UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analytical Results for 249 Water Samples from the Mount Belknap Caldera and Deer Trail Mountain-Alunite Ridge areas and vicinity, Southwestern Utah

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TABLE OF CONTENTS

ILLUSTRATIONS

TABLES

ABSTRACT

Two hundred and forty-nine water samples were collected from small first-order streams, springs, and mine drainages from the Mount Belknap caldera and Deer Trail Mountain-Alunite Ridge areas and vicinity in southwestern Utah. The samples were collected during three hydrogeochemical surveys in 1978, 1979, and 1981. The water samples were analyzed for Ca, Mg, Na, K, Li, SiO_2, alkalinity (HCO_3), SO_4, Cl, F, Zn, Cu, Mo, As, U, and pH. Temperature and specific conductance were also measured. Analytical results are presented in this report.

ACKNOWLEDGMENTS

We thank John F. Guadagnoli, James D. Tucker, Greg K. Lee, and Lou D. Guardia for helping with the sample collection.

INTRODUCTION

The survey area is located in the Tushar Mountains in southwestern Utah (figure 1), and covers an area of approximately 1,430 square kilometers (550 square miles). Two hundred and forty-nine water samples were collected from the Mount Belknap caldera and Deer Trail Mountain-Alunite Ridge areas during three hydrogeochemical surveys. The first survey was conducted in the summer of 1978 as part of the Richfield 1° x 2° CUSMAP (Conterminous United States Mineral Assessment Program) project (McHugh and others, 1981). Analyses of one hundred and seventeen samples from this survey are included in this report. The second study was conducted in the summer of 1979 in the Mount Belknap caldera and vicinity (McHugh and others, 1980; and Tucker and others, 1980). Analyses of eighty-six samples from this survey are included in this report. The third survey was conducted in the summer of 1981 in the Deer Trail Mountain-Alunite Ridge area (Tucker and others, 1983). Analyses of forty-six samples from this survey are included in this report.

SAMPLE COLLECTION AND ANALYTICAL TECHNIQUES

The hydrogeochemical samples were collected from small first-order streams--generally less than one kilometer in length--springs, and mine drainages. Two water samples were collected at each site. The first sample consisted of 60 ml of water passed through a 0.45 µm membrane filter into an acid-rinsed polyethylene bottle and acidified with reagent grade nitric acid to a pH less than 2. The acidification prevents to a large degree, adsorption of the ions onto the container surfaces. This sample was analyzed for Ca, Mg, Na, K, Li, SiO_2, Zn, Cu, Mo, and As. The analytical methods are given in Table 1. The second sample was collected in a 500 ml polyethylene bottle, but not filtered or acidified. Alkalinity, specific conductance, U, SO_4, Cl and F were determined from this sample (Table 1). The pH was determined in most cases the same day of collection from this sample in the 1978 and 1979 surveys. The pH was determined at the site during the 1971 survey. Temperature was measured at the site in all surveys.

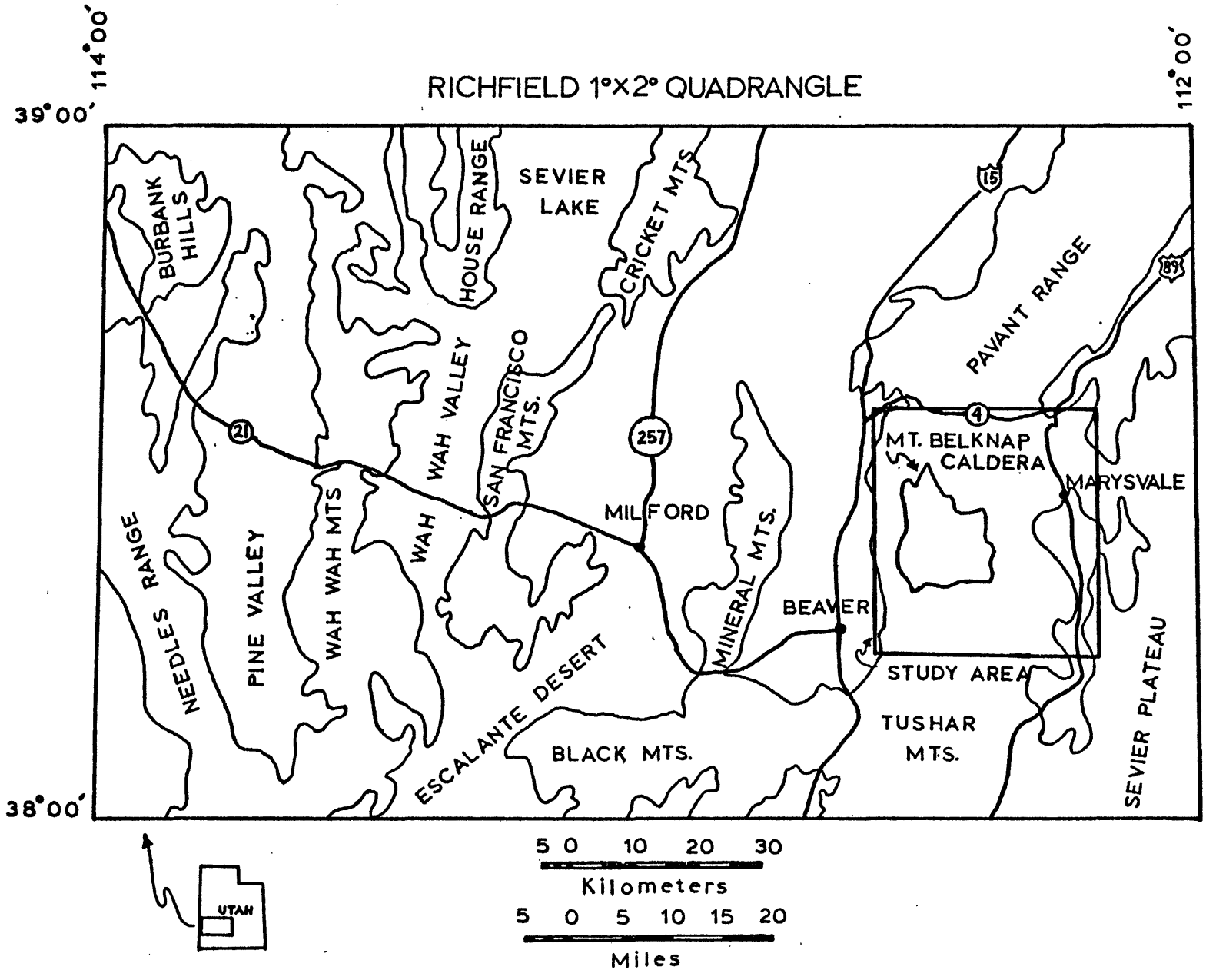

Figure 1.--Index map of the Mount Belknap caldera area and the Deer Trail Mountain-Alunite Ridge study area, Utah

Table 1.--Analytical methods used for water analyses, Mount Belknap caldera area and Deer Trail Mountain-Alunite Ridge study area, Utah

Constituent	Method	Reference
Alkalinity	Gran's plot potentiometric titration	Orion Research, Inc. (1975)
Sulfate	Ion chromatography	Smee and Hall (1978)
Chloride	---do	Do.
Fluoride	---do	Do.
Calcium	Flame atomic absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Magnesium	---do	Do.
Sodium	---do	Do.
Potassium	---do	Do.
Lithium	---do	Do.
Silica	---do	Do.
Zinc	---do	Do.
Copper	Flameless atomic absorption spectrophotometry	Perkin-Elmer Corp. (1977)
Molybdenum	---do	Do.
Arsenic	Ion exchange separation method	Ficklin (1983)
Uranium	Fluorometric	McHugh (1979)
Specific conductance	Conductivity bridge	Brown and others (1970)

ANALYTICAL RESULTS AND STATISTICAL SUMMARY

The sample numbers from the original surveys have been changed for this report to a more continuous set of sample numbers. Figure 2 gives the site locations and Appendix 1 gives the cross reference from original sample numbers used in older reports to those used in this report. Samples 001 to 117 are from the 1978 survey, samples 201 to 286 are from the 1979 survey, and samples 401 to 445 are from the 1981 survey. The analytical results are given in Appendix 2. From the three individual surveys twenty-five sites were sampled in duplicate. Three sites were duplicated in each survey during the summers of 1979 and 1981. In the 1981 survey duplicate analyses were made on five samples. All the duplicate samples are listed below the earlier sample in Appendix 2 and are listed in Table 2. A statistical summary is given in Table 3. The duplicate samples were removed before calculation of the data summary. The geometric mean and deviation were calculated using Cohen's method on logarithmically transformed data (Miesch, 1967; VanTrump and Miesch, 1977). A logarithmic transformation was done to best approximate a Gaussian distribution, which is assumed for Cohens method calculations.

A charge balance based on electrical neutrality of the water was calculated from the analytical data in order to test the accuracy of the analytical results. The charge balance is calculated by the equation:

$$\frac{\sum \frac{\text{anions}}{\text{eq. wt.}^*} - \sum \frac{\text{cations}}{\text{eq. wt.}}}{\sum \frac{\text{anions}}{\text{eq. wt.}} + \sum \frac{\text{cations}}{\text{eq. wt.}}} \times 100 = \pm \,\%\ \text{difference}$$

*eq. wt. = equivalent weight = molecular weight/charge

The charge balance difference for 220 samples is less than 10 percent. The charge balance difference for 29 samples is less than 20 percent. This indicates that the analyses are adequate.

