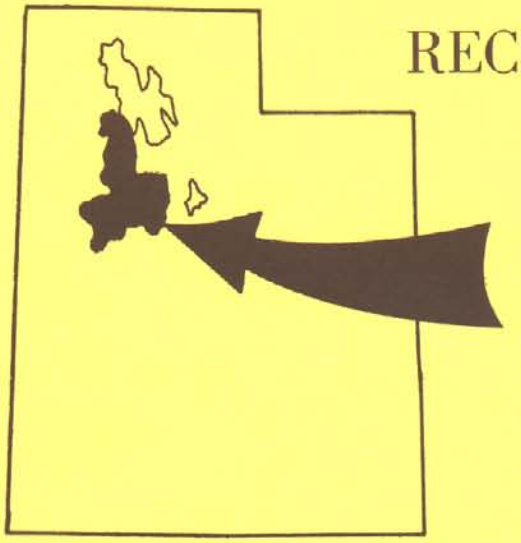
WATER-RESOURCES BULLETIN 9
PART I *1967*

UTAH GEOLOGICAL AND MINERALOGICAL SURVEY
affiliated with
THE COLLEGE OF MINES AND MINERAL INDUSTRIES
University of Utah, Salt Lake City, Utah



RECONNAISSANCE OF THE CHEMICAL QUALITY OF WATER IN WESTERN UTAH

Sink Valley Area, Drainage Basins of Skull, Rush, and Government Creek Valleys and the Dugway Valley - Old River Bed Area

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Price $1.50

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PART I

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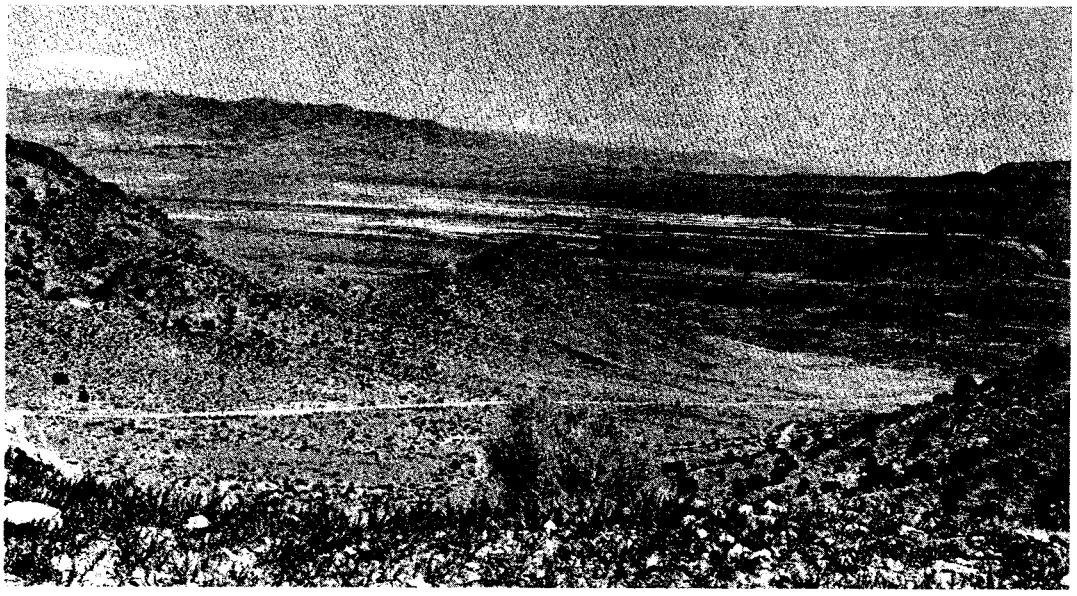
by K. M. Waddell
Chemist, U. S. Geological Survey



View of Dugway Valley, looking eastward from Dugway Pass toward Simpson Mountains (left horizon) and Keg Mountains (far right). Old River Bed passes between the two upland areas. Valley is floored with fine-grained lacustrine deposits. The valley is typical of the undeveloped desert basins of western Utah. (Photograph by J. W. Hood.)

WATER-RESOURCES BULLETIN 9 PRICE $1.50 MARCH, 1967

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The survey is enjoined to cooperate with all existing agencies to the end that the geological and mineralogical resources of the state may be most advantageously investigated and publicized for the good of the state. The *Utah Code, Annotated, 1953 Replacement Volume 5, Chapter 36, 53-36-2,* describes the Survey's functions.

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William P. Hewitt
Director

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RECONNAISSANCE OF THE CHEMICAL QUALITY OF WATER IN WESTERN UTAH

PART I

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by K. M. Waddell
Chemist, U. S. Geological Survey

INTRODUCTION

This report presents data collected during the first part of an investigation that was started in 1963 by the U. S. Geological Survey in cooperation with the Utah Geological and Mineralogical Survey. The investigation has the purpose of providing information about the chemical quality of water in western Utah that will help interested parties to evaluate the suitability of the water for various uses in a broad area of Utah where little information of this type previously has been available. The area studied includes the Sink Valley area, the drainage basins of Skull, Rush, and Government Creek Valleys, and the Dugway Valley-Old River Bed area (fig. 1). Osamu Hattori and G. L. Hewitt started the investigation, and the author completed it and prepared this report.

The report consists mainly of basic data, including a few data collected prior to 1963 by the Geological Survey. Table 1 gives the chemical analyses of water from selected water sources in the five areas studied, and table 2 gives the spectrographic analyses of water from some of the sources listed in table 1. The locations of all sampling sites are plotted on the maps for the respective drainage basins (figs. 3-6). The dissolved-solids content of water from each source is shown beside the source symbol so that the range of mineralization by area may be readily seen, and the range of dissolved solids in each area is given in table 3.

The U. S. Geological Survey made the chemical analyses listed in table 1 using the methods described by Rainwater and Thatcher (1960) or other currently proposed methods. The spectrographic analyses in table 2 were made using methods described by Silvey and Brennan (1962).

Samples collected for spectrographic analyses were filtered through a 0.45 micron filter. Samples collected for the determination of iron, manganese, copper, lead, and zinc were filtered and then acidified with hydrochloric acid. This was done to inhibit possible changes of concentration after the water was removed from its natural environment and was stored prior to analysis.

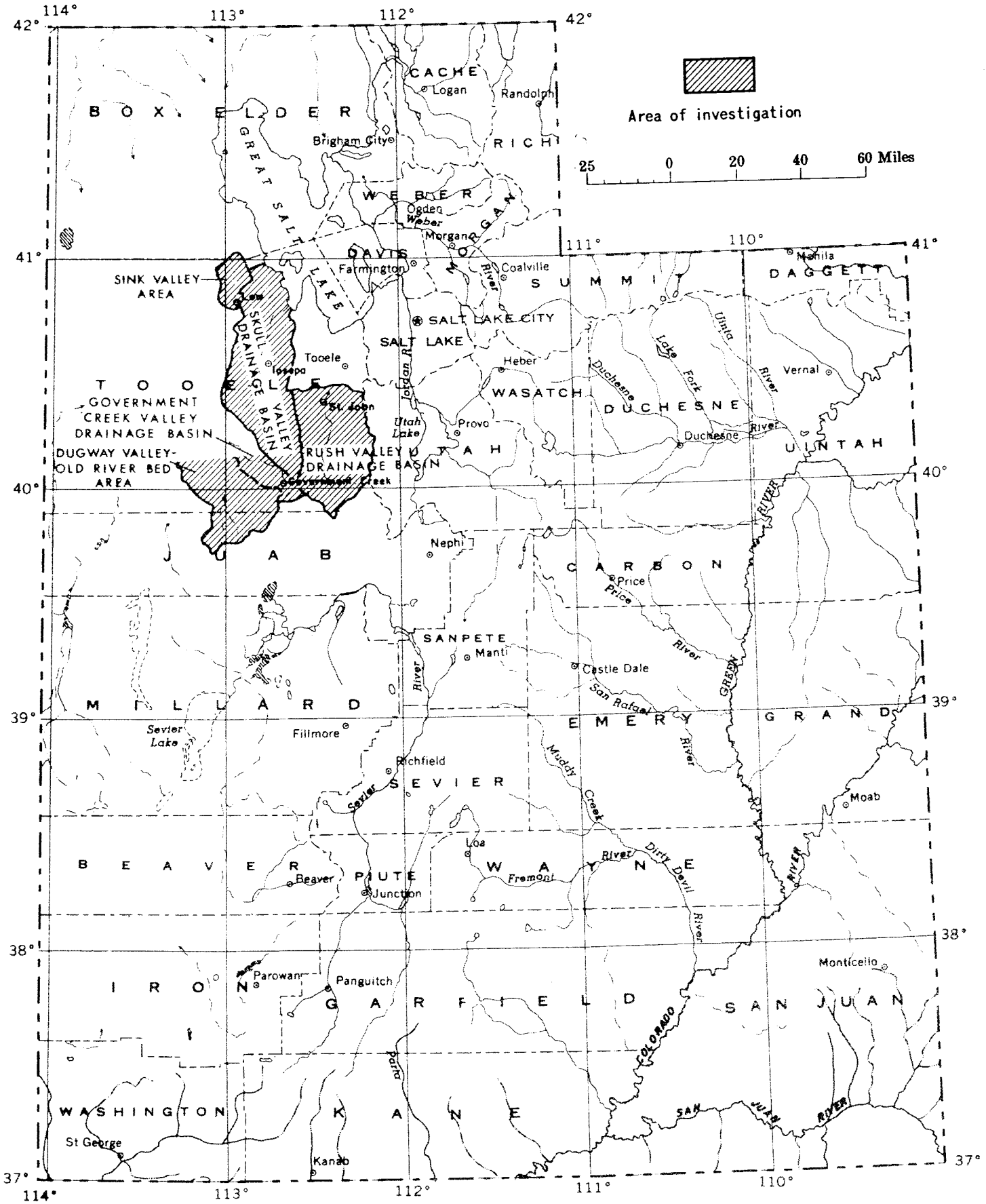


Figure 1.-Index map.

