2	15 -20	213	<50	<50	<1,500
010b3	23 -25	338	<50	<50	<1,500
010b4	29 -30	188	<50	<50	<1,500
010b5	37 -38	293	<50	<50	<1,500
010b6	45 -46	341	<50	<50	<1,500
010b7	50 -52	202	288	<50	<1,500
010b8	57.5-60	307	105	<50	<1,500
010b9	60 -63	193	<50	<50	<1,500
010b10	63 -67	467	<50	<50	<1,500
010b11	70 -75	<40	120	<50	<1,500
010b12	86 -90	489	140	<50	<1,500

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Ca(carb) mg/kg	Ca(MnO) mg/kg	Ca(amfe) mg/kg	Ca(cryfe) mg/kg
X1-107b1	16	1,875	260	1,996	173
X1-107b2	17	3,988	84	1,825	81
X1-107b3	17.5	2,667	107	1,666	10
X1-107b4	18	1,593	38	1,373	27
X1-107b5	19 -24	1,381	85	1,562	10
X1-107b6	38 -39	2,068	34	1,795	49
X1-107b7	46 -47	1,420	25	-	37
X1-107b8	56 -57	1,000	11	1,944	42
X1-107b9	71 -72	4,666	81	1,726	28
X5-505b1	0.7- 1.1	4,810	1,424	2,056	22
X5-505b2	1.1- 2	1,089	320	2,083	22
X5-505b3	9 -10	2,023	357	1,711	27
X5-505b4	10 -11.5	2,804	262	1,753	40
X5-505b5	18 -21.5	1,419	40	2,160	28
X5-505b6	23 -24.8	2,848	411	3,401	41
X5-505b7	58 -60	3,670	322	2,083	31
X5-505b8	60 -61.5	3,518	324	1,697	43
X5-505b9	64 -65	20,120	396	1,829	82
X5-505b10	71 -73	33,300	-	1,475	24
X5-506b1	0.8- 1.2	4,343	820	3,724	10
X5-506b2	10.5-11.5	4,268	189	2,286	18
X5-506b3	19 -22	2,105	60	2,105	115
X5-506	23 -24.8	2,863	1,449	2,264	40
451b1	10.5	2,062	128	3,203	19
451b2	11	2,215	85	2,848	19
451b3	12	-	304	2,667	24
451b4	13	1,235	103	1,764	8.8
451	21	4,659	3,053	14,204	144
451b5	30 -31	4,135	99	2,237	52
451b6	32	2,215	221	1,977	16
451b7	36	2,903	65	3,696	72
451b8	37.5-38	1,753	372	2,380	228
451b9	42.5	1,428	33	2,487	112
451	51.8-52.3	1,683	260	86	31
451b10	57	1,705	26	3,014	38
451b11	70 -73	2,717	24	2,649	57
451b12	76.5-70	2,666	50	2,083	92
452b1	3 - 6	3,505	93	3,092	52
452b2	6.5- 7	2,083	104	3,422	39
452b3	11 -12	3,315	141	2,241	35

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Ca(carb) mg/kg	Ca(MnO) mg/kg	Ca(amfe) mg/kg	Ca(cryfe) mg/kg
452	14.8-15	4,807	103	841	84
452b4	18 -19	1,941	44	2,730	63
452b5	19 -21	3,125	69	3,359	44
452b6	23 -23	2,865	76	2,668	101
010b1	5 -10	5,108	111	2,309	100
010b2	15 -20	1,500	58	1,805	17
010b3	23 -25	1,774	62	1,680	86
010b4	29 -30	2,329	71	2,982	45
010b5	37 -38	2,388	56	2,152	78
010b6	45 -46	1,117	56	1,764	74
010b7	50 -52	1,333	50	1,458	36
010b8	57.5-60	1,989	48	2,217	94
010b9	60 -63	2,336	11	1,834	49
010b10	63 -67	2,083	180	1,302	69
010b11	70 -75	48,837	1,017	1,671	113
010b12	86 -90	27,536	362	1,811	90

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Al(carb) mg/kg	Al(MnO) mg/kg	Al(amfe) mg/kg	Al(cryfe) mg/kg
X1-107b1	16	25	76	1,597	2,986
X1-107b2	17	40	53	-	9,691
X1-107b3	17.5	88	111	2,233	2,300
X1-107b4	18	44	36	906	1,318
X1-107b5	19 -24	63	76	1,348	2,368
X1-107b6	38 -39	78	32	1,005	6,178
X1-107b7	46 -47	261	23	1,193	1,250
X1-107b8	56 -57	200	55	1,055	5,194
X1-107b9	71 -72	304	28	1,023	36,666
X5-505b1	0.7- 1.1	58	92	1,234	2,563
X5-505b2	1.1- 2	49	86	769	2,147
X5-505b3	9 -10	33	116	1,220	3,273
X5-505b4	10 -11.5	44	76	1,768	4,116
X5-505b5	18 -21.5	22	123	1,080	3,055
X5-505b6	23 -24.8	38	126	1,898	4,556
X5-505b7	58 -60	61	139	1,527	3,576
X5-505b8	60 -61.5	31	111	1,543	4,367
X5-505b9	64 -65	83	112	1,128	3,506
X5-505b10	71 -73	81	-	1,076	3,368
X5-506b1	0.8- 1.2	52	38	1,338	1,464
X5-506b2	10.5-11.5	56	119	1,890	2,286
X5-506b3	19 -22	48	26	1,157	5,789
X5-506	23 -24.8	50	192	1,340	4,710
451b1	10.5	35	153	1,438	2,125
451b2	11	38	25	1,170	5,759
451b3	12	49	131	2,073	3,536
451b4	13	49	65	970	1,529
451	21	45	48	937	5,227
451b5	30 -31	44	25	1,049	4,290
451b6	32	68	107	1,709	2,183
451b7	36	47	43	1,559	5,000
451b8	37.5-38	52	98	1,428	1,994
451b9	42.5	43	64	1,020	5,357
451	51.8-52.3	71	123	1,815	3,493
451b10	57	35	74	911	2,970
451b11	70 -73	76	100	1,250	4,076
451b12	76.5-70	87	33	1,222	6,028
452b1	3 - 6	33	15	798	3,222
452b2	6.5- 7	26	24	684	2,559
452b3	11 -12	52	35	1,277	4,836

Table 3. Analytical results for partial sequential extractions of Pinal Creek aquifer material--(Continued)

Sample	Depth (feet)	Al(carb) mg/kg	Al(MnO) mg/kg	Al(amfe) mg/kg	Al(cryfe) mg/kg
452	14.8-15	52	17	1,346	8,894
452b4	18 -19	31	51	946	4,368
452b5	19 -21	35	47	1,188	3,375
452b6	23 -23	40	25	842	5,280
010b1	5 -10	37	14	1,086	1,739
010b2	15 -20	53	22	917	889
010b3	23 -25	86	35	1,720	7,204
010b4	29 -30	64	17	1,335	1,903
010b5	37 -38	53	56	1,417	7,722
010b6	45 -46	71	18	1,500	6,823
010b7	50 -52	138	33	1,528	4,861
010b8	57.5-60	84	59	-	7,500
010b9	60 -63	35	16	-	3,940
010b10	63 -67	92	28	-	8,020
010b11	70 -75	72	26	581	7,558
010b12	86 -90	78	11	-	8,369