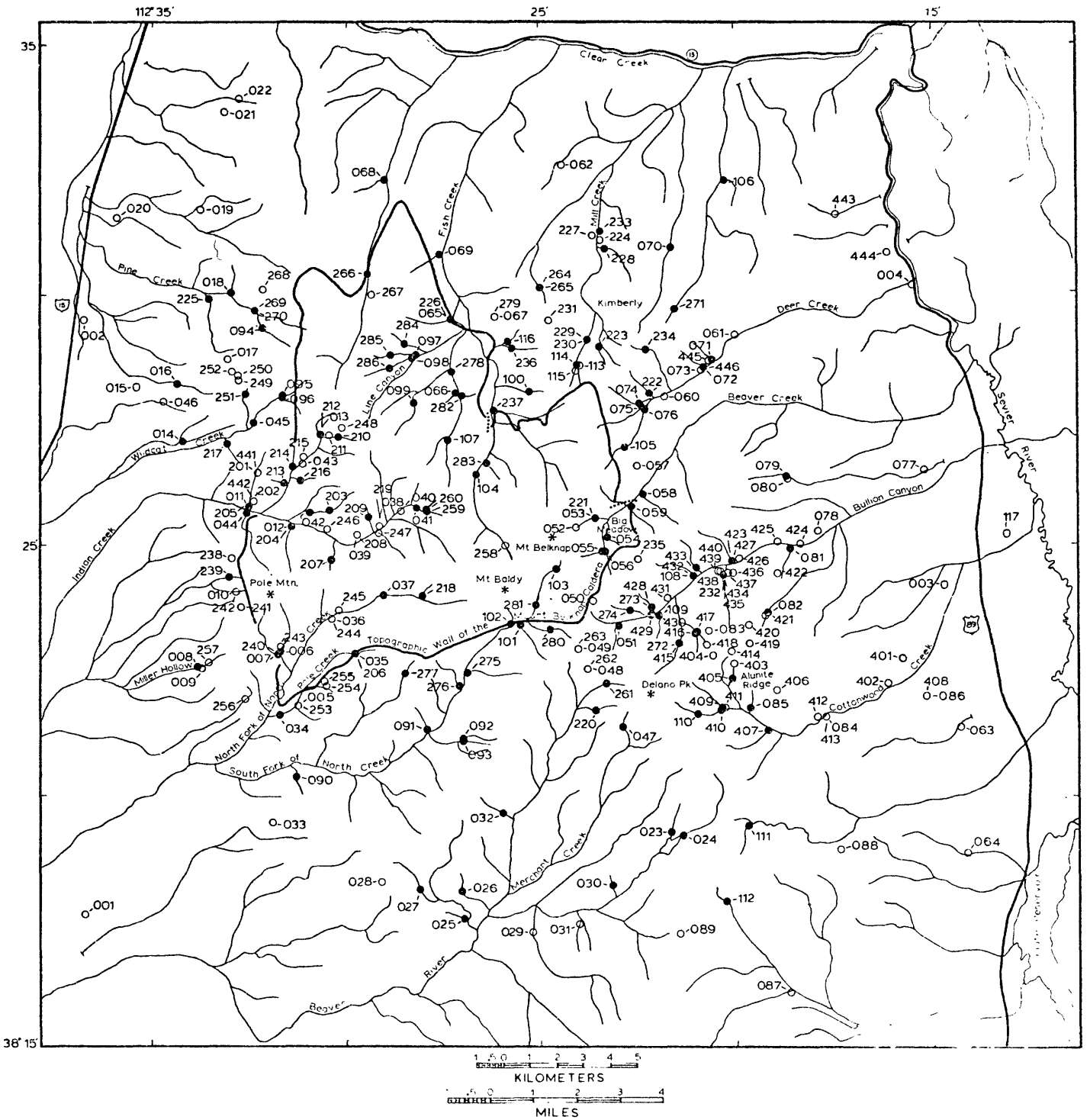

Figure 2.--Sample locations for the Mount Belknap caldera area and the Deer Trail Mountain-Alunite Ridge study area, Utah.

Table 2.--Listing of the 25 sites duplicated in different years, the six sites duplicated during the same survey, and the five analytical duplicates

sites duplicated in different years	sites duplicated during an individual survey
005 - 253	1979
007 - 240	
011 - 205	229 - 230
012 - 204	264 - 265
013 - 212	269 - 270
035 - 206	
036 - 244	1981
038 - 219	
038 - 208	423 - 427
039 - 203	434 - 435
042 - 262	439 - 440
048 - 263	
053 - 221	
065 - 226	analytical duplicates
067 - 279	
072 - 446	402 - 402andu
084 - 413	409 - 409andu
086 - 408	421 - 421andu
108 - 432	429 - 429andu
109 - 430	435 - 435andu
201 - 441	
202 - 442	
232 - 434	
272 - 415	
273 - 428	

Table 3.--Summary of the analytical results from water samples in the Mount Belknap caldera and Deer Trail Mountain-Alunite Ridge study area, Utah

[Ca, Mg, Na, K, SiO_2 AlK, So_4, Cl, and F are reported as milligrams per liter; Li, Zn, Cu, Mo, As, and U are reported as micrograms per liter.]

constituent*	minimum	maximum	geometric mean	geometric deviation	valid**	L	N
Ca (1mg/L)	1.3	450	21.2	2.91	216	0	0
Mg (1mg/L)	<1.0	520	3.62	3.41	199	17	0
Na (1mg/L)	<1.0	80	5.90	2.54	214	2	0
K (1mg/L)	<1.0	5.3	0.904	2.01	191	115	0
Li (4µg/L)	<4.0	376	3.78	3.16	107	109	0
SiO_2 (1mg/L)	2.0	115	16.9	1.99	216	0	0
Alk (1mg/L)	<1.0	468	51.7	4.07	207	9	0
SO_4 (0.1mg/L)	0.5	8200	12.2	4.56	216	0	0
Cl (0.01mg/L)	0.03	205	3.81	4.59	216	0	0
F (0.01mg/L)	<0.01	48	0.284	3.22	214	2	0
Zn (1µg/L	<1.0	3750	4.29	4.75	205	11	0
Cu (1µg/L)	<1.0	950	1.07	3.11	124	92	0
Mo (1µg/L)	<1.0	47.5	0.315	5.79	58	156	2
As (1µg/L)	<1.0	190	1.45	2.50	147	67	2
U (0.2µg/L)	<0.2	490	0.467	5.03	162	54	0

* the concentration is the analytical detection limit.

** number of samples with constituent concentrations greater than the detection limit; L is the number of samples with constituent concentrations below the detection limit; N is the number of samples with no determintions for the constituent.

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Appendix 1.--Cross reference for original site numbers and site numbers used in this and other studies pertaining to the Mount Belknap caldera area and the Deer Trail Mountain-Alunite Ridge study area, Utah.

1978 study (McHugh and others, 1981)

1104 - 001*	1481 - 031	1599 - 061	2354 - 091
1106 - 002	1482 - 032	1736 - 062	2355 - 092
1116 - 003	1507 - 033	1744 - 063	2356 - 093
1117 - 004	1520 - 034	1748 - 064	2375 - 094
1413 - 005	1523 - 035	1755 - 065	2377 - 095
1416 - 006	1530 - 036	1758 - 066	2378 - 096
1417 - 007	1534 - 037	1759 - 067	2383 - 097
1429 - 008	1538 - 038	2144 - 068	2384 - 098
1421 - 009	1542 - 039	2145 - 069	2386 - 099
1423 - 010	1546 - 040	2146 - 070	2387 - 100
1424 - 011	1550 - 041	2301 - 071	2389 - 101
1425 - 012	1557 - 042	2302 - 072	2390 - 102
1427 - 013	1560 - 043	2304 - 073	2391 - 103
1431 - 014	1562 - 044	2305 - 074	2392 - 104
1432 - 015	1571 - 045	2306 - 075	2393 - 105
1433 - 016	1574 - 046	2307 - 076	2424 - 106
1434 - 017	1576 - 047	2308 - 077	2435 - 107
1437 = 018	1577 - 048	2310 - 078	2436 - 108
1438 - 019	1578 - 049	2311 - 079	2437 - 109
1440 - 020	1579 - 050	2312 - 080	2438 - 110
1442 - 021	1580 - 051	2313 - 081	2439 - 111
1443 - 022	1581 - 052	2327 - 082	2444 - 112
1450 - 023	1582 - 053	2328 - 083	2833 - 113
1452 - 024	1583 - 054	2331 - 084	2834 - 114
1469 - 025	1584 - 055	2332 - 085	2835 - 115
1470 - 026	1585 - 056	2335 - 086	2838 - 116
1471 - 027	1589 - 057	2338 - 087	2850 - 117
1472 - 028	1590 - 058	2341 - 099	
1475 - 029	1591 - 059	2344 - 089	
1477 - 030	1597 - 060	2347 - 090	

Appendix 1.--Continued

1979 study (McHugh and others, 1980)

7902 - 201	7937 - 229	7977 - 257	8061 - 285
7903 - 202	7938 - 230	7979 - 258	8062 - 286
7904 - 203	7939 - 231	7981 - 259	
7905 - 204	7940 - 232	7982 - 260	
7906 - 205	7943 - 233	7983 - 261	
7907 - 206	7944 - 234	7984 - 262	
7908 - 207	7945 - 235	7985 - 263	
7909 - 208	7947 - 236	7987 - 264	
7910 - 209	7950 - 237	7988 - 265	
7911 - 210	7952 - 238	7989 - 266	
7912 - 211	7953 - 239	7991 - 267	
7913 - 212	7954 - 240	7992 - 268	
7914 - 213	7955 - 241	7993 - 269	
7915 - 214	7956 - 242	7994 - 270	
7916 - 215	7957 - 243	7995 - 271	
7917 - 216	7958 - 244	7997 - 272	
7920 - 217	7960 - 245	7998 - 273	
7921 - 218	7962 - 246	7999 - 274	
7923 - 219	7964 - 247	8003 - 275	
7924 - 220	7965 - 248	8004 - 276	
7925 - 221	7966 - 249	8005 - 277	
7928 - 222	7967 - 250	8008 - 278	
7929 - 223	7968 - 251	8010 - 279	
7930 - 224	7969 - 252	8052 - 280	
7931 - 225	7970 - 253	8053 - 281	
7934 - 226	7971 - 254	8055 - 282	
7935 - 227	7972 - 255	8056 - 283	
7936 - 228	7974 - 256	8060 - 284	

Appendix 1.--Continued

1981 study Tucker and others, 1983)

M01 - 401	M24 - 424
M02 - 402	M25 - 425
M03 - 403	M26 - 426
M04 - 404	M27 - 427
M05 - 405	M28 - 428
M06 - 406	M29 0 429
M07 - 407	M30 - 430
M08 - 408	M31 - 431
M09 - 409	M32 - 432
M10 - 410	M33 - 433
M11 - 411	M34 - 434
M12 - 412	M35 - 435
M13 - 413	M36 - 436
M14 - 414	M37 - 437
M15 - 415	M38 - 438
M16 - 416	M39 - 439
M17 - 417	M40 - 440
M18 - 418	M41 - 441
M19 - 419	M43 - 442
M20 - 420	M44 - 443
M21 - 421	M45 - 444
M22 - 422	M46 - 445
M23 - 432	M47 - 446

*original site number - new site number

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.