The system of numbering wells in Utah is based on the cadastral land-survey system of the U. S. Government. In this report the locations of all sampling sites of springs, streams, canals, and reservoirs are numbered according to the well-numbering system. The system is illustrated in figure 2. The well number is comprised of letters and numbers that designate consecutively the quadrant and township (shown together in parentheses by a capital letter designating the quadrant in relation to the base point of the Salt Lake base and meridian and the numbers designating the township and range); the number of the section; the quarter section (designated by a letter); the quarter of the quarter section; the quarter of the quarter-quarter section; and, finally, the particular well within the 10-acre tract (designated by a number). By this system the letters a, b, c, and d designate respectively the northeast, northwest, southwest, and southeast quarter of the section, of the quarter section, and of the quarter-quarter section. Thus, the number (C-8-4)30dcd-1 designates the first well recorded or visited in the SE$\frac{1}{4}$SW$\frac{1}{4}$SE$\frac{1}{4}$ sec. 30, T. 8 S., R. 4 W., the letter C showing that the township is south of the Salt Lake base line and the range is west of the Salt Lake meridian. The number (C-1-7)9ccc designates a spring in the SW$\frac{1}{4}$SW$\frac{1}{4}$SW$\frac{1}{4}$ sec. 9, T. 1 S., R. 7 W.

As an aid to readers of this report, some of the terms used are defined as follows:

Dissolved solids is the total content of dissolved material in the water. It is determined by weighing the residue remaining after a sample has been evaporated at 180°C, or it is calculated from the sum of the determined constituents.

Equivalents per million (epm) is a unit for expressing the concentration of chemical constituents in terms of the interreacting values of the electrically charged particles, or ions, in solution. In chemical reaction, 1 epm of a positively charged ion will react with 1 epm of a negatively charged ion. Parts per million is converted to equivalents per million by multiplying by the reciprocal of the combining weight of the ion.

pH (hydrogen-ion concentration) is a measure of the degree of acidity or alkalinity. A pH of 7.0 indicates that the water is neither acid nor alkaline. As pH values decrease from 7.0, the acidity increases; and as pH values increase from 7.0, the alkalinity increases.

Parts per billion (ppb) is a unit for expressing the concentration of chemical constituents by weight, usually as grams of constituents per billion grams of a solution.

Parts per million (ppm) is a unit expressing the concentration of chemical constituents by weight, usually as grams of constituents per million grams of a solution.

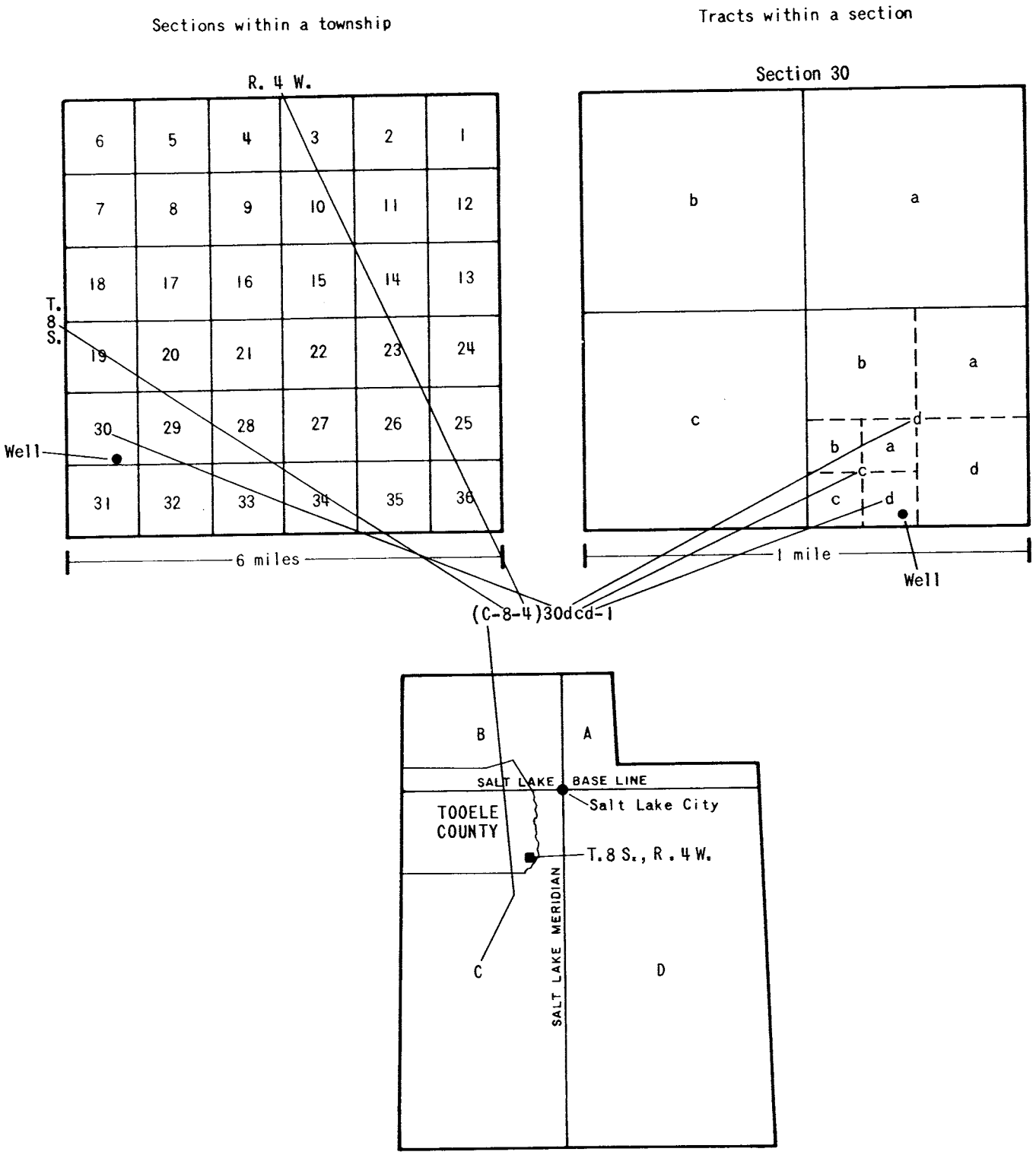


Figure 2.-Well- and spring-numbering system used in Utah.

Percent sodium is the ratio, expressed as a percentage, of the concentration of sodium to the sum of the concentrations of calcium, magnesium, sodium, and potassium in equivalents per million.

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reaction with soil and is an index of sodium or alkali hazard to the soil. This ratio should be known especially for water used for irrigating farm land. (See U. S. Salinity Lab. Staff, 1954, p. 72-75.)

Specific conductance is a measure of the ability of water to conduct an electrical current and is expressed in micromhos per centimeter at 25°C. Because the specific conductance is related to the number and specific chemical types of ions in solution, it can be used for approximating the salinity of the water.

DESCRIPTION OF THE CHEMICAL QUALITY OF THE WATER

The springs and streams in the Stansbury, Sheeprock, Oquirrh, and Simpson Mountains yield the least mineralized water in the project area; the water from higher elevations in these mountains contains less than 400 ppm of dissolved solids. The Sink Valley area and northern Skull and Dugway Valleys yield the most highly mineralized water; one sample contained 17,200 ppm of dissolved solids.

Throughout the project area, increasingly greater concentrations of dissolved solids generally are accompanied by increasingly greater relative concentrations of sodium and chloride. Sodium and chloride generally are the principal constituents in water that contains more than 600 ppm of dissolved solids.

Table 3 shows the ranges of dissolved-solids content in water from wells, springs, and streams in the valley and springs and streams in the mountains for each drainage basin or area.

