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ANALYTICAL RESULTS FOR 50 WATER SAMPLES FROM BEAVER VALLEY, UTAH

by

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and William R. Miller

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This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards.

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ABSTRACT

Fifty water samples were collected from the Beaver Valley, south-central Utah, during the summer of 1979, as a part of the hydrogeochemical study of the basin. The water samples were analyzed for arsenic, copper, molybdenum, zinc, uranium, calcium, lithium, magnesium, potassium, sodium, selenium, vanadium, silica, fluoride, chloride, sulfate, and nitrate. Temperature, specific conductance, and pH were also measured. Sample analyses and localitities are presented in this report.

INTRODUCTION

Fifty water samples were collected from thirty-eight wells, seven springs, and five surface streams, during August of 1979, in the Beaver Valley, Utah. Beaver Valley is two hundred and ten miles south of Salt Lake City, Utah. Figure 1 is an index map of the study area. Figure 2 is a sample locality map.

Temperature and pH were measured at the sample site. The remaining analyses were completed at the U.S. Geological Survey laboratory in Denver, Colorado. The results of the analyses are given in this report.

SAMPLE COLLECTION TECHNIQUE

At each locality, a 60 mL sample was collected and filtered through a 0.45 μm membrane filter and then acidified to pH <2 with nitric acid. An untreated 1/2 L sample was also taken. The acidified samples were stored in acid-rinsed polyethylene bottles.

ANALYTICAL TECHNIQUES

Water temperature and pH were measured at the sample site. The remaining analyses were done in the Denver laboratory. The filtered, acidified sample was analyzed for arsenic, copper, molybdenum, zinc, uranium, calcium, lithium, magnesium, potassium, sodium, selenium, vanadium, and silica. The untreated sample was analyzed for fluoride, chloride, sulfate, nitrate, and measured for specific conductance.

Specific conductance and pH were measured using standard instrumental methods. Fluoride, chloride, sulfate, and nitrate were analyzed by ion chromatography (Smee and Hall, 1978, p. 245). Calcium, lithium, magnesium, potassium, sodium, and silica were analyzed by flame atomic absorption spectrophotometry (Perkin-Elmer Corp., 1976). Arsenic, copper, molybdenum, zinc, selenium, and vanadium were determined by flameless atomic absorption spectrophotometry (Perkin-Elmer Corp., 1977). Uranium was analyzed by a fluorometric method (McHugh, 1979).

RESULTS

Table 1 is a list of sample locality numbers and sources for samples shown on fig. 2. Table 2 is analytical data for each sample locality. Table 3 is a summary of all the chemical analyses for the 50 Beaver Valley water samples showing each variable with its minimum and maximum values, mean, geometric mean, standard deviation, and geometric deviation.