Sample	latitude	longitude	Ca(mg/L)	Mg(mg/L)	Na(mg/L)	K(mg/L)	Li(ug/L)	SiO2(mg/L)	alk(mg/L)	SO4(mg/L)
*001SPR	38 17 40	112 36 43	43.0	8.0	18.0	2.0	9	26.0	161.0	46.0
002SPR	38 29 29	112 36 47	50.0	10.0	18.0	5.0	21	48.0	167.0	40.0
003SPR	38 24 17	112 14 46	41.0	13.0	3.0	<1.0	5	6.0	170.0	42.0
004SPR	38 30 10	112 15 28	20.0	5.0	5.0	<1.0	4	16.0	61.0	14.0
005SPR	38 21 47	112 31 17	58.0	7.0	8.0	2.0	10	14.0	178.0	25.0
253SPR	38 21 46	112 31 19	65.0	9.0	8.5	1.7	10	17.0	154.0	35.0
006STR	38 22 51	112 31 43	23.0	4.0	8.0	1.0	4	40.0	61.0	230.0
007STR	38 22 50	112 31 47	68.0	26.0	18.0	2.0	12	28.0	230.0	100.0
240STR	38 22 58	112 32 3	64.0	23.0	16.0	2.1	10	27.0	201.0	59.0
008STR	38 22 34	112 33 48	125.0	57.0	48.0	1.0	12	22.0	256.0	220.0
009SPR	38 22 33	112 33 44	145.0	68.0	65.0	2.0	15	26.0	468.0	370.0
010SPR	38 24 6	112 32 52	60.0	12.0	20.0	3.0	6	28.0	114.0	43.0
011STR	38 25 46	112 32 31	53.0	13.0	13.0	3.0	7	14.0	105.0	78.0
205SPR	38 25 46	112 32 31	53.0	17.0	13.0	3.2	8	13.0	94.0	82.0
012STR	38 25 26	112 31 24	15.0	2.0	5.0	1.0	4	28.0	38.0	8.9
204STR	38 25 25	112 31 24	11.0	2.4	6.2	1.3	<4	29.0	35.0	4.8
013STR	38 27 9	112 30 43	8.0	1.0	5.0	<1.0	<4	24.0	27.0	3.9
212STR	38 27 9	112 30 42	6.8	1.4	4.3	1.1	<4	25.0	22.0	3.0
014STR	38 27 5	112 34 16	73.0	16.0	23.0	2.0	<4	20.0	286.0	35.0
015SPR	38 28 13	112 35 29	95.0	19.0	20.0	<1.0	10	48.0	402.0	12.0
016STR	38 28 16	112 34 26	73.0	14.0	28.0	1.0	5	42.0	290.0	15.0
017SPR	38 28 47	112 33 2	50.0	9.0	13.0	<1.0	5	36.0	216.0	3.3
018STR	38 30 2	112 33 1	63.0	15.0	25.0	<1.0	12	46.0	280.0	8.3
019SPR	38 31 43	112 33 50	113.0	24.0	48.0	<1.0	27	42.0	366.0	31.0
020SPR	38 31 33	112 36 0	108.0	34.0	55.0	2.0	36	64.0	385.0	56.0
021SPR	38 33 38	112 33 13	65.0	13.0	65.0	3.0	22	68.0	295.0	6.2
022SPR	38 33 55	112 32 52	53.0	12.0	20.0	1.0	19	34.0	174.0	14.0
023STR	38 19 18	112 21 41	25.0	4.0	3.0	<1.0	<4	14.0	83.0	3.1
024STR	38 19 20	112 21 6	25.0	3.0	3.0	<1.0	<4	12.0	74.0	5.0
025STR	38 17 32	112 26 55	10.0	2.0	3.0	2.0	<4	34.0	47.0	3.3
026STR	38 18 1	112 26 57	6.0	1.0	3.0	1.0	<4	30.0	21.0	3.1
027STR	38 18 7	112 28 5	7.0	1.0	3.0	1.0	<4	34.0	24.0	3.3
028SPR	38 18 19	112 29 2	6.0	1.0	3.0	2.0	<4	40.0	27.0	3.3
029SPR	38 17 15	112 25 13	40.0	5.0	3.0	2.0	<4	48.0	130.0	1.9
030STR	38 18 9	112 23 8	10.0	1.0	3.0	1.0	<4	30.0	35.0	3.0
031SPR	38 17 35	112 23 59	14.0	2.0	3.0	2.0	<4	40.0	61.0	1.9
032STR	38 19 42	112 26 1	6.0	<1.0	3.0	<1.0	<4	28.0	21.0	1.8
033SPR	38 19 32	112 31 54	28.0	8.0	23.0	<1.0	<4	24.0	159.0	7.2
034STR	38 21 36	112 31 43	93.0	11.0	20.0	5.0	30	26.0	295.0	54.0
035STR	38 22 54	112 29 37	10.0	1.0	3.0	<1.0	<4	14.0	39.0	4.2
206STR	38 22 52	112 29 47	10.0	1.9	4.1	<1.0	<4	17.0	36.0	4.2
036SPR	38 23 33	112 30 26	4.0	<1.0	3.0	<1.0	<4	20.0	3.0	7.5
244SPR	38 23 38	112 30 19	3.4	<1.0	4.4	1.0	<4	25.0	<1.0	9.6
037STR	38 23 59	112 29 3	4.0	<1.0	4.0	<1.0	<4	22.0	14.0	7.5
038SPR	38 25 24	112 29 12	8.0	1.0	5.0	<1.0	5	24.0	33.0	2.5