Sink Valley Area

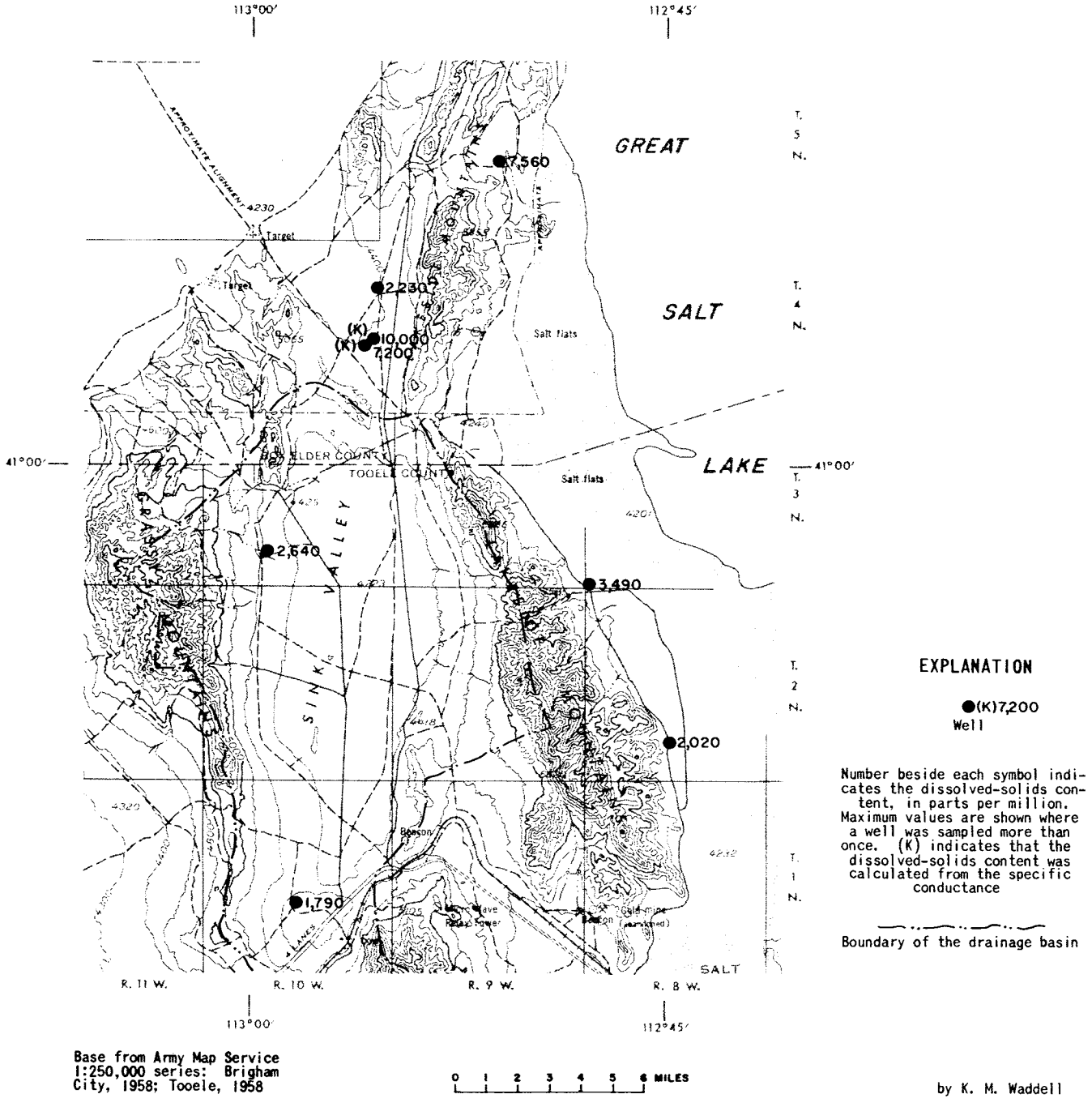
In the Sink Valley area, eight wells were sampled (fig. 3). The dissolved-solids content of the water ranges from 1,790 to 10,000 ppm and the principal chemical constituents are sodium and chloride.

Skull Valley Drainage Basin

In Skull Valley, 31 wells, 29 springs, and 5 streams were sampled (fig. 4). The dissolved solids range from 253 to 17,200 ppm. The sources in the southern part

Table 3—Ranges of dissolved-solids content in water in a part of western Utah.

Drainage basin or area	Ranges of dissolved-solids content, in parts per million			
	Wells		Springs and streams	
	Minimum	Maximum	Minimum	Maximum
Sink Valley area	1,790	10,000	-	-
Skull Valley drainage basin				
Skull Valley	253	4,010	696	17,200
Stansbury Mountains	-	-	98	395
Cedar Mountains	-	-	200	2,380
Rush Valley drainage basin				
Rush Valley	344	868	342	1,490
Stansbury Mountains	-	-	206	338
Oquirrh Mountains	-	-	213	291
West Tintic Mountains	-	-	266	267
Government Creek valley drainage basin				
Government Creek valley	627	1,090	-	-
Simpson and Sheeprock Mountains	-	-	186	620
Dugway Valley-Old River Bed area				
Dugway Valley	3,590	10,200	-	-
Old River Bed	633	1,240	-	-
Simpson Mountains	-	-	248	1,240
Sheeprock Mountains	-	-	131	683
Keg (McDowell) Mountains	-	-	998	2,300



Base from Army Map Service 1:250,000 series: Brigham City, 1958; Tooele, 1958

Figure 3.-Map of the Sink Valley area showing locations of wells and the dissolved-solids content of the water.

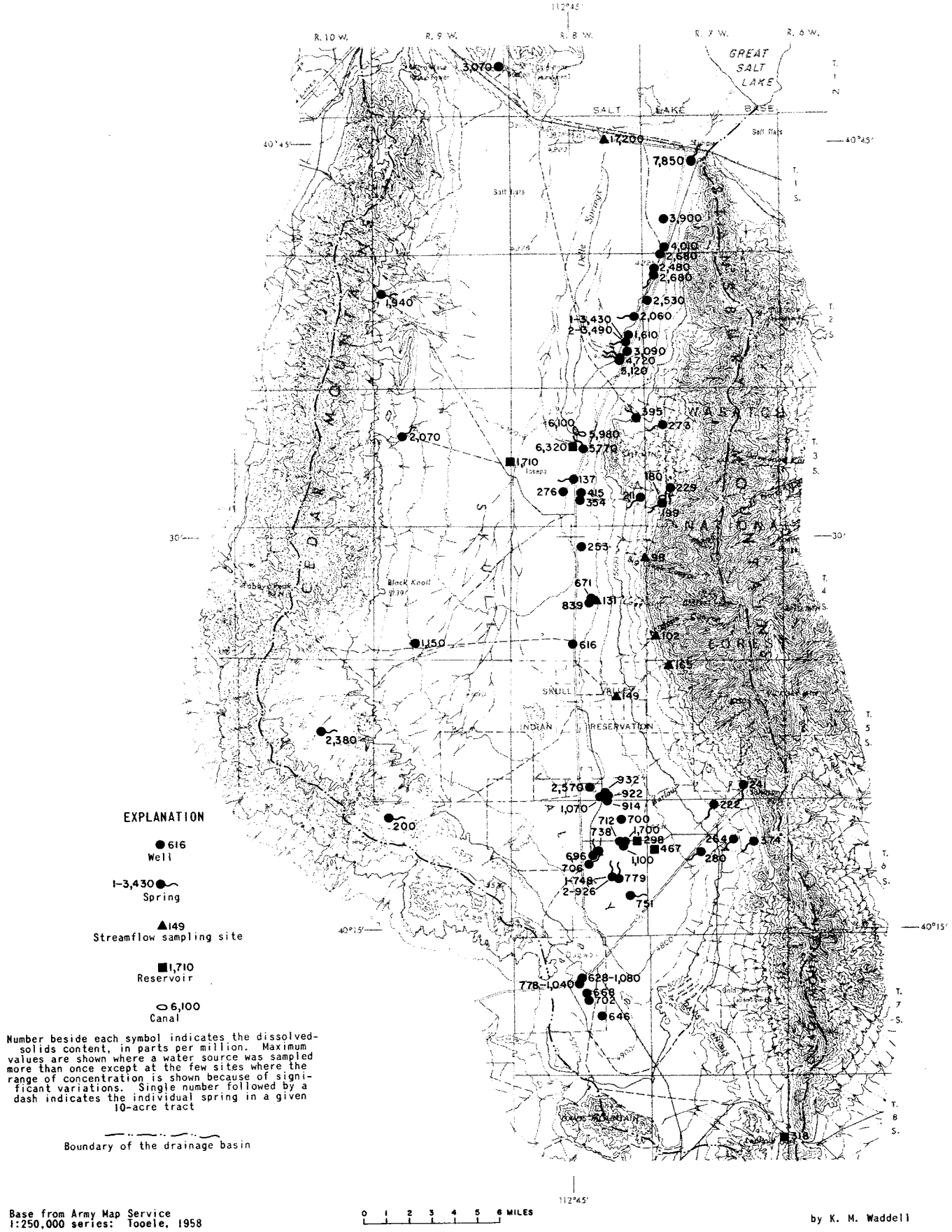


Figure 4.-Map of the Skull Valley drainage basin showing locations of wells, springs, reservoirs, and streamflow sampling sites and the dissolved-solids content of the water.

of the valley generally yield water having a lower dissolved-solids content than those in the northern part of the valley. The dissolved-solids content of water from wells and springs in the valley south of Iosepa ranges from 253 to 2,570 ppm. North of Iosepa, the dissolved-solids content of the water from wells and springs ranges from 1,610 to 7,850 ppm and water in the stream at site (C-1-8)2cc contained 17,200 ppm of dissolved solids. Sodium and chloride are the principal chemical constituents in water from most of the wells and springs in the valley.