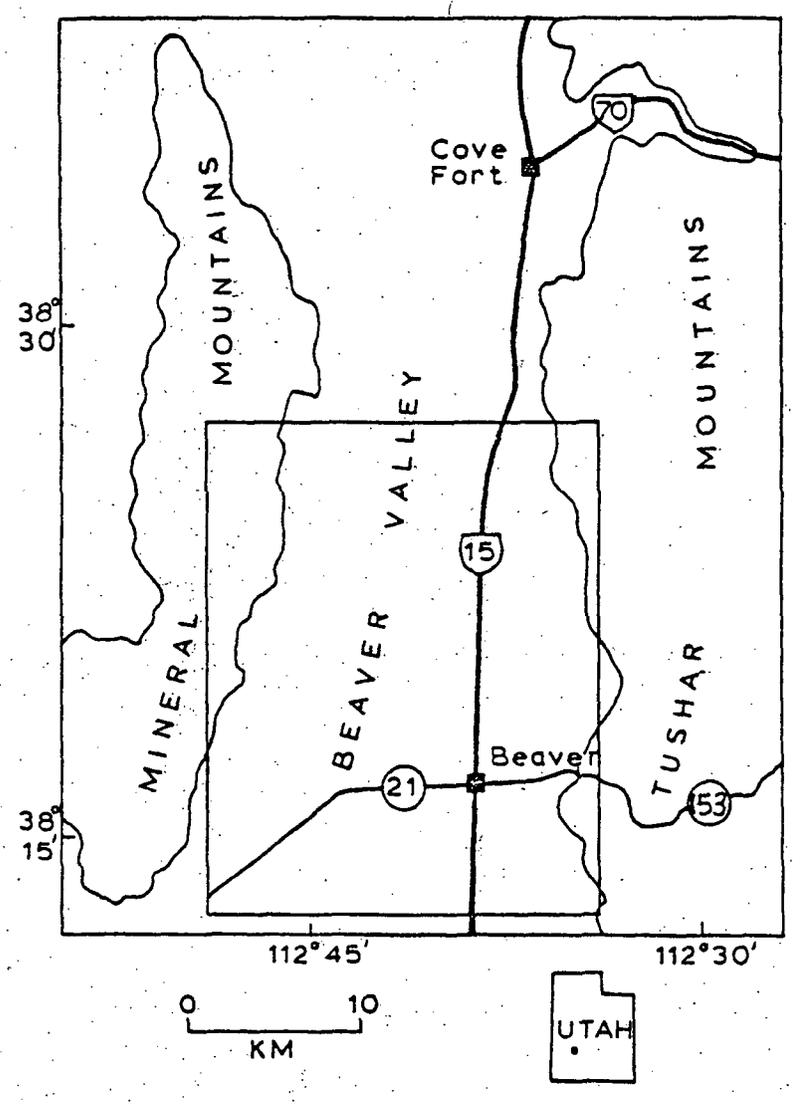

Figure 1. Index map of Beaver Valley, Utah

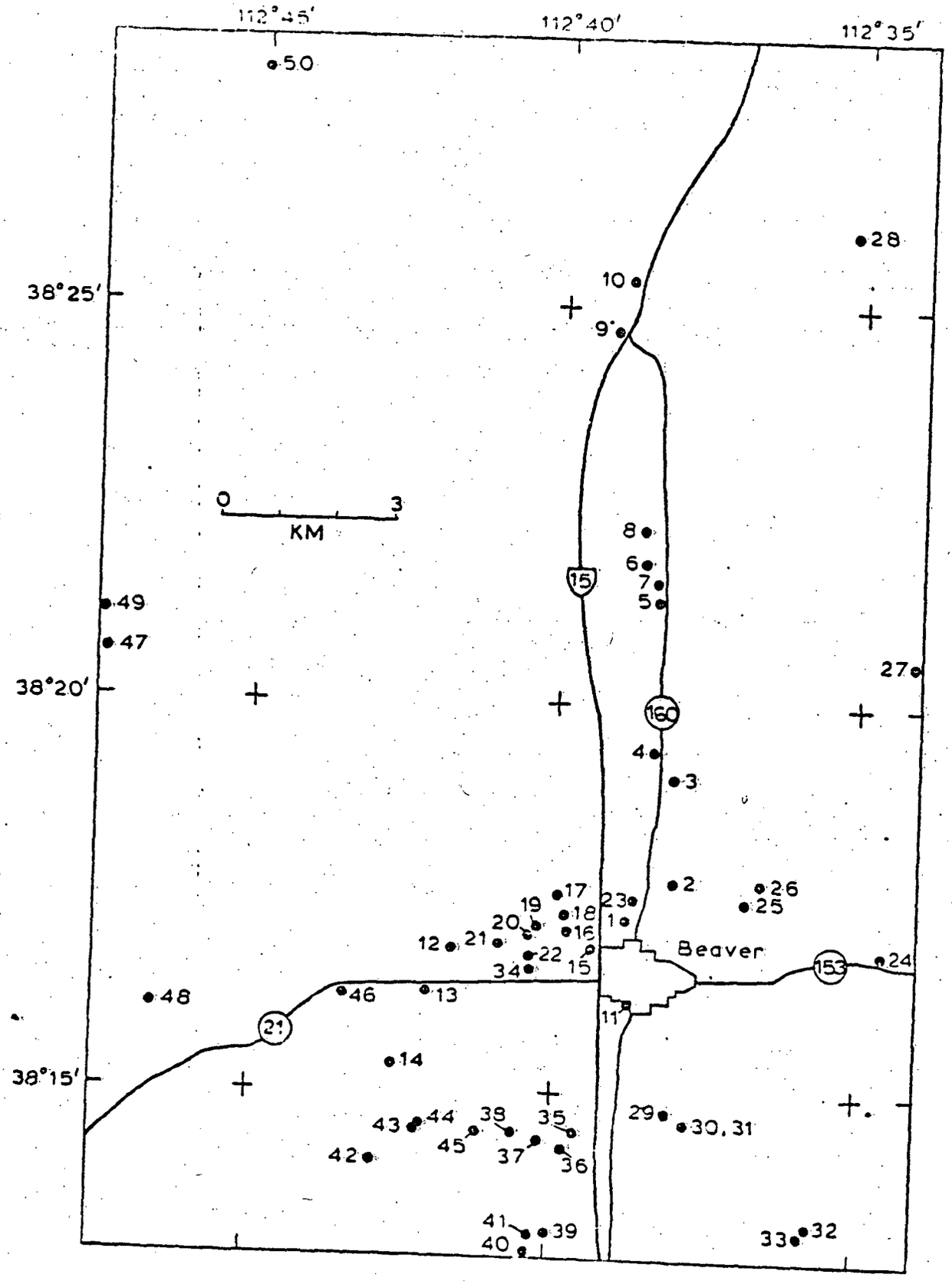

Figure 2. Sample localities, Beaver Valley, Utah

Table 1.--Sample localities and sources of 50 water samples, Beaver Valley, Utah

Sample no.	Source of sample
BV01	Irrigation well
BV02	Irrigation well
BV03	Irrigation well
BV04	Domestic well
BV05	Irrigation well
BV06	Irrigation well
BV07	Manderfield town water system (wells)
BV08	Irrigation well
BV09	Irrigation well
BV10	Steel holding tank, water from irrigation well
BV11	Spring
BV12	Irrigation well
BV13	Irrigation well
BV14	Greenville town water system (artesian well)
BV15	Steel holding tank, well used for livestock
BV16	Steel holding tank, well used for livestock
BV17	Steel holding tank, well used for livestock
BV18	Livestock well
BV19	Steel holding tank, well used for livestock
BV20	Irrigation well
BV21	Irrigation well
BV22	Steel holding tank, well used for livestock
BV23	Beaver town water system (wells)
BV24	Stream, Beaver Creek
BV25	Steel holding tank, well used for livestock
BV26	Irrigation well
BV27	Stream, North Creek
BV28	Stream, Indian Creek
BV29	Irrigation well
BV30	Spring (3 miles to the east), water is used for livestock. Water is piped from Kane Spring
BV31	Livestock well
BV32	Stream, Birch Creek
BV33	Stream, South Creek
BV34	Irrigation well
BV35	Irrigation well
BV36	Irrigation well
BV37	Livestock well
BV38	Spring, water is piped from spring 1 mile away. Water is used for livestock
BV39	Irrigation well
BV40	Irrigation well

Table 1.--Sample localities and sources of 50 water samples, Beaver Valley Utah--Continued

Sample no.	Source of sample
BV41	Irrigation well
BV42	Irrigation well
BV43	Artesian irrigation well
BV44	Artesian irrigation well
BV45	Spring
BV46	Irrigation well
BV47	Spring, Mud Spring
BV48	Irrigation well
BV49	Spring
BV50	Spring, Mathew Spring