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	Cl(mg/L)	F(mg/L)	Zn(ug/L)	Cu(ug/L)	Mo(ug/L)	As(ug/L)	U(mg/L)	Cond	pH	Temp(C)
001SPR	26.00	.90	7.1	6.0	2.0	<1.0	13.40	430	7.69	14.0
002SPR	53.00	.36	514.0	3.7	1.1	3.5	3.90	545	7.75	20.0
003SPR	.60	.34	224.0	2.5	<1.0	1.1	.40	355	8.05	14.0
004SPR	7.70	.64	2,105.0	8.1	1.0	<1.0	.20	178	7.52	14.0
005SPR	6.40	.46	4.5	<1.0	1.0	<1.0	12.40	360	7.00	7.0
253SPR	7.70	.52	5.0	3.4	1.0	4.8	20.00	430	6.95	8.0
006STR	16.00	.16	1.9	<1.0	<1.0	<1.0	1.00	174	8.05	12.0
007STR	18.00	.33	2.3	<1.0	<1.0	<1.0	3.10	580	8.20	14.0
240STR	17.00	.29	5.0	2.5	<1.0	3.9	3.40	580	7.80	10.0
008STR	84.00	.24	1.5	1.3	<1.0	1.0	4.90	1,050	8.20	14.0
009SPR	94.00	.34	3.5	1.7	10.2	4.7	3.80	1,380	7.60	17.5
010SPR	100.00	.50	7.0	<1.0	<1.0	<1.0	.40	530	6.90	8.5
011STR	13.00	4.10	12.0	1.7	<1.0	<1.0	100.00	430	8.00	14.0
205SPR	21.00	4.20	20.0	3.9	<1.0	3.3	200.00	490	7.85	13.0
012STR	12.00	.09	2.3	<1.0	<1.0	<1.0	.20	105	7.65	11.5
204STR	7.20	.10	4.0	1.1	<1.0	2.3	<.20	116	7.95	8.0
013STR	4.80	.19	2.2	<1.0	<1.0	<1.0	<.20	68	7.80	10.5
212STR	3.90	.13	5.0	<1.0	<1.0	1.7	<.20	74	7.95	7.0
014STR	13.00	.22	3.0	1.0	<1.0	<1.0	1.10	525	8.35	17.5
015SPR	38.00	.10	320.0	2.6	<1.0	1.1	3.20	650	7.05	19.0
016STR	49.00	.14	1.8	5.2	<1.0	1.6	2.40	555	8.40	16.0
017SPR	5.90	.10	5.7	1.0	<1.0	1.0	.30	340	7.30	10.0
018STR	35.00	.27	2.0	1.7	<1.0	2.8	4.50	505	8.40	19.5
019SPR	92.00	.28	5.8	<1.0	<1.0	4.9	4.10	850	7.40	12.5
020SPR	180.00	<.01	3.7	1.0	1.3	4.6	6.10	939	7.75	17.5
021SPR	43.00	.23	3.2	1.6	<1.0	5.7	1.00	680	7.85	17.5
022SPR	67.00	.18	2.5	<1.0	<1.0	<1.0	1.90	425	7.35	16.0
023STR	.80	.04	2.3	1.3	<1.0	<1.0	<.20	144	7.95	6.5
024STR	18.00	.06	1.9	<1.0	<1.0	<1.0	<.20	127	7.90	6.5
025STR	2.10	.06	3.9	<1.0	<1.0	1.5	1.30	87	7.65	9.5
026STR	1.10	.05	2.7	1.3	<1.0	<1.0	<.20	49	7.60	9.0
027STR	1.90	.05	2.9	<1.0	<1.0	<1.0	<.20	59	7.50	12.5
028SPR	1.10	.06	3.9	1.2	<1.0	<1.0	.20	58	6.35	4.0
029SPR	1.90	.09	6.5	<1.0	<1.0	1.3	.30	220	7.30	15.0
030STR	.81	.05	1.8	<1.0	<1.0	<1.0	<.20	79	7.65	8.5
031SPR	.90	.07	2.2	<1.0	<1.0	<1.0	.20	101	7.10	3.5
032STR	1.10	.20	1.8	1.6	<1.0	<1.0	<.20	45	7.45	15.0
033SPR	18.00	.26	2.6	<1.0	1.0	3.7	2.90	274	7.95	16.0
034STR	13.00	.76	2.5	4.7	6.8	6.1	14.00	565	8.20	13.0
035STR	2.30	.38	2.3	<1.0	1.0	<1.0	1.00	79	8.23	11.0
206STR	2.10	.40	8.0	2.5	<1.0	2.0	3.70	92	7.55	7.0
036SPR	1.00	1.50	17.0	<1.0	<1.0	<1.0	.80	43	5.85	10.0
244SPR	1.80	1.50	22.0	<1.0	<1.0	2.0	.60	56	6.05	8.0
037STR	1.60	1.10	14.0	<1.0	<1.0	<1.0	.50	43	6.45	12.5
038SPR	2.20	.34	3.4	<1.0	<1.0	<1.0	.60	74	6.30	7.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	latitude	longitude	Ca(mg/L)	Mg(mg/L)	Na(mg/L)	K(mg/L)	Li(ug/L)	SiO2(mg/L)	alk(mg/L)	SO4(mg/L)
219SPR	38 25 28	112 29 6	7.5	1.2	5.3	1.0	<4	23.0	31.0	3.6
039SPR	38 25 7	112 29 40	8.0	1.0	6.0	<1.0	7	20.0	27.0	5.8
208SPR	38 25 7	112 29 40	7.9	1.1	6.0	<1.0	7	21.0	25.0	4.8
040SPR	38 25 43	112 28 39	9.0	1.0	8.0	<1.0	10	18.0	34.0	6.3
041STR	38 25 48	112 28 17	7.0	1.0	3.0	<1.0	<4	24.0	27.0	1.7
042STR	38 25 42	112 30 55	6.0	1.0	3.0	<1.0	<4	14.0	23.0	1.7
203STR	38 25 44	112 30 24	5.5	1.1	3.9	<1.0	<4	15.0	17.0	3.0
043SPR	38 26 42	112 31 8	8.0	1.0	3.0	1.0	<4	22.0	28.0	2.5
044STR	38 25 38	112 32 34	13.0	4.0	8.0	2.0	5	30.0	55.0	7.1
045STR	38 27 27	112 32 22	25.0	4.0	5.0	1.0	4	24.0	100.0	4.6
046SPR	38 27 55	112 34 46	95.0	21.0	18.0	1.0	12	48.0	418.0	6.2
047STR	38 21 23	112 22 54	13.0	2.0	3.0	<1.0	<4	6.0	42.0	1.7
048SPR	38 22 31	112 23 46	10.0	2.0	5.0	<1.0	<4	14.0	54.0	1.8
262SPR	38 22 33	112 23 47	7.2	2.5	8.5	<1.0	<4	13.0	53.0	1.5
049SPR	38 22 54	112 24 3	6.3	2.8	3.0	<1.0	<4	8.0	45.0	1.3
263SPR	38 22 50	112 24 5	9.2	3.1	2.2	<1.0	<4	4.2	45.0	.5
050SPR	38 23 52	112 23 39	33.0	3.0	3.0	<1.0	5	10.0	34.0	54.0
051STR	38 23 26	112 23 2	6.5	<1.0	3.0	<1.0	<4	4.0	31.0	3.1
052SPR	38 25 16	112 24 8	5.0	<1.0	1.0	<1.0	<4	4.0	2.4	8.1
053STR	38 25 28	112 23 56	2.0	<1.0	3.0	<1.0	<4	8.0	1.2	11.0
221STR	38 25 28	112 23 53	2.9	<1.0	1.7	<1.0	<4	8.4	<1.0	7.2
054STR	38 25 6	112 23 14	10.0	1.0	3.0	<1.0	<4	8.0	14.0	11.0
055STR	38 24 54	112 23 22	2.0	<1.0	2.0	<1.0	<4	10.0	1.0	8.3
056STR	38 24 52	112 23 20	18.0	1.0	2.0	<1.0	<4	4.0	30.0	22.0
057SPR	38 26 34	112 22 35	29.0	1.0	3.0	<1.0	5	4.0	84.0	5.0
058STR	38 26 2	112 22 25	33.0	2.0	3.0	<1.0	<4	4.0	68.0	26.0
059STR	38 25 46	112 22 42	15.0	1.0	3.0	<1.0	<4	2.0	43.0	6.4
060SPR	38 28 0	112 21 51	13.0	1.0	3.0	<1.0	<4	12.0	43.0	9.4
061SPR	38 29 13	112 19 56	28.0	4.0	15.0	1.0	8	24.0	101.0	13.0
062SPR	38 32 39	112 24 30	90.0	9.0	33.0	5.0	24	64.0	202.0	28.0
063SPR	38 31 20	112 19 8	58.0	8.0	18.0	3.0	17	30.0	168.0	7.7
064SPR	38 18 53	112 14 8	78.0	30.0	30.0	1.0	32	24.0	331.0	71.0
065STR	38 29 30	112 27 16	20.0	3.0	10.0	<1.0	8	32.0	75.0	3.8
226STR	38 29 31	112 27 16	12.0	1.9	11.0	<1.0	6	29.0	29.0	4.6
066STR	38 28 0	112 27 7	8.0	1.0	5.0	1.0	5	22.0	22.0	8.6
067SPR	38 29 34	112 25 57	63.0	11.0	10.0	2.0	7	14.0	179.0	48.0
279SPR	38 29 32	112 26 13	72.0	12.0	23.0	1.3	4	17.0	201.0	41.0
068STR	38 32 21	112 28 57	27.0	6.0	13.0	2.0	7	32.0	101.0	7.3
069STR	38 30 50	112 27 32	8.0	2.0	5.0	<1.0	<4	28.0	30.0	2.3
070STR	38 30 59	112 21 36	7.0	2.0	3.0	<1.0	<4	28.0	30.0	2.9
071STR	38 28 41	112 20 36	7.3	2.1	5.0	1.0	5	26.0	33.0	5.4
072STR	38 28 30	112 20 49	6.0	1.7	8.0	<1.0	6	30.0	40.0	5.5
446STR	38 28 30	112 20 49	13.0	2.0	6.0	<1.0	<4	26.0	37.0	6.4
073SPR	38 28 28	112 20 52	100.0	12.0	13.0	1.0	18	16.0	257.0	104.0
074STR	38 27 50	112 22 28	10.0	2.0	5.0	<1.0	<4	12.0	41.0	4.9