Water from wells (C-7-8)9dad-1 and (C-7-8)9dca-1 was sampled numerous times during the period 1951-65. Selected analyses in table 1 show a variation of dissolved-solids content from 628 to 1,080 ppm and 778 to 1,040 ppm, respectively.

Samples were obtained from 11 springs in the Stansbury Mountains and from 4 streams originating in the mountains. The dissolved-solids content of the water ranges from 98 to 395 ppm and the principal chemical constituents are generally calcium and bicarbonate.

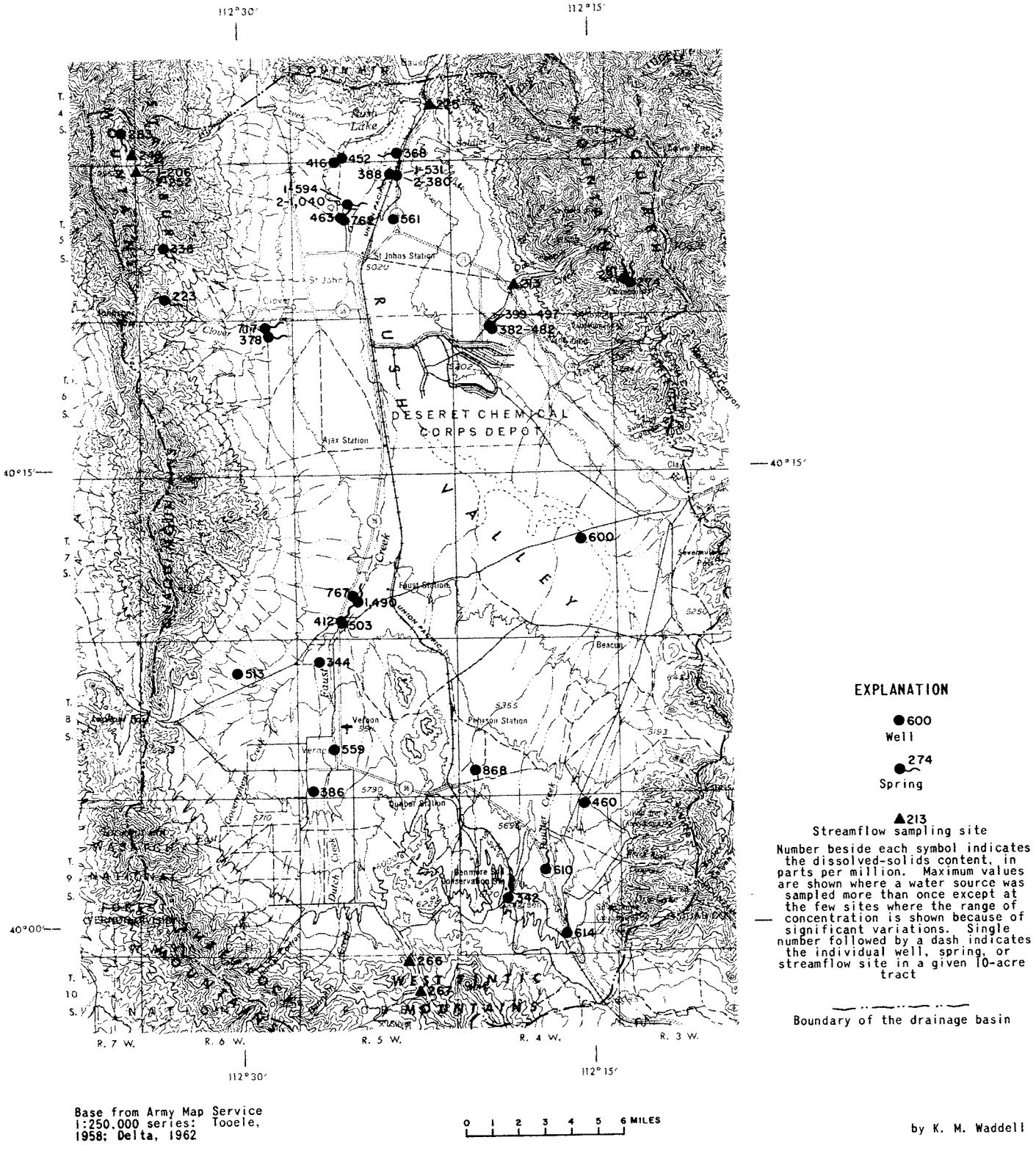
In the Cedar Mountains, four springs were sampled, and the dissolved-solids content of the water ranges from 200 to 2,380 ppm. Water from three of the springs, however, contains dissolved solids ranging from 1,930 to 2,380 ppm, and the principal chemical constituents are sodium and chloride. White Rock Spring, which contains only 200 ppm of dissolved solids, is not a perennial spring and the low mineralization may be due to direct local recharge during the spring runoff. Sodium, calcium, and bicarbonate are the principal chemical constituents in White Rock Spring, and sodium and chloride are the principal constituents in the remaining springs.

Rush Valley Drainage Basin

In Rush Valley, 17 wells and 12 springs were sampled (fig. 5). The dissolved-solids content of the water ranges from 344 to 1,490 ppm. The principal constituents in the water vary considerably. Water with calcium and bicarbonate as the principal constituents has the highest occurrence; whereas magnesium, sodium, and chloride are the principal constituents in some of the water.

In Rush Valley, the dissolved-solids content of water from well (C-6-4)5bdb-1 increased consistently from 399 to 497 ppm during the period May 5, 1948, to October 11, 1954, and in 1960 the concentration of dissolved solids was 404 ppm. The dissolved-solids content of water from well (C-6-4)5bdd-1 also increased consistently from 421 to 482 ppm during the period May 6, 1948, to September 8, 1953. The dissolved-solids content then fluctuated between 446 ppm on September 29, 1954, and 382 ppm on June 10, 1963.

In the Stansbury Mountains, three springs and three streams were sampled. The dissolved-solids content of the water ranges from 206 to 338 ppm, and the principal chemical constituents are calcium and bicarbonate.



Base from Army Map Service 1:250,000 series: Tooele, 1958; Delta, 1962

by K. M. Waddell

Figure 5.-Map of the Rush Valley drainage basin showing the locations of wells, springs, and streamflow sampling sites and the dissolved-solids content of the water.

In the Oquirrh Mountains, two springs and one stream were sampled. The dissolved-solids content of the water ranges from 213 to 291 ppm, and the principal constituents are calcium and bicarbonate.

In the West Tintic Mountains, two streams were sampled. The dissolved-solids content of the water is 266 and 267 ppm, and the principal constituents are calcium and bicarbonate.

Government Creek Valley Drainage Basin

In Government Creek valley, six wells were sampled (fig. 6). The dissolved-solids content of the water ranges from 627 to 1,090 ppm, and the principal constituents are sodium and chloride. The wells have been sampled numerous times since 1950, but the chemical analyses do not indicate any notable change of dissolved-solids content of the water.

In the Simpson and Sheeprock Mountains, 13 springs and 3 streams were sampled. The dissolved-solids content of the water ranges from 186 to 620 ppm, and calcium and bicarbonate predominate in the water of most springs and streams. However, sodium and bicarbonate predominate in the water from Simpson Springs, Government Creek, and spring (C-9-7)31dbb.