Table 2. -- WATER ANALYSES FROM THE BEAVER VALLEY, UTAH

sample no.	LAT	LONG	CA(mg/L)	MG(mg/L)	NA(mg/L)	K(mg/L)	LI(mg/L)	SIO2(mg/L)	SO4(mg/L)	CL(mg/L)	F(mg/L)	NO3(mg/L)
BV01	38 17 17	112 38 48	56.0	11.0	16.0	2.1	.015	34	30.0	30.0	.50	<.1
BV02	38 17 47	112 38 2	33.0	6.2	14.0	1.3	.005	27	24.0	7.1	.55	<.1
BV03	38 19 5	112 38 3	50.0	8.8	13.0	1.5	.016	28	29.0	45.0	.40	<.1
BV04	38 19 25	112 38 22	37.0	7.1	12.0	1.4	.010	26	20.0	43.0	.34	<.1
BV05	38 21 19	112 38 18	72.0	12.0	30.0	2.0	.017	30	35.0	36.0	.68	12.0
BV06	38 21 48	112 38 34	55.0	8.8	23.0	1.8	.015	28	38.0	44.0	1.50	<.1
BV07	38 21 34	112 38 22	25.0	4.2	8.5	1.4	.010	34	8.4	11.0	.29	3.0
BV08	38 22 13	112 38 37	47.0	9.0	37.0	2.2	.006	23	18.0	32.0	.75	6.0
BV09	38 24 44	112 39 6	79.0	12.0	23.0	2.7	.019	29	22.0	17.0	.63	11.0
BV10	38 25 23	112 38 54	120.0	22.0	22.0	4.0	.026	34	51.0	72.0	1.10	49.0
BV11	38 16 13	112 38 43	38.0	7.4	13.0	2.1	.006	29	11.0	8.3	.78	13.0
BV12	38 16 54	112 41 40	41.0	8.2	51.0	12.0	.018	59	83.0	34.0	1.70	1.0
BV13	38 16 21	112 42 4	68.0	13.0	92.0	11.0	.042	50	65.0	32.0	1.50	38.0
BV14	38 15 23	112 42 37	28.0	4.2	29.0	8.4	.024	71	38.0	8.1	1.30	<.1
BV15	38 16 56	112 39 22	38.0	7.8	15.0	1.9	.005	21	14.0	9.2	.79	10.0
BV16	38 17 8	112 39 46	43.0	7.3	9.7	1.5	.005	24	17.0	9.8	.83	6.0
BV17	38 17 36	112 39 55	65.0	15.0	13.0	1.7	.012	23	26.0	41.0	1.10	3.0
BV18	38 17 22	112 39 48	61.0	9.0	10.0	2.3	.005	32	21.0	19.0	1.00	6.0
BV19	38 17 12	112 40 17	48.0	9.0	11.0	1.9	.006	27	16.0	18.0	1.10	1.0
BV20	38 17 5	112 40 23	60.0	12.0	13.0	4.2	.009	32	24.0	24.0	1.20	6.0
BV21	38 16 59	112 40 53	28.0	4.8	29.0	5.7	.010	46	45.0	12.0	.86	<.1
BV22	38 16 48	112 40 22	33.0	10.0	12.0	2.7	.004	21	26.0	19.0	.81	8.0
BV23	38 17 33	112 38 41	50.0	9.6	13.0	1.7	<.002	24	25.0	14.0	.64	9.0
BV24	38 16 52	112 34 33	18.0	3.7	4.9	1.6	<.002	25	4.7	2.4	.12	<.1
BV25	38 17 32	112 36 50	74.0	13.0	37.0	1.9	.010	24	44.0	33.0	.64	22.0
BV26	38 17 47	112 36 35	49.0	9.0	21.0	1.9	.010	27	40.0	32.0	.45	8.0
BV27	38 20 34	112 34 4	18.0	3.3	4.5	1.3	.002	21	28.0	2.1	.46	<.1
BV28	38 25 59	112 35 12	9.6	1.7	5.7	1.0	.004	21	12.0	4.0	.54	<.1
BV29	38 14 48	112 38 3	30.0	7.4	15.0	4.3	.007	58	17.0	13.0	.29	2.0
BV30	38 14 40	112 37 44	52.0	13.0	14.0	3.8	.005	56	8.6	20.0	.33	<.1
BV31	38 14 41	112 37 45	59.0	16.0	12.0	3.2	.002	42	16.0	7.4	.26	14.0
BV32	38 13 24	112 35 41	13.0	4.5	4.5	2.7	<.002	41	5.0	1.9	.17	.2
BV33	38 13 17	112 35 48	15.0	4.2	5.2	2.1	<.002	41	12.0	3.3	.25	<.1
BV34	38 16 40	112 40 21	34.0	7.5	17.0	4.5	.012	48	21.0	17.0	.86	.1
BV35	38 14 32	112 39 34	26.0	6.2	12.0	3.6	.005	53	13.0	12.0	.30	.6
BV36	38 14 21	112 39 47	76.0	18.0	37.0	5.3	.010	51	53.0	39.0	.29	6.0
BV37	38 14 27	112 40 10	63.0	18.0	115.0	5.6	.020	61	86.0	111.0	.58	14.0
BV38	38 14 32	112 40 36	71.0	16.0	63.0	5.3	.014	54	31.0	53.0	.58	5.0
BV39	38 13 16	112 39 59	22.0	4.9	31.0	5.5	.010	67	16.0	15.0	.28	.9
BV40	38 13 2	112 40 19	21.0	4.5	29.0	5.2	.011	64	16.0	16.0	.27	1.0
BV41	38 13 15	112 40 17	21.0	4.7	31.0	5.6	.010	67	15.0	11.0	.20	1.0
BV42	38 14 9	112 42 56	15.0	2.4	31.0	6.0	.012	57	14.0	8.9	.34	<.1
BV43	38 14 34	112 42 13	17.0	2.8	29.0	8.3	.014	77	21.0	7.6	.34	<.1
BV44	38 14 38	112 42 8	26.0	5.5	30.0	9.7	.020	70	25.0	6.9	.44	<.1
BV45	38 14 33	112 41 12	37.0	12.0	39.0	6.6	.020	66	31.0	57.0	.70	5.0