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	Cl(mg/L)	F(mg/L)	Zn(ug/L)	Cu(ug/L)	Mo(ug/L)	As(ug/L)	U(mg/L)	Cond	pH	Temp(C)
219SPR	3.30	.41	5.0	<1.0	<1.0	1.7	.20	80	7.15	4.5
039SPR	2.70	.48	3.0	<1.0	<1.0	<1.0	.70	78	6.40	14.0
208SPR	3.60	.52	5.0	<1.0	<1.0	1.8	.70	84	7.55	7.0
040SPR	2.50	.83	4.4	<1.0	1.1	<1.0	.60	91	6.95	15.0
041STR	1.90	.52	3.8	<1.0	<1.0	<1.0	<.20	62	6.60	6.5
042STR	2.20	.14	3.2	1.2	1.1	<1.0	<.20	52	7.45	17.0
203STR	3.60	.21	6.0	<1.0	<1.0	1.1	1.90	60	7.80	13.0
043SPR	3.20	.19	3.3	1.2	<1.0	<1.0	.50	70	7.00	6.0
044STR	12.00	.12	3.3	1.8	1.0	<1.0	.40	173	7.85	15.0
045STR	5.00	.10	1.8	1.8	<1.0	1.1	.50	195	8.20	13.0
046SPR	39.00	.10	400.0	3.3	<1.0	1.4	2.80	720	6.90	19.0
047STR	.46	.09	2.4	<1.0	<1.0	<1.0	<.20	815	7.60	17.5
048SPR	.21	.09	2.6	<1.0	<1.0	<1.0	.30	98	7.70	2.5
262SPR	.83	.13	2.0	<1.0	<1.0	2.6	.40	97	7.85	3.0
049SPR	.03	.32	2.6	1.0	<1.0	<1.0	.20	96	7.85	1.0
263SPR	.15	.06	3.0	<1.0	<1.0	1.6	.20	84	7.75	11.0
050SPR	1.20	.49	4.0	<1.0	<1.0	<1.0	.30	225	7.40	3.0
051STR	.32	.03	2.2	<1.0	<1.0	1.0	.20	73	7.60	8.0
052SPR	1.20	.51	3.5	<1.0	N	N	1.10	31	6.75	1.0
053STR	1.30	.66	11.0	1.3	<1.0	<1.0	.60	37	6.40	9.5
221STR	.51	.51	10.0	<1.0	<1.0	1.4	.30	32	7.70	6.0
054STR	3.30	.77	4.3	1.3	<1.0	<1.0	.20	70	6.95	8.0
055STR	.31	.86	60.0	3.3	<1.0	<1.0	.40	40	6.30	9.0
056STR	.53	.17	1.9	<1.0	N	N	<.20	104	7.60	8.5
057SPR	1.20	.17	20.0	2.0	1.4	1.5	4.70	177	7.80	6.0
058STR	1.60	.23	1.8	1.3	<1.0	<1.0	.30	215	8.00	9.5
059STR	1.50	.19	2.7	1.8	<1.0	<1.0	.20	97	8.00	5.0
060SPR	4.60	.67	2.7	1.7	<1.0	<1.0	.20	95	6.85	5.5
061SPR	36.00	.51	3.0	1.9	<1.0	1.0	2.60	265	7.30	9.5
062SPR	130.00	.32	3.6	2.4	1.5	4.1	9.20	730	7.15	13.0
063SPR	35.00	.24	50.0	1.0	1.2	2.5	1.70	445	8.00	10.0
064SPR	89.00	.17	1.8	1.0	<1.0	4.6	6.10	760	7.85	16.0
065STR	8.90	.62	3.1	<1.0	1.0	1.3	1.60	145	7.70	10.0
226STR	11.00	.82	4.0	1.5	<1.0	2.0	1.60	150	7.95	14.0
066STR	3.10	.47	7.0	1.6	<1.0	1.2	<.20	84	7.40	11.0
067SPR	12.00	.19	2.0	1.0	1.5	1.3	3.40	450	8.10	12.0
279SPR	39.00	.16	5.0	2.5	1.0	4.8	2.00	560	7.20	7.5
068STR	37.00	.21	1.1	1.4	<1.0	2.6	.50	255	8.30	21.0
069STR	5.30	.55	1.5	<1.0	<1.0	1.5	<.20	88	7.80	12.0
070STR	4.60	.15	1.4	<1.0	<1.0	1.7	<.20	68	8.00	10.5
071STR	7.00	.21	1.4	1.0	<1.0	1.2	<.20	105	7.65	13.5
072STR	4.60	.18	1.4	<1.0	<1.0	1.5	.60	102	7.75	11.0
446STR	5.00	.91	2.0	<1.0	<1.0	1.5	.50	99	7.56	10.5
073SPR	13.00	1.70	2.8	<1.0	3.4	<1.0	2.20	640	7.10	8.5
074STR	2.60	.60	1.7	1.1	1.7	<1.0	.80	93	7.85	10.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	latitude	longitude	Ca(mg/L)	Mg(mg/L)	Na(mg/L)	K(mg/L)	Li(ug/L)	SiO2(mg/L)	alk(mg/L)	SO4(mg/L)
075STR	38 27 39	112 22 29	8.0	2.0	3.0	<1.0	<4	12.0	29.0	2.7
076STR	38 27 37	112 22 19	7.0	2.0	3.0	<1.0	<4	12.0	31.0	2.1
077SPR	38 26 35	112 15 15	35.0	5.0	33.0	<1.0	14	28.0	127.0	84.0
078SPR	38 25 27	112 17 57	150.0	14.0	13.0	1.0	22	20.0	355.0	200.0
079STR	38 26 23	112 18 44	58.0	6.0	5.0	1.0	5	10.0	208.0	18.0
080SPR	38 26 19	112 18 42	85.0	9.0	8.0	2.0	20	14.0	167.0	140.0
081STR	38 24 58	112 18 37	73.0	9.0	5.0	2.0	13	8.0	89.0	150.0
082STR	38 23 40	112 19 12	22.0	3.0	3.0	<1.0	<4	6.0	37.0	33.0
083SPR	38 23 32	112 20 44	63.0	8.0	5.0	<1.0	15	8.0	98.0	120.0
084SPR	38 21 42	112 17 40	23.0	7.0	3.0	1.0	15	10.0	50.0	36.0
413SPR	38 21 41	112 17 30	23.0	7.6	2.8	1.3	12	11.0	44.0	59.0
085STR	38 21 51	112 19 37	50.0	8.0	3.0	1.0	5	10.0	108.0	64.0
086SPR	38 22 3	112 15 9	85.0	19.0	5.0	2.0	12	12.0	143.0	190.0
408SPR	38 22 4	112 15 9	70.0	18.0	5.4	1.9	10	8.5	139.0	115.0
087SPR	38 16 12	112 18 39	35.0	8.0	8.0	<1.0	<4	32.0	142.0	3.2
088SPR	38 18 59	112 17 21	50.0	20.0	5.0	<1.0	<4	36.0	246.0	5.3
089SPR	38 17 14	112 21 26	7.0	1.0	3.0	1.0	<4	22.0	27.0	2.2
090STR	38 20 26	112 31 19	68.0	23.0	10.0	2.0	9	46.0	284.0	17.0
091STR	38 21 17	112 27 58	88.0	26.0	10.0	2.0	14	16.0	235.0	140.0
092STR	38 21 4	112 27 6	28.0	6.0	5.0	<1.0	<4	22.0	92.0	10.0
093STR	38 21 3	112 27 7	48.0	9.0	8.0	<1.0	<4	12.0	174.0	10.0
094STR	38 29 20	112 32 7	53.0	9.0	8.0	<1.0	7	36.0	203.0	3.8
095STR	38 28 2	112 31 43	20.0	4.0	6.0	<1.0	5	24.0	77.0	2.2
096STR	38 27 59	112 31 43	9.0	2.0	3.0	<1.0	<4	20.0	33.0	2.6
097STR	38 28 45	112 28 15	9.0	1.0	8.0	1.0	5	30.0	36.0	1.9
098STR	38 28 40	112 28 21	8.0	1.0	3.0	2.0	4	32.0	27.0	1.9
099STR	38 27 58	112 28 11	6.0	<1.0	3.0	<1.0	<4	18.0	23.0	2.5
100STR	38 28 2	112 25 18	13.0	2.0	3.0	<1.0	4	10.0	54.0	3.5
101STR	38 23 27	112 25 29	7.0	<1.0	<1.0	<1.0	<4	12.0	24.0	1.4
102STR	38 22 54	112 26 39	7.0	1.0	3.0	<1.0	<4	16.0	11.0	12.0
103STR	38 24 28	112 24 51	4.0	<1.0	3.0	<1.0	<4	18.0	3.6	12.0
104STR	38 26 29	112 26 36	5.0	<1.0	3.0	<1.0	<4	16.0	12.0	1.7
105STR	38 27 5	112 22 40	9.0	<1.0	2.0	<1.0	<4	10.0	25.0	2.0
106STR	38 32 22	112 20 22	13.0	8.0	63.0	3.0	20	40.0	126.0	8.9
107STR	38 27 1	112 27 20	5.0	4.0	3.0	<1.0	<4	24.0	24.0	5.0
108STR	38 24 27	112 21 6	40.0	3.0	3.0	<1.0	<4	8.0	109.0	32.0
432STR	38 24 27	112 21 8	34.0	2.5	2.3	<1.0	<4	6.1	91.0	22.0
109STR	38 23 41	112 22 1	18.0	1.0	2.0	<1.0	<4	6.0	49.0	13.0
430STR	38 23 42	112 22 2	16.0	<1.0	1.7	<1.0	<4	5.0	57.0	6.9
110STR	38 21 41	112 21 6	17.0	1.0	2.0	<1.0	<4	6.0	42.0	17.0
111STR	38 19 28	112 19 32	28.0	9.0	3.0	<1.0	<4	16.0	106.0	6.2
112STR	38 17 58	112 20 19	18.0	5.0	3.0	<1.0	<4	24.0	87.0	2.3
113STR	38 28 37	112 24 6	1.3	1.0	5.0	<1.0	<4	14.0	15.0	1.6
114STR	38 28 34	112 24 9	4.5	2.0	3.0	<1.0	<4	8.0	29.0	5.8
115SPR	38 28 29	112 24 10	4.3	15.0	20.0	1.0	<4	8.0	25.0	1.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	Cl(mg/L)	F(mg/L)	Zn(ug/L)	Cu(ug/L)	Mo(ug/L)	As(ug/L)	U(mg/L)	Cond	pH	Temp(C)
075STR	2.00	.44	1.6	1.1	<1.0	<1.0	<.20	67	7.85	7.0
076STR	1.80	.33	2.0	<1.0	<1.0	<1.0	<.20	68	7.25	6.0
077SPR	6.30	.74	3.4	1.0	5.6	11.3	1.10	400	7.55	14.5
078SPR	8.90	1.40	11.0	1.3	29.0	2.1	1.70	850	7.25	11.0
079STR	6.50	.26	2.8	1.0	<1.0	2.0	1.50	350	8.15	10.0
080SPR	4.00	1.80	8.2	<1.0	47.5	1.8	.60	540	7.70	22.0
081STR	1.90	.80	4.0	1.3	8.3	1.6	.20	433	7.95	11.0
082STR	1.20	.10	4.0	1.4	<1.0	1.0	<.20	158	7.50	7.0
083SPR	2.00	.50	3.0	1.5	1.1	1.3	.60	395	7.40	3.5
084SPR	2.50	.38	60.0	1.3	<1.0	1.4	<.20	182	7.30	7.5
413SPR	3.70	.45	40.0	<1.0	<1.0	<1.0	<.20	210	6.79	7.0
085STR	2.60	.14	4.0	3.6	<1.0	1.2	.30	310	7.70	10.5
086SPR	10.00	.77	1.8	6.9	16.0	1.5	.90	545	7.50	14.5
408SPR	7.90	.54	4.0	<1.0	13.0	2.1	.82	510	6.80	14.9
087SPR	2.10	.20	24.0	1.4	<1.0	3.5	1.70	240	7.67	10.0
088SPR	6.40	.13	1.5	1.4	<1.0	1.7	.60	390	8.22	8.0
089SPR	.32	.04	3.1	<1.0	<1.0	1.5	<.20	59	7.11	4.5
090STR	17.00	.22	<.5	2.7	2.1	2.6	4.70	520	8.30	10.5
091STR	4.80	.76	.5	4.5	7.7	2.5	29.20	62	8.10	15.5
092STR	1.80	.13	<.5	1.0	<1.0	1.1	.40	180	8.20	12.0
093STR	2.20	.13	<.5	2.3	<1.0	1.6	1.30	310	8.20	12.5
094STR	5.00	.13	<.5	<1.0	<1.0	1.6	3.90	335	8.20	4.0
095STR	2.50	.13	<.5	1.5	<1.0	1.2	.40	160	7.75	7.0
096STR	2.70	.03	<.5	<1.0	<1.0	1.1	<.20	93	7.80	6.0
097STR	3.50	.26	20.0	<1.0	<1.0	1.2	.30	86	7.80	10.0
098STR	2.90	.22	.5	<1.0	<1.0	1.2	.20	80	7.80	10.0
099STR	1.30	.17	<.5	<1.0	<1.0	1.1	<.20	59	7.80	14.0
100STR	2.60	.18	<.5	<1.0	<1.0	1.0	.50	108	7.90	14.0
101STR	.15	.04	<.5	<1.0	<1.0	<1.0	.50	49	8.05	13.0
102STR	.90	.47	1.6	<1.0	<1.0	1.0	<.20	70	7.65	17.0
103STR	1.40	.39	3.9	<1.0	<1.0	1.0	.40	39	8.15	14.0
104STR	.80	1.80	.6	<1.0	1.3	<1.0	1.00	45	7.80	14.0
105STR	.50	.26	<.5	<1.0	<1.0	1.0	.30	63	7.90	13.0
106STR	51.00	1.00	2.5	<1.0	<1.0	3.7	2.70	340	7.93	12.5
107STR	3.00	.65	3.0	<1.0	<1.0	<1.0	.30	67	7.05	7.0
108STR	1.70	.23	1.0	3.5	1.3	1.3	<.20	245	8.45	13.0
432STR	1.10	.16	2.0	<1.0	1.1	<1.0	.24	207	8.17	11.8
109STR	.34	<.01	.7	<1.0	<1.0	<1.0	<.20	115	8.25	5.5
430STR	1.90	.04	1.0	<1.0	<1.0	1.5	.31	97	7.66	8.5
110STR	.07	.16	1.2	<1.0	<1.0	2.1	.20	109	8.20	5.5
111STR	.42	.10	1.5	2.6	1.0	<1.0	<.20	190	8.20	5.0
112STR	1.00	.07	.6	1.1	<1.0	<1.0	<.20	146	8.10	6.5
113STR	1.90	.44	2.5	1.4	<1.0	1.1	.20	40	7.30	4.0
114STR	7.30	.21	2.5	3.6	<1.0	<1.0	.70	66	8.00	7.0
115SPR	1.50	.17	<.5	2.5	27.0	<1.0	.80	60	7.40	1.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	latitude	longitude	Ca(mg/L)	Mg(mg/L)	Na(mg/L)	K(mg/L)	Li(ug/L)	SiO2(mg/L)	alk(mg/L)	SO4(mg/L)
116STR	38 29 0	112 25 44	43.0	12.0	8.0	2.0	8	12.0	160.0	50.0
117SPR	38 25 16	112 13 4	48.0	12.0	80.0	1.0	11	18.0	224.0	160.0
201SPR	38 26 22	112 32 21	53.0	15.0	9.4	2.4	<4	15.0	79.0	54.0
441STR	38 26 22	112 32 21	78.0	22.0	14.0	4.8	<4	14.0	210.0	115.0
202MINE	38 25 48	112 32 17	90.0	29.0	18.0	2.9	70	34.0	<1.0	364.0
442MINE	38 25 48	112 32 17	77.0	34.0	19.0	3.5	64	30.0	<1.0	320.0
207STR	38 24 48	112 30 23	9.0	1.6	5.4	1.1	7	19.0	30.0	3.6
209STR	38 25 34	112 29 30	7.5	1.4	5.5	1.1	<4	13.0	26.0	3.0
210STR	38 27 13	112 30 17	6.2	1.3	3.7	1.0	<4	19.0	21.0	3.0
211SPR	38 27 11	112 30 29	10.0	2.1	6.7	1.0	4	23.0	36.0	4.2
213STR	38 26 14	112 31 33	70.0	4.5	41.0	5.2	63	10.0	56.0	179.0
214STR	38 26 33	112 31 20	21.0	8.2	10.0	1.3	10	27.0	135.0	5.4
215SPR	38 26 42	112 31 8	6.7	1.4	5.0	1.0	<4	23.0	20.0	3.6
216STR	38 26 21	112 31 18	10.0	2.1	10.0	<1.0	14	29.0	43.0	7.8
217STR	38 27 2	112 33 4	85.0	20.0	13.0	2.8	<4	13.0	221.0	60.0
218STR	38 23 59	112 27 58	7.6	1.6	9.4	2.4	<4	44.0	12.0	39.0
219STR	38 21 42	112 23 34	12.0	2.2	3.1	<1.0	<4	13.0	44.0	1.8
222STR	38 28 1	112 22 12	11.0	1.6	4.7	<1.0	<4	15.0	38.0	4.2
223STR	38 28 56	112 23 27	14.0	1.7	3.7	<1.0	<4	8.4	49.0	2.3
224SPR	38 31 3	112 23 34	82.0	10.0	57.0	<1.0	22	44.0	244.0	24.0
225STR	38 30 2	112 33 46	72.0	16.0	25.0	1.7	14	32.0	243.0	12.0
227SPR	38 31 10	112 23 37	27.0	1.4	20.0	1.0	15	38.0	70.0	17.0
228STR	38 30 54	112 23 24	26.0	4.1	13.0	1.0	4	34.0	74.0	5.1
229STR	38 29 6	112 23 52	5.6	1.0	3.0	<1.0	<4	10.0	16.0	1.7
230D229	38 29 6	112 23 52	5.2	<1.0	3.0	<1.0	<4	10.0	18.0	1.7
231SPR	38 29 32	112 24 42	31.0	3.3	3.6	<1.0	<4	8.4	91.0	4.6
232STR	38 24 32	112 20 17	44.0	5.3	2.7	<1.0	<4	6.3	81.0	50.0
434STR	38 24 35	112 20 16	43.0	4.8	2.7	<1.0	<4	7.2	90.0	66.0
435D434	38 24 35	112 20 16	43.0	4.8	2.7	<1.0	<4	6.9	97.0	53.0
435ANDU	38 24 35	112 20 16	42.0	4.8	2.7	<1.0	<4	6.6	97.0	59.0
233STR	38 31 13	112 23 34	14.0	1.9	5.7	<1.0	<4	17.0	51.0	4.6
234STR	38 28 48	112 22 9	17.0	2.9	4.0	1.0	4	21.0	56.0	8.0
235SPR	38 24 36	112 22 24	9.1	<1.0	1.1	<1.0	<4	4.2	26.0	2.9
236STR	38 28 39	112 25 57	40.0	8.3	7.2	1.1	4	10.0	88.0	26.0
237STR	38 27 40	112 26 11	8.2	1.4	3.9	<1.0	<4	15.0	29.0	2.9
238SPR	38 24 41	112 32 56	102.0	19.0	15.0	1.3	4	23.0	249.0	27.0
239STR	38 24 21	112 33 7	67.0	14.0	17.0	2.2	6	25.0	193.0	19.0
241SPR	38 23 44	112 32 41	48.0	11.0	18.0	2.4	6	32.0	189.0	13.0
242SPR	38 24 6	112 32 52	110.0	26.0	29.0	3.7	20	27.0	135.0	74.0
243SPR	38 22 57	112 31 42	18.0	4.6	10.0	1.6	6	36.0	52.0	9.9
245SPR	38 23 41	112 30 10	5.6	1.1	8.1	1.5	<4	23.0	<1.0	16.0
246SPR	38 25 13	112 30 17	6.9	1.2	5.7	1.0	4	21.0	20.0	5.3
247MINE	38 25 11	112 29 2	6.7	1.4	5.4	1.2	6	27.0	6.0	19.0
248SPR	38 27 18	112 30 7	6.2	1.4	3.6	1.0	<4	23.0	23.0	2.6
249SPR	38 28 16	112 32 42	28.0	6.2	9.6	2.3	<4	36.0	95.0	5.8