Dugway Valley-Old River Bed Area

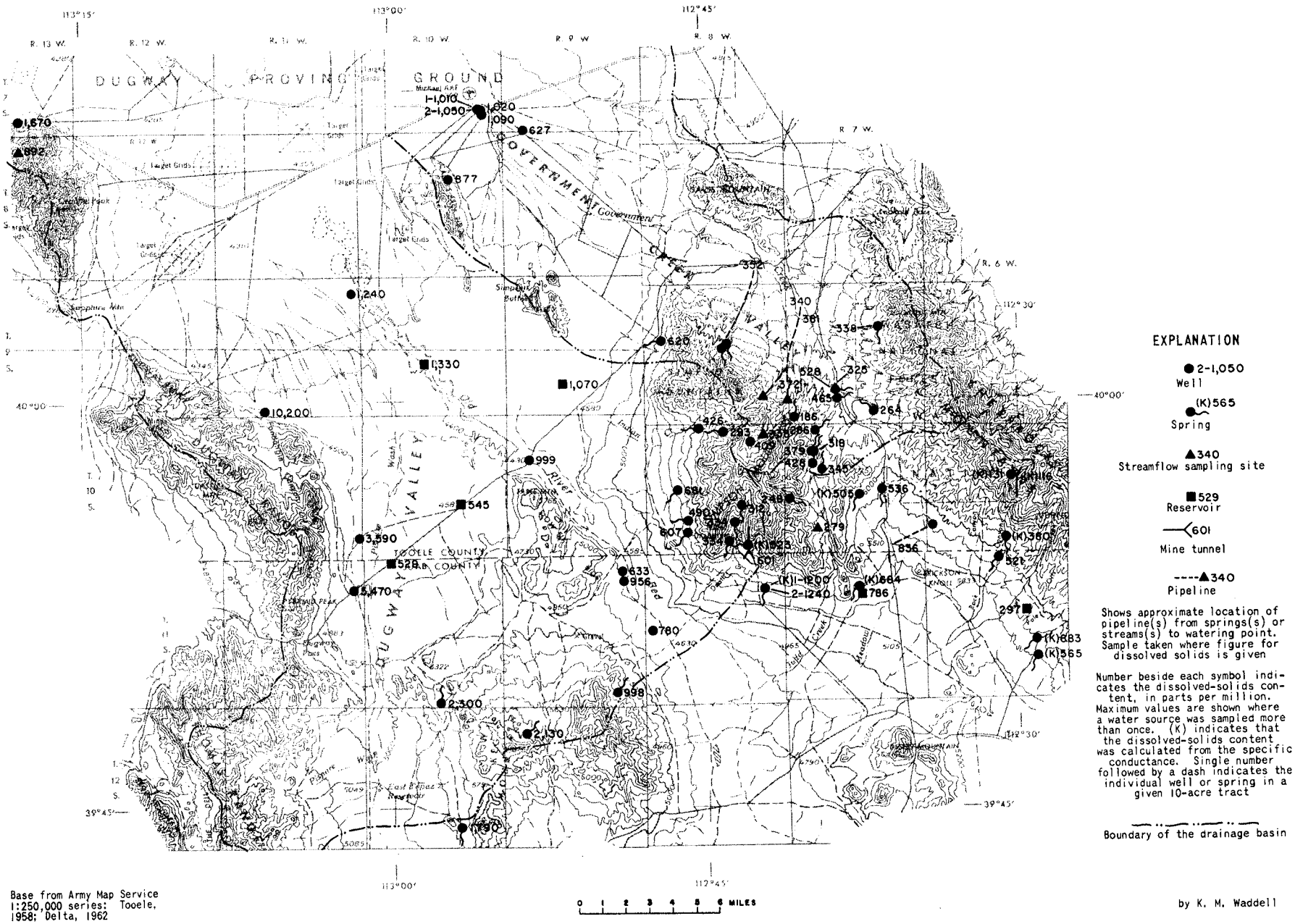
In Dugway Valley, three wells were sampled. The dissolved-solids content of the water ranges from 3,590 to 10,200 ppm, and sodium and chloride are the principal chemical constituents.

In the Old River Bed area, five wells were sampled. The dissolved-solids content of the water ranges from 633 to 1,240 ppm, and the principal constituents are calcium, sodium, chloride, and bicarbonate.

In the Simpson Mountains, 16 springs and 1 stream were sampled. The dissolved-solids content of the water ranges from 248 to 1,240 ppm. Calcium and bicarbonate are the principal constituents in most of the water, but the water having larger concentrations of dissolved solids has relatively larger amounts of sodium and chloride.

In the Sheeprock Mountains, six springs were sampled. The dissolved-solids content of the water ranges from 131 to 683 ppm, and the principal constituents are calcium and bicarbonate.

In the Keg Mountains, four springs were sampled. The dissolved-solids content of the water ranges from 998 to 2,300 ppm, and calcium, sodium, and bicarbonate are the principal constituents.



Base from Army Map Service 1:250,000 series: Tooele, 1958; Delta, 1962

Figure 6.-Map of the Government Creek valley drainage basin and the Dugway Valley-Old River Bed area showing the locations of water-sampling sites and the dissolved-solids content of the water.

REFERENCES

Rainwater, F. H., and Thatcher, L. L., 1960, Methods for collection and analysis of water samples: U. S. Geol. Survey Water-Supply Paper 1454, 301 p.

Silvey, W. D., and Brennan, Robert, 1962, Concentration method for the spectrochemical determination of seventeen minor elements in natural water: Anal. Chemistry, v. 34, p. 784-786.

U. S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U. S. Dept. Agriculture Handb. 60, 160 p.

Table 1. Chemical analyses of water in a part of western Utah

Location: See text for description of numbering system.
Use: H, domestic; I, irrigation; P. public supply; S, stock; U, unused.
Discharge (gallons per minute): e, estimated; m, measured; r, reported.

(Concentrations of chemical constituents are in parts per million unless noted otherwise)