Table 2.--WATER ANALYSES FROM THE BEAVER VALLEY, UTAH--Continued

Sample no.	ZN(ug/L)	CU(ug/L)	MO(ug/L)	AS(ug/L)	U(ug/L)	SE(ug/L)	V(ug/L)	SP. COND (umhos/cm)	pH	TEMP.(C)
BV01	4.5	4.9	2.1	3.6	14.0	2.5	<5	440	7.61	14
BV02	5.4	3.1	1.7	2.0	6.0	1.7	<5	265	7.45	14
BV03	5.3	5.5	1.1	2.3	5.2	2.4	<5	395	7.37	14
BV04	78.0	29.0	.9	2.0	1.7	1.5	<5	320	7.50	22
BV05	9.5	5.2	1.7	3.6	52.0	2.9	<5	570	7.35	12
BV06	17.0	5.3	1.1	3.4	12.0	2.6	<5	450	7.71	13
BV07	43.0	2.1	1.3	6.6	5.6	1.0	5	195	8.54	20
BV08	5.5	4.0	1.2	1.9	10.0	2.1	<5	460	7.30	10
BV09	9.0	5.3	1.6	2.6	13.0	2.8	<5	560	8.02	16
BV10	66.0	63.0	1.3	2.5	11.0	5.6	5	820	7.85	20
BV11	6.0	3.3	1.2	2.9	3.4	1.4	6	295	7.12	14
BV12	1.8	4.8	16.0	13.0	<.2	3.3	5	530	8.21	16
BV13	3.8	3.9	8.0	17.0	17.0	3.6	5	800	7.38	11
BV14	4.8	2.1	10.0	17.0	<.2	1.0	<5	320	8.22	14
BV15	68.0	3.7	2.2	1.7	7.4	1.8	<5	320	6.98	21
BV16	60.0	7.7	1.6	1.9	6.2	1.9	<5	315	7.24	19
BV17	12.0	7.8	2.4	1.8	35.0	2.8	<5	500	6.98	22
BV18	115.0	5.7	1.6	2.2	9.6	2.4	<5	400	7.20	14
BV19	42.0	5.3	2.1	1.3	18.0	2.4	5	355	6.84	14
BV20	4.1	5.4	2.6	3.8	30.0	3.0	5	440	7.05	16
BV21	3.4	3.4	2.4	12.0	11.0	1.0	6	320	7.72	15
BV22	390.0	5.8	6.0	1.3	6.4	3.0	<5	400	6.98	20
BV23	370.0	5.7	1.9	1.7	17.0	1.8	<5	360	7.70	19
BV24	9.5	1.5	.9	1.7	<.2	.7	<5	143	7.57	15
BV25	70.0	20.0	4.5	1.6	39.0	3.6	<5	620	7.42	15
BV26	4.2	5.0	3.0	2.6	12.0	2.9	5	420	7.76	14
BV27	16.0	1.6	2.0	1.1	1.4	.7	<5	145	7.32	16
BV28	5.2	1.6	1.1	1.0	1.2	.5	<5	92	7.96	15
BV29	4.2	1.9	1.5	3.8	1.2	1.0	12	275	7.60	16
BV30	7.8	2.8	1.1	3.9	2.1	1.1	12	410	7.33	21
BV31	220.0	25.0	.6	2.5	5.2	2.0	7	450	7.09	11
BV32	5.6	2.1	.5	1.2	<.2	.4	6	122	8.13	15
BV33	3.7	.8	.5	1.2	.2	.8	5	138	7.26	15
BV34	7.5	3.0	2.3	9.6	6.0	1.1	7	320	7.63	12
BV35	8.6	1.9	1.1	3.5	.9	.8	12	240	8.00	13
BV36	7.0	4.2	1.0	3.8	6.2	3.2	10	650	7.44	13
BV37	1/ 1,000.0	2.6	3.0	22.0	9.6	3.5	36	900	7.60	14
BV38	9.5	4.4	2.0	5.6	15.0	2.5	16	710	7.41	15
BV39	3.2	.9	.7	4.5	3.4	.7	16	280	8.15	17
BV40	3.2	1.3	.7	4.6	2.4	.4	14	270	8.16	21
BV41	3.6	1.1	.7	4.5	3.1	.8	14	280	8.13	20
BV42	2.0	.7	1.5	16.0	.5	.7	<5	240	8.35	18
BV43	2.4	.8	1.1	12.0	.9	.5	15	250	8.22	25
BV44	4.4	1.4	1.6	12.0	1.4	.8	7	320	8.09	24
BV45	7.6	2.0	.6	5.7	3.7	1.1	18	470	7.64	14