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	Cl(mg/L)	F(mg/L)	Zn(ug/L)	Cu(ug/L)	Mo(ug/L)	As(ug/L)	U(mg/L)	Cond	pH	Temp(C)
116STR	9.70	1.10	2.5	2.5	3.6	<1.0	.60	385	8.10	11.5
117SPR	21.00	.32	1.8	6.0	1.3	3.8	2.40	710	8.25	13.0
201SPR	12.30	.30	7.0	4.0	<1.0	3.3	.20	450	6.90	9.0
441STR	15.00	.09	4.0	<1.0	<1.0	<1.0	3.00	620	6.80	11.1
202MINE	33.00	27.00	290.0	5.7	1.5	11.2	490.00	780	5.60	11.0
442MINE	29.00	25.00	283.0	5.2	1.5	2.9	440.00	790	5.48	15.8
207STR	4.80	.37	5.0	9.2	<1.0	1.7	<.20	91	7.35	6.0
209STR	5.50	.49	6.0	1.1	<1.0	1.9	<.20	83	8.25	14.0
210STR	3.50	.17	5.0	<1.0	<1.0	1.4	.20	68	7.30	6.0
211SPR	5.90	.40	10.0	<1.0	<1.0	2.1	<.20	108	7.45	12.0
213STR	12.00	2.90	6.0	4.5	6.8	6.0	.20	570	7.85	16.0
214STR	8.10	.20	5.0	1.6	<1.0	3.3	2.30	320	8.30	13.0
215SPR	4.30	.25	4.0	<1.0	<1.0	2.1	.20	77	7.55	5.0
216STR	8.10	.68	4.0	<1.0	<1.0	2.5	2.30	136	7.70	7.0
217STR	14.00	.10	7.0	3.0	<1.0	3.1	<.20	580	7.70	23.0
218STR	2.00	.82	36.0	1.1	<1.0	2.2	.30	128	6.75	14.0
219STR	.51	.10	5.0	<1.0	<1.0	2.1	<.20	96	7.70	4.0
222STR	2.60	.13	5.0	<1.0	<1.0	2.0	<.20	98	7.85	11.0
223STR	2.60	.28	4.0	1.3	<1.0	1.8	<.20	106	8.05	13.0
224SPR	42.00	1.00	9.0	1.8	<1.0	5.4	5.20	600	8.00	14.0
225STR	46.00	.21	5.0	1.6	<1.0	4.5	2.80	540	8.40	15.5
227SPR	20.00	.36	6.0	1.8	<1.0	6.5	1.50	260	7.95	16.0
228STR	16.00	.16	3.0	1.0	<1.0	3.4	.20	240	8.05	14.5
229STR	1.40	.28	3.0	<1.0	<1.0	2.1	<.20	52	8.15	7.0
230D229	1.30	.28	2.0	<1.0	<1.0	2.6	<.20	52	7.55	7.0
231SPR	3.30	.11	2.0	1.2	<1.0	3.6	<.20	220	7.50	7.0
232STR	.95	.21	1.0	4.1	1.0	3.6	.30	300	8.15	8.5
434STR	1.50	.22	2.0	1.7	1.2	<1.0	.30	295	8.17	13.4
435D434	2.70	.22	3.0	<1.0	1.2	<1.0	.30	295	8.17	13.4
435ANDU	.92	.21	3.0	<1.0	1.2	N	N	295	8.17	13.4
233STR	3.30	.39	5.0	1.2	2.4	2.5	1.10	128	8.05	9.0
234STR	3.30	.20	3.0	1.4	<1.0	2.5	1.50	140	8.05	8.5
235SPR	.29	.04	2.0	1.1	<1.0	1.7	<.20	64	8.25	3.5
236STR	5.00	.37	4.0	2.8	<1.0	4.2	.30	310	8.25	10.0
237STR	2.00	.57	5.0	<1.0	<1.0	2.0	<.20	78	7.65	6.0
238SPR	18.00	.22	8.0	2.0	<1.0	5.6	.60	600	7.90	10.0
239STR	34.00	.15	7.0	2.4	<1.0	4.6	.80	520	8.25	16.0
241SPR	25.00	.29	3.0	3.1	<1.0	4.7	1.90	420	7.80	16.0
242SPR	205.00	.88	6.0	2.3	<1.0	4.2	.90	900	7.00	13.0
243SPR	13.00	.24	4.0	<1.0	<1.0	2.9	.40	200	6.75	12.0
245SPR	5.70	1.90	13.0	<1.0	1.5	2.2	.40	92	6.20	16.0
246SPR	3.50	.50	6.0	<1.0	<1.0	2.0	.70	79	6.80	7.0
247MINE	2.80	.83	6.0	<1.0	<1.0	1.9	.30	90	7.30	10.0
248SPR	3.20	.19	8.0	<1.0	<1.0	1.9	<.20	70	7.55	7.0
249SPR	13.00	.31	35.0	<1.0	<1.0	4.5	2.10	260	7.75	9.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	latitude	longitude	Ca(mg/L)	Mg(mg/L)	Na(mg/L)	K(mg/L)	Li(ug/L)	SiO2(mg/L)	alk(mg/L)	SO4(mg/L)
250SPR	38 28 17	112 32 42	53.0	5.7	9.1	1.0	<4	40.0	170.0	4.8
251STR	38 28 1	112 32 37	72.0	17.0	25.0	1.3	8	38.0	308.0	7.5
252SPR	38 28 24	112 32 53	19.0	4.7	8.9	1.2	4	34.0	48.0	5.5
254SPR	38 22 10	112 30 29	18.0	6.1	10.0	5.3	8	25.0	<1.0	83.0
255SPR	38 22 8	112 30 33	18.0	4.4	9.5	3.6	22	38.0	<1.0	61.0
256SPR	38 21 54	112 32 36	63.0	22.0	24.0	3.2	12	63.0	256.0	14.0
257SPR	38 22 38	112 33 34	130.0	54.0	45.0	1.8	8	21.0	361.0	152.0
258SPR	38 24 51	112 25 49	6.4	<1.0	7.0	1.6	<4	38.0	<1.0	36.0
259STR	38 25 39	112 27 54	5.2	1.1	5.4	<1.0	<4	23.0	21.0	2.7
260STR	38 25 41	112 27 56	5.9	1.3	5.8	<1.0	<4	25.0	26.0	3.2
261STR	38 22 14	112 23 23	13.0	2.4	3.3	<1.0	<4	8.4	53.0	4.3
264STR	38 30 8	112 24 57	23.0	3.5	5.8	<1.0	<4	19.0	61.0	11.0
265D264	38 30 8	112 24 57	23.0	3.4	5.8	<1.0	6	19.0	66.0	11.0
266STR	38 30 18	112 29 30	5.8	1.2	4.3	<1.0	<4	21.0	22.0	1.9
267SPR	38 30 4	112 29 23	6.2	1.6	4.5	<1.0	4	21.0	22.0	2.8
268SPR	38 30 8	112 32 13	39.0	4.6	22.0	<1.0	6	21.0	143.0	4.2
269STR	38 29 37	112 32 18	11.0	2.5	5.1	<1.0	4	23.0	53.0	2.0
270D269	38 29 37	112 32 18	11.0	2.5	5.0	<1.0	<4	23.0	52.0	2.0
271STR	38 29 41	112 21 38	6.1	1.5	3.5	<1.0	<4	29.0	18.0	5.1
272STR	38 22 59	112 21 28	20.0	1.2	1.6	<1.0	<4	4.2	46.0	16.0
415STR	38 23 12	112 21 24	23.0	1.2	1.6	<1.0	<4	5.6	43.0	26.0
273STR	38 23 44	112 22 19	23.0	1.8	1.5	<1.0	<4	4.2	61.0	11.0
428STR	38 23 43	112 22 9	32.0	2.2	2.0	<1.0	<4	5.5	82.0	19.0
274STR	38 23 39	112 22 41	22.0	2.0	1.2	<1.0	<4	2.1	61.0	7.9
275STR	38 22 30	112 26 44	13.0	1.6	2.3	<1.0	<4	13.0	48.0	3.0
276STR	38 22 9	112 27 4	9.3	2.5	2.6	<1.0	<4	10.0	30.0	8.0
277STR	38 22 29	112 28 31	3.7	1.1	2.4	<1.0	<4	13.0	13.0	2.4
278STR	38 28 27	112 27 16	7.8	1.4	7.2	1.0	<4	25.0	17.0	11.0
280STR	38 23 20	112 24 45	10.0	1.6	2.0	<1.0	<4	6.3	28.0	3.7
281STR	38 23 50	112 25 7	2.5	<1.0	2.4	<1.0	<4	15.0	<1.0	8.5
282STR	38 27 58	112 26 54	31.0	3.6	8.8	<1.0	6	23.0	99.0	5.0
283STR	38 26 38	112 26 37	4.1	<1.0	3.2	<1.0	<4	17.0	8.0	1.9
284STR	38 29 1	112 28 30	9.1	2.0	5.0	<1.0	<4	29.0	45.0	2.4
285STR	38 28 49	112 28 54	6.7	1.5	3.9	1.1	<4	27.0	21.0	2.1
286STR	38 28 31	112 29 4	5.9	1.4	3.6	1.6	<4	29.0	24.0	2.6
401MINE	38 22 48	112 15 37	270.0	64.0	8.1	1.9	11	12.0	223.0	817.0
402SPR	38 22 13	112 16 14	39.0	4.7	2.6	<1.0	<4	8.0	92.0	37.0
402ANDU	38 22 13	112 16 14	36.0	4.8	2.6	<1.0	<4	9.3	102.0	33.0
403SPR	38 22 38	112 20 3	69.0	16.0	3.6	1.6	27	9.2	113.0	125.0
404MINE	38 22 47	112 20 32	7.4	<1.0	1.3	<1.0	4	10.0	<1.0	36.0
405STR	38 22 19	112 20 8	58.0	11.0	3.2	1.5	16	9.2	86.0	99.0
406MINE	38 22 7	112 18 55	9.4	1.5	2.4	3.8	<4	19.0	<1.0	66.0
407STR	38 21 19	112 19 12	30.0	3.9	2.9	<1.0	4	10.0	78.0	25.0
409STR	38 21 44	112 20 19	21.0	1.6	1.5	<1.0	<4	5.6	54.0	19.0
409ANDU	38 21 44	112 20 19	21.0	1.6	1.5	<1.0	<4	7.0	54.0	18.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	Cl(mg/L)	F(mg/L)	Zn(ug/L)	Cu(ug/L)	Mo(ug/L)	As(ug/L)	U(mg/L)	Cond	pH	Temp(C)
250SPR	11.00	.18	3.0	1.1	<1.0	4.7	1.70	350	7.55	7.0
251STR	17.00	.47	2.0	1.8	<1.0	5.4	2.50	570	8.10	17.0
252SPR	17.00	.11	3.0	<1.0	<1.0	2.6	<.20	205	6.80	7.0
254SPR	5.00	.37	40.0	3.8	<1.0	4.2	.40	245	5.95	7.0
255SPR	6.50	1.00	28.0	1.9	<1.0	4.2	1.20	22	6.55	8.0
256SPR	27.00	.22	3.0	1.5	<1.0	5.5	1.20	580	7.40	21.0
257SPR	48.00	.29	4.0	2.5	1.1	3.9	6.20	1,050	7.65	13.0
258SPR	.84	2.50	180.0	<1.0	<1.0	2.5	1.30	136	4.40	6.0
259STR	2.20	.95	3.0	<1.0	1.0	2.0	.80	66	7.70	6.0
260STR	2.50	.97	7.0	1.0	<1.0	1.5	.40	75	8.00	7.0
261STR	.46	.08	4.0	1.9	<1.0	2.4	.80	110	8.05	7.0
264STR	5.00	.24	1.0	1.5	<1.0	3.0	.40	180	7.40	6.0
265D264	5.00	.26	3.0	1.5	1.1	2.8	.40	180	7.45	6.0
266STR	2.50	.29	3.0	<1.0	<1.0	1.7	.20	65	7.80	8.0
267SPR	3.70	.06	2.0	<1.0	<1.0	1.6	.20	73	7.45	8.5
268SPR	23.00	.63	1.0	1.8	<1.0	4.1	6.50	340	7.55	11.0
269STR	3.00	.13	3.0	<1.0	<1.0	2.0	.40	108	7.75	11.0
270D269	3.00	.15	3.0	<1.0	<1.0	1.7	.20	108	7.75	11.0
271STR	3.20	.11	1.0	<1.0	<1.0	2.3	.20	68	8.40	5.0
272STR	.37	.18	1.0	3.2	<1.0	2.8	.20	136	7.90	5.0
415STR	.39	.18	5.0	1.5	<1.0	<1.0	<.20	192	7.65	9.0
273STR	.87	.05	2.0	2.8	<1.0	2.4	<.20	150	8.00	8.0
428STR	1.60	.08	2.0	1.3	1.0	<1.0	<.20	193	7.70	12.0
274STR	.85	.06	2.0	2.5	<1.0	2.2	<.20	144	7.90	7.0
275STR	.87	.10	4.0	<1.0	1.0	2.1	.80	97	8.40	5.0
276STR	1.10	.24	3.0	<1.0	1.0	1.8	.60	91	8.05	8.0
277STR	1.00	.08	3.0	<1.0	<1.0	1.5	.40	45	7.95	5.0
278STR	3.40	.52	4.0	<1.0	<1.0	1.8	.50	98	7.40	10.0
280STR	.28	.08	4.0	1.0	<1.0	2.4	.60	82	7.75	3.0
281STR	.74	.83	20.0	<1.0	<1.0	1.9	.90	39	6.80	8.0
282STR	7.50	.11	2.0	1.1	<1.0	3.5	2.80	240	8.20	7.0
283STR	1.40	1.90	3.0	<1.0	1.1	1.6	1.10	48	8.15	9.5
284STR	5.50	.15	4.0	<1.0	<1.0	2.0	.30	97	7.60	8.5
285STR	3.70	.19	6.0	<1.0	<1.0	1.9	.30	76	7.45	9.0
286STR	3.20	.13	3.0	<1.0	<1.0	1.6	<.20	70	7.50	8.0
401MINE	6.10	2.30	2,150.0	4.5	14.0	6.9	2.80	1,500	6.52	17.0
402SPR	1.30	.41	4.0	2.5	<1.0	1.4	.20	246	7.37	8.0
402ANDU	1.70	.37	3.0	2.5	<1.0	N	N	245	7.37	8.0
403SPR	2.00	.46	9.0	<1.0	2.1	2.9	1.20	510	6.53	5.0
404MINE	.76	.04	10.0	99.0	<1.0	1.8	.38	244	3.09	6.8
405STR	1.90	.48	6.0	2.8	1.0	4.0	.62	415	7.73	13.0
406MINE	1.70	.06	10.0	11.0	<1.0	2.2	.24	420	3.10	3.5
407STR	1.00	.23	6.0	<1.0	<1.0	20.0	<.20	250	7.79	10.4
409STR	.59	.22	4.0	<1.0	<1.0	<1.0	<.20	125	7.77	13.6
409ANDU	.73	.31	3.0	<1.0	<1.0	N	N	123	7.77	13.6