Location	Source	Date of collection	Use	Reported depth of well (feet)	Discharge (gallons per minute)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature (°F)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Iron (Fe)	Manganese (Mn)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Lithium (Li)	Strontium (Sr)	Bromide (Br)	Iodide (I)	Dissolved solids: Residue on evaporation at 180°C	Dissolved solids: Calculated	Hardness as $CaCO_3$: Calcium magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio
SINK VALLEY AREA																																				
(B-1-10)21dd-1	Well	1-13-66	S	253	14m	3,110	7.7	60	40	64	0.5	653	26	381	0	113	710	1.2	8.5	0.16	0.26	0.35	0.00	0.00	0.05	0.03	0.2	0.0	-	-	1,790	1,750	18	0	97	67
1/(B-2-8)28dcb-1	FERA Well No. 80	4-22-64	S	122	20r	3,490	8.0	-	17	40	55	609	33	183	0	147	990	.7	1.3	.47	.39	-	-	-	-	-	-	-	-	-	2,020	1,990	328	178	78	15
1/(B-3-8)31ccc-1	Well	4-23-64	S	80	-	5,870	7.7	-	21	92	108	1,010	40	201	0	211	1,780	.5	11	-	.54	-	-	.00	.07	-	.5	-	1.0	0.02	3,490	3,380	675	510	75	17
(B-3-10)29dd-1	Bertagnole well	1-13-66	S	363	10m	4,410	8.3	62	44	4.4	3.2	932	34	400	4	347	900	1.8	9.0	.86	.70	1.0	.04	.02	.02	.34	.2	.1	-	-	2,640	2,480	24	0	97	83
(B-4-10)13caa-1	Kirk Homestead well	2-9-62	H	216	35r	3,980	8.0	57	34	22	12	807	17	268	0	86	1,090	.6	-	-	.91	.51	.00	-	-	-	-	-	-	-	2,230	2,200	104	0	93	35
		4-2-62			18r	3,710	8.2	-	38	26	15	2/741		258	0	100	1,000	1.0	8.4	-	-	.22	.00	-	-	-	-	-	-	-	2,060	2,060	125	0	93	29
		8-20-65			20e	3,960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25bac-1	Well	8-20-65	-	739	40e	15,700	-	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25bcc-1	do	8-20-65	-	302	30e	11,400	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(B-5-9)22a	do	4-23-64	S	-	-	12,000	7.3	-	40	164	163	2,270	91	130	0	414	4,030	1.0	14	-	.79	-	-	.01	.11	-	.8	-	2.0	.05	7,560	7,260	1,080	971	81	30
SKULL VALLEY DRAINAGE BASIN																																				
(B-1-9)24cdd-1	Delle Well	12-29-65	S	215	40r	5,190	7.3	-	24	78	102	849	39	158	0	146	1,540	0.8	11	0.00	0.46	0.93	0.02	0.00	0.02	0.09	0.2	1.8	-	-	3,070	2,870	613	483	74	15
(C-1-7)9ccc	Big Spring	7-18-63	-	-	2,700e	12,900	7.7	65	14	134	79	2,630	93	212	0	310	4,260	.1	4.1	-	.79	1.1	.04	.01	.04	-	.8	.4	3.0	.04	7,850	7,630	658	484	88	45
30add-1	Well	1-29-54	I,S	132	-	6,800	7.5	-	36	79	64	1,300	58	277	0	177	2,040	.3	3.8	-	.51	-	-	-	-	-	-	-	-	-	-	3,900	460	233	84	26
31daa-1	do	7-18-63	H,I,S	130	1,000r	6,540	7.2	66	31	107	71	1,220	45	234	0	231	1,980	.2	3.8	-	.57	.41	.00	.00	.00	.10	.3	.7	1.0	.02	4,010	3,800	558	366	81	22
		9-5-63			1,000r	6,320	7.3	66	31	106	69	1,180	46	233	0	248	1,950	.2	8.1	.02	.38	.39	.02	.00	.08	.02	.6	1.0	4.2	.17	3,910	3,760	546	355	81	22
31dcd-1	do	7-18-63	S	150	3/1.2m	4,690	7.3	62	29	62	37	859	34	212	0	118	1,380	.2	2.1	-	.23	.38	.00	.00	.00	.20	.3	.3	1.0	.01	2,680	2,630	308	134	84	21
(C-1-8)2cd	Stream	5-29-65	-	-	100e	26,400	7.7	70	19	234	178	5,790	212	282	0	767	9,070	2.3	20	.09	1.7	.53	.05	.03	.19	.03	2.6	5.8	21	.09	17,200	16,500	1,320	1,090	89	69
(C-2-7)6caa-2	Well	4-29-55	-	-	3/50e	4,380	7.7	60	32	70	41	793	30	206	0	107	1,270	.2	6.0	-	-	-	-	-	-	-	-	-	-	-	2,480	2,450	343	174	82	19
6cda	Burnt Spring	7-18-63	S	-	26m	4,610	7.3	67	26	84	45	824	31	207	0	114	1,360	.2	7.4	-	.23	.18	.00	.00	.00	.10	.3	.4	1.0	.01	2,680	2,590	394	224	81	18
7ccc-1	Well	3-16-54	I	175	600e	4,590	7.8	63	21	78	42	820	30	190	0	95	1,350	.1	4.5	-	.28	-	-	-	-	-	-	-	-	-	-	2,530	367	212	81	19
(C-2-8)13dcb	Muskrat Spring	7-18-63	-	-	40e	3,670	7.4	66	22	85	36	639	25	218	0	87	1,050	.1	5.1	-	.19	.17	.00	.01	.00	.10	.1	.8	.0	.01	2,060	2,060	360	181	78	15
24bcd-1	Well	7-1-54	I	132	540m	2,910	-	61	22	70	31	485	16	199	-	76	825	.1	3.7	-	-	-	-	-	-	-	-	-	-	-	-	1,610	302	-	77	12
24cc-1	Spring (improved)	7-18-63	I,S	-	25m	5,650	7.1	64	22	103	44	1,020	32	190	0	126	1,720	.1	3.4	-	.26	.78	.00	.03	.02	.15	.3	1.2	1.0	.02	3,430	3,160	436	280	82	21
24cc-2	Spring-fed pond	7-18-63	I,S	-	-	5,810	7.3	72	18	101	46	1,060	25	183	0	133	1,790	.1	2.8	-	.30	.53	.00	.06	.02	.15	.4	1.2	1.0	.03	3,490	3,270	440	290	83	22
25bbd-1	Well	7-1-54	I,S	147	(3)	5,350	-	64	22	95	46	993	34	188	-	128	1,630	.1	4.4	-	-	-	-	-	-	-	-	-	-	-	-	3,090	426	-	82	21
26dab	Horseshoe Springs	7-18-63	-	-	-	7,720	7.8	73	47	126	47	1,500	47	244	0	190	2,420	.2	8.7	-	.39	.50	.00	.00	.02	.20	.5	.5	1.0	.02	4,720	4,510	508	308	85	29
26dba	do	7-18-63	-	-	-	8,570	7.3	73	29	123	49	1,720	59	246	0	227	2,700	.7	6.0	-	.40	.11	.00	.00	.00	.10	.6	1.0	1.0	.02	5,120	5,040	508	306	87	33
(C-2-9)7cb	Redlum Spring (improved)	7-19-63	S	-	5e	3,090	7.7	-	15	180	96	314	8.2	232	0	163	840	.2	3.3	-	.15	.01	.00	.01	.00	.05	.2	1.4	.0	.01	1,930	1,730	845	655	44	4.7
		10-27-63		-	1-5e	3,040	7.3	59	14	180	94	2/315		226	0	137	845	-	1.6	-	-	-	-	-	-	-	-	-	-	-	1,940	1,700	836	651	45	4.7
(C-3-7)7daa	Spring (improved)	7-30-63	S	-	2.7m	507	7.4	55	18	42	7.1	53	1.2	188	0	11	57	.2	1.5	-	.06	.03	.00	.00	.00	.05	.1	.0	.0	.01	273	283	134	0	46	2.0
29bcb	Chokecherry Spring	7-31-63	-	-	450e	398	7.6	51	11	41	11	27	1.1	169	0	14	41	.2	.3	.02	.03	.05	.00	.00	.00	.05	.1	.0	.0	.00	229	230	148	9	28	1.0
4/30dac	Canal	7-31-63	-	-	900e	307	7.2	62	11	33	8.0	18	1.0	132	0	12	30	.1	.2	-	.03	.06	.00	.00	.00	.05	.1	.0	.0	.00	180	178	116	8	25	.7
30ddb	Spring	7-31-63	-	-	50e	343	7.6	61	10	38	9.0	24	1.1	158	0	10	31	.1	.3	.00	.02	.03	.00	.00	.00	.00	.1	.0	1.0	.00	199	202	132	2	28	.9
5/(C-3-8)9ddb	Canal	7-18-63	-	-	450e	10,100	7.2	86	16	152	62	1,990	68	208	0	294	3,220	.3	4.6	-	.49	.42	.02	.01	.02	.15	.6	1.0	2.0	.03	6,100	5,910	635	464	86	34
6/10ccc	do	7-30-63	-	-	1,800e	9,820	7.3	73	17	152	61	1,970	66	241	0	280	3,150	.4	6.9	-	.47	.09	.01	.00	.00	.05	.8	1.0	2.0	.04	5,980	5,820	630	432	86	34