Table 2.--WATER ANALYSES FROM THE BEAVER VALLEY, UTAH--continued

sample no.	LAT	LONG	CA(mg/L)	MG(mg/L)	NA(mg/L)	K(mg/L)	LI(mg/L)	SIO2(mg/L)	SO4(mg/L)	CL(mg/L)	F(mg/L)	NO3(mg/L)
BV46	38 16 17	112 43 28	32.0	7.9	87.0	7.1	.007	27	71.0	24.0	1.60	2.0
BV47	38 20 38	112 47 27	65.0	8.5	32.0	1.4	.027	23	24.0	50.0	1.90	<.1
BV48	38 16 7	112 46 38	50.0	15.0	20.0	3.2	.018	30	27.0	44.0	1.30	1.0
BV49	38 21 8	112 47 32	20.0	3.9	9.6	1.6	.004	19	6.5	12.0	.44	<.1
BV50	38 28 0	112 45 0	59.0	12.0	35.0	4.6	.025	50	18.0	36.0	1.00	8.0

Table 2.--WATER ANALYSES FROM THE BEAVER VALLEY, UTAH--continued

sample no.	ZN(ug/L)	CU(ug/L)	MO(ug/L)	AS(ug/L)	U(ug/L)	SE(ug/L)	V(ug/L)	SP. COND (umhos/cm)	pH	TEMP.(C)
BV46	3.2	3.1	10.0	4.1	8.1	1.6	<5	580	9.00	17
BV47	4.0	4.2	89.0	2.7	740.0	1.7	8	490	7.03	15
BV48	4.0	3.2	6.0	7.6	5.2	2.5	6	420	8.02	13
BV49	15.0	.9	1.0	1.0	1.6	.6	<5	190	7.44	14
BV50	8.4	3.7	2.5	3.1	17.0	1.6	5	540	7.00	11

1/ Probable zinc contamination from galvanized pipe in sample BV37.

Table 3.--Summary of chemical analyses of 50 water samples, Beaver Valley, Utah

Variable	Minimum	Maximum	Mean	Geometric Mean	Standard Deviation	Geometric Deviation
Ca (mg/l)	9.6	120.	43.8	38.1	22.2	1.75
Mg (mg/l)	1.7	22.	8.88	7.70	4.58	1.76
Na (mg/l)	4.5	115.	25.6	19.2	22.5	2.14
K (mg/l)	1.0	12.	3.81	3.08	2.66	1.92
Li (mg/l)	<0.002	.042	.011	.008	.008	2.48
SiO_2 (mg/l)	19.	77.	39.8	36.6	16.9	1.52
SO_4 (mg/l)	4.7	86.	27.2	22.2	18.6	1.92
Cl (mg/l)	1.9	111.	24.5	17.1	20.8	2.53
F (mg/l)	0.12	1.9	0.710	.583	0.439	1.92
NO_3 (mg/l)	<0.1	49.	5.47	.894	9.36	10.8
Zn (ug/l)	1.8	1000.	55.3	11.5	158	4.46
Cu (ug/l)	0.70	63.	5.87	3.44	9.90	2.50
Mo (ug/l)	0.50	89.	4.25	1.88	12.6	2.61
As (ug/l)	1.0	22.	5.02	3.48	4.96	2.28
U (ug/l)	<0.2	740.	23.6	4.37	104.	5.73
Se (ug/l)	0.40	5.6	1.84	1.52	1.11	1.94
V (ug/l)	<5.0	36.	6.34	4.44	6.29	2.27
Sp. Cond. (umhos/cm)	92.	900.	396.	354.	182.	1.65
pH	6.84	9.00	7.62	--	0.471	--

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