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	latitude	longitude	Ca(mg/L)	Mg(mg/L)	Na(mg/L)	K(mg/L)	Li(ug/L)	SiO2(mg/L)	alk(mg/L)	SO4(mg/L)
410STR	38 21 42	112 20 19	20.0	1.3	1.7	<1.0	4	6.6	54.0	13.0
411MINE	38 21 45	112 20 17	48.0	5.0	3.3	<1.0	8	11.0	140.0	45.0
412STR	38 21 34	112 17 55	31.0	6.9	2.8	1.2	6	11.0	56.0	69.0
414STR	38 22 53	112 20 8	18.0	2.5	2.2	<1.0	<4	10.0	15.0	45.0
416STR	38 23 12	112 21 1	33.0	2.5	1.6	<1.0	<4	6.5	52.0	56.0
417STR	38 23 14	112 20 59	36.0	5.2	2.5	<1.0	12	9.0	60.0	52.0
418MINE	38 23 1	112 20 46	46.0	8.9	2.3	1.1	24	10.0	76.0	109.0
419SPR	38 23 2	112 19 42	4.4	<1.0	<1.0	<1.0	<4	3.3	1.8	3.0
420MINE	38 23 25	112 19 44	39.0	6.2	2.1	<1.0	7	8.2	10.0	132.0
421MINE	38 24 43	112 20 9	47.0	6.2	2.3	<1.0	<4	7.7	94.0	92.0
421ANDU	38 24 43	112 20 9	48.0	6.2	2.4	<1.0	<4	7.4	96.0	83.0
422SPR	38 23 37	112 19 19	27.0	4.9	5.7	<1.0	<4	17.0	125.0	5.1
423STR	38 24 33	112 18 55	49.0	4.6	4.5	1.0	4	5.6	138.0	50.0
427D423	38 24 46	112 19 56	51.0	4.6	4.3	<1.0	<4	6.0	130.0	44.0
424SPR	38 24 44	112 20 9	87.0	11.0	7.4	1.9	12	10.0	181.0	147.0
425SPR	38 25 1	112 18 27	68.0	7.5	7.4	1.2	<4	8.4	170.0	84.0
426SPR	38 25 6	112 19 2	86.0	12.0	8.2	1.1	10	10.0	179.0	130.0
429STR	38 23 41	112 22 10	14.0	1.2	2.0	<1.0	<4	5.3	45.0	4.6
429ANDU	38 23 41	112 22 10	14.0	1.2	2.0	<1.0	<4	4.5	45.0	4.6
431SPR	38 23 54	112 21 49	39.0	3.4	3.9	<1.0	8	7.0	116.0	31.0
433STR	38 24 32	112 21 2	32.0	2.2	2.1	<1.0	<4	6.6	87.0	11.0
436MINE	38 24 27	112 20 8	82.0	11.0	5.4	<1.0	9	9.1	155.0	150.0
437MINE	38 24 31	112 20 15	73.0	11.0	5.3	<1.0	7	8.7	144.0	90.0
438MINE	38 24 31	112 20 19	44.0	5.0	2.8	<1.0	<4	8.2	97.0	62.0
439MINE	38 24 32	112 20 22	44.0	4.8	2.7	<1.0	<4	7.5	95.0	64.0
440D439	38 24 32	112 20 22	43.0	4.8	2.7	<1.0	<4	6.5	94.0	61.0
443SPR	38 31 40	112 17 21	101.0	25.0	35.0	1.3	11	16.0	301.0	18.0
444SPR	38 30 48	112 16 7	450.0	520.0	44.0	<1.0	376	115.0	<1.0	8,200.0
445MINE	38 28 40	112 20 40	110.0	25.0	14.0	1.2	<4	14.0	340.0	15.0