12ab	Spring (improved)	7-30-63	S	-	4.6m	678	7.5	66	21	63	11	60	.8	203	0	20	102	.2	1.2	-	.04	.03	.00	.00	.00	.05	.1	.0	.0	.00	395	379	202	35	39	1.8
15cba	Spring	7-30-63	-	-	200e	9,590	7.2	71	16	138	55	1,960	66	223	0	260	3,090	.3	4.3	-	.44	.15	.04	.00	.00	.05	.7	1.0	1.0	.03	5,770	5,700	570	387	87	36
16ad	Reservoir	7-30-63	-	-	-	10,400	7.7	71	17	156	63	2,100	71	240	0	298	3,350	.5	6.5	-	.51	.09	.02	.02	.00	.10	.7	.6	2.0	.04	6,320	6,180	650	453	86	36
7/21ddb	Spring (improved)	7-23-63	S	-	10m	238	7.1	75	11	23	5.4	14	.9	90	0	10	26	.2	.1	-	.02	1.2	.10	.07	.00	.40	.1	.1	.0	.00	137	136	80	6	27	.7
25dbd	Spring	7-31-63	S	-	29m	352	7.8	54	11	37	8.8	25	1.1	156	0	15	34	.1	.0	.02	.04	.07	.00	.00	.00	.00	.1	.0	.0	.00	211	209	128	0	30	1.0
28adc-1	Well	7-23-63	I	396	2,150m	643	7.3	56	17	58	11	51	4.5	149	0	12	124	.2	.5	-	.06	1.1	.00	.01	.00	.25	.2	.3	.0	.00	377	352	190	68	36	1.6
		7-30-63			2,150m	655	7.8	-	19	64	10	53	4.2	151	0	16	130	.1	1.3	-	.09	.01	.00	-	-	-	-	-	-	-	415	372	202	78	36	1.6
28bcd-1	do	7-23-63	I	183	1,400m	493	7.1	56	18	39	9.5	47	2.6	132	0	9.7	86	.3	.4	-	.05	.64	.00	.01	.00	.15	.2	.0	.0	.00	276	278	137	29	42	1.7
28ddb-1	do	7-23-63	I	241	1,030m	613	7.0	56	17	54	13	49	1.8	139	0	19	114	.2	.9	-	.07	.25	.00	.01	.00	.10	.1	.0	.0	.00	354	337	189	75	36	1.5
(C-3-9)8c	Eightmile Spring (improved)	7-23-63	S	-	3.6m	3,050	7.9	64	13	180	111	268	8.5	196	0	129	855	.1	3.7	-	.17	.72	.08	.00	.00	.10	.2	1.9	.0	.00	1,940	1,670	905	744	39	3.9
		9-5-63			3.6m	3,000	7.3	64	13	174	114	262	7.9	196	0	129	840	.3	2.6	-	.18	.48	.01	-	.00	-	.0	2.2	.0	.05	2,070	1,640	905	744	38	3.8
24a	Reservoir	7-23-63	S	-	-	2,890	7.9	82	16	53	16	544	52	315	0	289	605	.6	5.1	-	3.1	.04	.44	.05	.00	.05	.3	.7	.0	.19	1,710	1,740	198	0	82	17
(C-4-7)30c	Antelope Canyon stream	8-1-63	H	-	-	169	7.1	-	8.9	17	4.4	10	.9	69	0	7.4	18	.2	.1	-	.02	.17	.00	.00	.00	-	.2	.0	.0	.01	102	101	60	3	26	.6
(C-4-8)3ccb-2	Well	7-31-63	I	331	977m	441	7.2	56	10	34	6.3	43	4.1	113	0	11	78	.1	.6	-	.03	.01	.00	.00	.00	.05	.1	.0	.0	.00	253	243	110	17	45	1.8
8/12ad	Stream	7-31-63	-	-	650e	157	7.4	51	8.4	16	4.1	11	.9	59	0	7.2	19	.3	.3	-	.02	.17	.00	.00	.00	.10	.1	.0	.0	.00	98	96	56	8	29	.6
9/22abd	Stream	8-1-63	H,I	-	300e	222	7.6	72	11	22	5.4	16	.8	86	0	10	25	.3	.1	-	.04	.45	.00	.01	.00	.20	.1	.0	.0	.00	131	133	76	5	31	.8
22baa-1	Well	8-1-63	I	325	716m	982	7.1	59	13	97	17	68	1.6	139	0	56	200	.1	14	-	.03	.59	.04	.01	.00	.10	.1	.0	.0	.00	671	535	311	197	32	1.7
22bda-1	do	8-1-63	H,I	347	436m	1,380	7.3	57	13	96	18	160	6.2	180	0	126	265	.0	24	-	.10	.66	.02	.01	.00	.05	.2	.2	.0	.01	839	798	316	168	52	3.9
33aba-1	do	8-1-63	I	500	350e	1,090	7.3	60	25	28	23	153	12	190	0	40	222	.1	12	-	.08	.09	.00	.00	.00	.05	.2	.0	.0	.01	616	608	163	7	65	5.2
(C-4-9)32abb-1	do	4-27-66	S	340	-	2,030	7.9	-	46	36	18	371	9.9	250	0	100	470	.7	4.4	-	.20	-	-	-	-	-	-	-	-	-	1,150	1,180	162	0	82	13
(C-5-7)6aa	Indian Hickman Canyon stream	8-1-63	H	-	900e	286	7.6	48	8.9	38	7.3	11	.9	154	0	8.8	16	.2	.0	.02	.02	.51	.00	.00	.00	.25	.2	.0	.0	.00	165	168	125	0	16	.4
35bcb	Sand Spring(improved)	8-14-63	H	-	5-10e	453	7.7	63	7.3	51	2.4	13	.7	270	0	11	17	.1	.2	-	.03	.30	.00	.00	.00	.10	.2	.1	.0	.00	241	258	224	3	11	.4
(C-5-8)11acc	Indian Hickman Canyon stream	5-29-65	H	-	450e	275	-	58	2.5	35	6.8	11	.6	122	8	8.0	16	.2	.7	.03	.04	-	-	-	-	-	.0	.0	.0	.01	-	149	116	3	17	.4
		12-22-65			450e	254	-	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34bdb-2	Well	8-16-63	H	120	30m	4,060	7.7	50	38	166	96	604	29	378	0	377	1,000	.8	2.9	-	.51	.24	.00	.00	.00	.30	.4	3.7	1.0	.01	2,570	2,500	810	500	61	9.2
34dad-1	do	8-16-63	S	-	.7m	1,650	7.7	57	24	75	43	208	12	301	0	79	348	.6	2.2	-	.22	.22	.00	.00	.00	.10	.2	.4	.0	.00	932	940	362	115	55	4.8
34ddb-5	do	8-16-63	I	35	3/150	1,880	7.5	52	27	67	42	265	14	351	0	102	375	.7	3.8	-	.29	.19	.00	.00	.00	.10	.2	.5	.0	.01	1,070	1,070	342	54	62	6.3
		9-27-63			3/150	1,850	7.8	52	26	79	36	259	14	351	0	111	380	.6	1.6	-	.28	.03	.00	-	-	-	-	-	-	-	1,060	1,080	348	60	61	6.0
35cbc-1	do	8-16-63	H	80	2e	1,580	7.8	53	24	74	39	199	11	288	0	74	330	.5	1.3	-	.17	.60	.00	.00	.00	.10	.2	.4	.0	.00	922	896	346	110	55	4.7
35ccc-2	do	4-29-55	H,S	120	3e	1,560	7.5	52	28	70	43	190	12	282	0	74	331	.6	1.9	-	.19	-	-	-	-	-	-	-	-	-	914	890	352	120	53	4.4
(C-5-10)15dcc	Cochran Spring (improved)	8-20-63	S	-	-	3,690	7.7	-	18	136	156	375	4.5	148	0	171	1,080	.2	2.2	-	.17	.11	.10	.00	.00	.00	.3	3.7	.0	.05	2,220	2,020	980	859	45	5.2
		9-5-63			-	3,580	7.6	-	18	144	157	377	4.7	142	0	167	1,080	.2	1.6	.00	.22	.12	-	.04	.04	.03	.0	4.5	.0	.15	2,380	2,020	1,000	889	45	5.2
(C-6-7)4aba	Spring (improved)	5-29-65	S	-	2m	418	8.1	58	1.8	35	28	13	.7	236	0	11	20	.2	.2	.00	.04	-	-	-	-	-	.0	.0	.1	.01	222	226	204	10	12	.4
10	do	8-14-63	H	-	5e	494	7.7	60	8.6	31	20	25	1.0	241	0	17	35	.1	1.4	-	.03	.15	.00	.02	.00	.10	.2	.0	.0	.00	264	278	207	9	21	.8
11cdb	Park Spring	8-14-63	I,S	-	200e	660	7.7	55	12	63	21	49	1.6	267	0	40	63	.3	1.7	-	.09	.77	.00	.01	.00	.15	.2	.3	.0	.00	374	384	241	22	30	1.4
16bbb	Spring (improved)	9-13-63	S	-	3m	520	7.6	-	8.5	57	20	25	1.2	261	0	19	34	.1	1.6	-	.04	.07	.00	.00	.00	.10	.1	.0	.0	.00	280	295	227	13	19	.7
18bbb	Reservoir	8-14-63	S	-	-	761	7.2	-	12	46	11	86	23	194	0	86	92	.4	.2	-	.35	1.5	.16	.34	.00	-	.2	.3	.0	.02	467	454	158	0	50	3.0
(C-6-8)2dcd-1	Well	8-16-63	I,S	601	300r	1,220	7.7	57	30	43	27	172	5.3	246	0	51	245	1.0	1.8	-	.15	.06	.00	.00	.04	.05	.2	.7	.0	.13	700	697	221	19	62	5.0
11dad-1	do	5-29-65	I	250	250e	2,500	7.7	57	37	127	77	268	9.1	209	0	98	652	.9	.4	.01	.16	.13	.15	.01	.04	.02	.0	1.8	1.6	.12	1,700	1,380	636	465	47	4.6
11dbd-2	do	8-20-63	H	-	35m	1,230	7.7	53	29	57	32	142	6.3	235	0	49	250	.6	1.3	-	.14	.35	.05	.00	.00	.75	.2	.6	.0	.02	712	684	272	79	52	3.8