Appendix 2.--Analytical data reesults for the Mount Belknap caldera, Deer Trail Mountain-Alunite Ridge study area, southwestern Utah.--continued

Sample	Cl(mg/L)	F(mg/L)	Zn(ug/L)	Cu(ug/L)	Mo(ug/L)	As(ug/L)	U(mg/L)	Cond	pH	Temp(C)
410STR	.50	.18	3.0	<1.0	<1.0	1.2	<.20	116	7.85	9.5
411MINE	2.10	.37	5.0	1.7	<1.0	<1.0	.22	310	7.19	3.8
412STR	1.80	.27	12.0	1.2	<1.0	<1.0	<.20	250	8.16	15.7
414STR	.73	.08	4.0	1.7	<1.0	<1.0	<.20	132	7.03	8.0
416STR	.83	.35	9.0	<1.0	<1.0	<1.0	<.20	215	7.79	8.4
417STR	1.10	.33	4.0	<1.0	<1.0	<1.0	.20	260	7.91	9.5
418MINE	1.40	.81	18.0	<1.0	<1.0	<1.0	.36	350	6.90	4.4
419SPR	6.40	.05	6.0	<1.0	<1.0	<1.0	<.20	12	6.44	3.3
420MINE	.90	.66	115.0	3.0	1.0	<1.0	<.20	295	6.91	1.5
421MINE	1.80	.19	93.0	<1.0	1.6	<1.0	.78	320	7.67	2.5
421ANDU	1.40	.18	92.0	<1.0	1.6	N	N	320	7.67	2.5
422SPR	3.70	.11	3.0	1.3	<1.0	1.8	<.20	224	7.10	10.0
423STR	2.30	.37	3.0	2.1	<1.0	<1.0	.80	318	8.67	15.3
427D423	1.90	.56	2.0	<1.0	1.3	1.5	.78	320	8.72	13.2
424SPR	7.30	1.10	2.0	2.1	26.0	1.4	1.40	540	7.52	12.8
425SPR	4.50	1.40	2.0	3.0	4.0	<1.0	.56	420	8.09	13.3
426SPR	5.10	.70	3.0	6.2	1.6	2.3	.78	540	7.58	9.0
429STR	.31	.17	2.0	<1.0	<1.0	<1.0	.20	82	7.70	9.8
429ANDU	.40	.08	2.0	1.1	<1.0	N	N	83	7.70	9.8
431SPR	.95	1.80	3.0	<1.0	1.0	1.1	<.20	255	7.36	8.2
433STR	2.50	.51	2.0	2.5	<1.0	<1.0	<.20	194	8.13	12.5
436MINE	3.00	.46	8.0	<1.0	2.5	<1.0	.52	500	7.81	9.8
437MINE	2.40	2.40	42.0	1.9	7.5	1.5	.46	450	8.02	8.3
438MINE	1.20	.24	175.0	5.1	2.8	1.4	.26	290	7.96	5.5
439MINE	1.10	1.00	283.0	7.8	3.0	1.8	.28	290	7.98	6.5
440D439	1.40	.25	284.0	7.5	3.0	1.5	.28	290	7.98	6.5
443SPR	97.00	5.60	2.0	<1.0	<1.0	<1.0	6.00	805	7.09	11.7
444SPR	84.00	48.00	3,750.0	950.0	47.0	190.0	<.20	6,500	2.58	21.5
445MINE	2.00	5.60	3.0	1.0	1.3	<1.0	17.00	.730	7.09	8.9

* SPR equals spring samples

STR equals stream samples

MINE equals mine drainage sample