Table 1. Continued

(Concentrations of chemical constituents are in parts per million unless noted otherwise)

Location	Source	Date of collection	Use	Reported depth of well (feet)	Discharge (gallons per minute)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature (°F)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Iron (Fe)	Manganese (Mn)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Lithium (Li)	Strontium (Sr)	Bromide (Br)	Iodide (I)	Dissolved solids: Residue on evaporation at 180°C	Dissolved solids: Calculated	Hardness as $CaCO_3$: Calcium magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio
GOVERNMENT CREEK VALLEY DRAINAGE BASIN--Continued.																																				
(C-10-7)5	Spring	8-12-64	S	-	-	492	7.9	65	8.4	40	16	43	1.1	212	0	14	54	0.2	0.1	-	0.08	0.08	0.02	0.00	0.00	0.01	0.0	0.0	0.1	0.08	286	283	164	0	36	1.5
8cac	Cherry Springs	7-17-64	S	-	1e	664	7.6	-	13	60	25	44	4.3	304	0	26	60	.4	.3	-	.08	.09	.01	.00	.01	.07	.0	.0	.2	.02	379	384	254	5	27	1.2
8cad	do	7-17-64		-	40e	566	7.3	50	11	55	22	35	.9	266	0	22	47	.0	1.0	-	.02	.08	.01	.00	.00	.04	.0	.0	.1	.02	318	326	228	10	25	1.0
17a	Spring (improved)	8-19-64	S	-	.5e	588	7.9	59	16	61	13	48	.6	256	0	19	58	.2	1.1	-	.06	.82	.09	.00	.01	-	.0	.0	.2	.04	345	345	204	0	34	1.5
17bab	Spring	7-17-64	S	-	5-10e	746	7.4	-	16	69	27	53	1.2	330	0	28	75	.4	.1	-	.07	.07	.03	.00	.00	.08	.0	.0	.2	.01	428	435	282	11	29	1.4
(C-10-8)1bd	Lee Canyon stream	7-15-64	-	-	100e	587	7.7	71	13	54	18	45	1.2	244	0	30	56	.0	.2	-	.06	.47	.24	.00	.00	.08	.0	.0	.1	.02	338	339	210	10	32	1.4
2dba	Spring	7-15-64	-	-	100e	698	7.6	49	16	70	27	46	.7	348	0	28	55	.3	.2	-	.07	.12	.05	.00	.03	.05	.0	.0	.2	.02	409	416	284	0	26	1.2
DUGWAY VALLEY - OLD RIVER BED AREA																																				
(C-7-13)34adc-1	Well	3-28-50	P	153	150r	2,990	7.2	-	20	72	26	514	13	242	0	142	760	3.2	1.7	-	0.08	-	-	-	-	-	-	-	-	-	1,670	1,670	286	88	79	13
(C-8-13)3dad	Spring (improved)	3-28-50	-	-	10r	1,560	7.5	-	20	85	22	202	10	222	0	72	348	2.0	.6	-	.08	-	-	-	-	-	-	-	-	-	892	871	302	120	58	5.1
(C-9-9)28dac	Reservoir	7-28-64	S	-	-	1,750	7.6	67	25	29	15	341	25	468	0	50	325	.5	2.5	-	.56	0.10	0.04	0.02	0.04	0.07	0.0	1.0	0.4	0.14	1,070	1,050	134	0	82	13
(C-9-10)21ddb-1	do	9-1-64	S	-	-	2,120	8.1	56	13	13	12	448	21	664	0	161	285	2.2	.7	-	1.1	1.4	.01	.03	.01	.16	.0	.1	.6	.28	1,330	1,290	82	0	90	21
(C-9-11)1ddb-1	Well	9-24-64	-	210	245e	1,990	7.7	60	31	88	58	2/286		266	0	97	538	.4	.0	-	-	-	-	-	-	-	-	-	-	-	1,240	1,230	458	240	58	5.8
22/33ccb-1	Fandangle Well	12-24-64	S	202	-	15,900	7.6	-	36	409	149	2,920	258	283	0	164	5,570	1.8	1.6	-	1.1	-	-	-	-	-	-	-	-	-	9,970	9,680	1,640	1,400	76	31
		12-29-65			8m	16,200	7.3	67	28	406	145	2,820	271	251	0	158	5,520	2.0	3.6	.01	1.0	9.6	.22	.03	.17	2.7	2.8	12	-	-	10,200	9,500	1,610	1,400	76	31
(C-10-6)14cbc	Mine tunnel outflow	5-30-63	I,S	-	100e	200	-	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15dad	Spring (improved)	5-30-63	I,S	-	1.5m	226	-	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34ac	do	5-30-63	U	-	.2m	656	-	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(C-10-7)19cad	Spring	5-21-63	S	-	100e	374	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-19-64			40e	424	7.7	59	6.3	46	11	29	.5	176	0	26	40	.1	.2	-	.06	.64	.00	.00	.00	.06	.0	.0	.2	.02	248	249	158	14	28	1
22bcd	do	5-31-63	H,I,S	-	196m	871	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23bc	Black Spring (improved)	5-31-63	S	-	2.0m	912	-	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-12-64			1-5e	874	7.6	55	17	69	22	78	2.6	197	0	40	163	.1	7.4	-	.10	.31	.00	.00	.01	.09	.0	.0	.3	.04	536	497	262	100	39	2.1
29dcc	Aspen Creek	8-19-64	-	-	1-5e	477	8.0	71	3.6	46	13	39	1.1	178	0	33	54	.2	.1	-	.07	.16	.03	.00	.00	.02	.0	.0	.1	.01	279	280	168	22	33	1.3
35da	Skunky Spring (improved) pipeline	8-12-64	S	-	4m	1,260	7.8	-	17	115	46	70	2.8	218	0	78	256	.5	1.4	.00	.11	-	.00	.00	.03	-	.0	1.0	.6	.05	836	696	474	295	24	1.4
(C-10-8)3ab	Indian Springs	7-15-64	S	-	-	520	8.0	59	11	51	19	30	1.1	246	0	18	40	.0	2.4	-	.02	.23	.04	.00	.00	.06	.0	.0	.1	.02	293	295	207	5	24	.9
		9-15-65			2,000e	492	8.4	61	5.6	38	19	2/33		192	8	19	40	-	.2	-	-	-	-	-	-	-	-	-	-	-	246	257	176	5	29	1.1
4abb	Spring	7-20-64	-	-	30-40e	732	7.7	51	13	77	28	46	1.2	360	0	39	54	.3	.2	-	.06	.11	.02	.01	.00	.17	.0	.0	.1	.01	426	437	308	13	24	1.1
20aca	Burnt Spring	7-22-64	S	-	10e	1,130	7.8	60	16	81	34	117	.6	351	0	105	145	.2	.1	-	.10	.24	.01	.00	.01	.05	.0	.0	.3	.05	681	673	340	52	43	2.8
23cdc	Spring (improved)	5-23-63	H,S	-	1.2m	615	-	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-19-64			8m	514	7.9	56	10	51	15	34	1.2	164	0	53	54	.2	.0	-	.04	.89	.74	.00	.00	.09	.0	.1	.1	.02	312	301	190	56	28	1.1
26cbc	do	5-23-63	S	-	5e	584	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-19-64			8m	542	7.6	57	9.4	50	12	47	1.2	172	0	47	64	.1	.0	-	.05	.16	.02	.00	.00	.01	.0	.1	.2	.02	334	316	172	31	37	1.6
28cbb	Spring	7-22-64	S	-	10e	825	7.5	60	12	78	15	75	1.3	226	0	76	112	.4	1.4	-	.06	.24	.01	.00	.01	.10	.0	.1	.3	.04	490	485	256	71	39	2.0
33bbb	do	5-29-63	S	-	30e	999	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7-22-64			40-50e	1,010	7.5	60	13	92	19	91	1.6	228	0	83	165	.2	1.4	-	.14	.25	.02	.02	.00	.07	.0	.0	.4	.04	607	580	308	121	39	2.2
34add	Spring-pond outflow	5-23-63	S	-	300e	554	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-19-64			200e	533	7.6	59	13	54	12	45	1.2	206	0	47	49	.3	1.3	-	.07	.10	.00	.00	.00	.01	.0	.1	.1	.02	334	324	185	16	34	1.4
35dbd	Spring (improved)	5-21-63	H	-	.8m	902	-	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35dca	Mine tunnel outflow	8-19-64	U	-	100e	953	7.6	59	11	112	13	76	1.7	260	0	117	120	.2	.2	-	.10	.65	.20	.03	.01	.20	.0	.6	.2	.04	601	583	334	121	33	1.8
(C-10-9)8cc-1	Well	12-24-64	S	130	50-100e	1,550	7.6	60	38	102	37	155	10	196	0	82	363	.5	3.3	-	.15	.16	.01	.04	.00	.04	.0	1.3	1.0	.05	999	890	406	245	45	3.3
(C-10-10)23ca	North Table Mountain Reservoir	7-28-64	S	-	-	874	7.8	71	20	33	10	137	29	365	0	19	99	.3	1.9	-	.31	.17	.00	.00	.01	.08	.0	.0	.3	.05	545	530	124	0	65	5.4
31bbb-1	Fera No. 38 Well	3-31-65	S	551	8e	5,980	7.7	76	19	105	34	1,080	99	188	0	62	1,890	2.0	.4	.03	.36	-	-	.00	.04	-	1.0	4.2	3.3	.18	3,460	3,390	400	246	82	23
		12-29-65			10-15e	6,230	7.4	76	45	106	34	1,060	109	200	0	61	1,870	2.1	8.2	.10	1.1	.61	.05	.02	.09	.77	.9	2.5	-	-	3,590	3,400	404	240	81	23
(C-11-6)3b	Spring (improved)	8-12-64	H,S	-	3m	852	8.0	56	25	88	25	62	3.2	369	0	43	84	1.6	.4	-	.11	.29	.01	.00	.00	.05	.0	.0	.2	.03	521	516	324	21	29	1.5
14bd	Reservoir	8-12-64	S	-	-	499	8.2	70	17	14	18	69	1.2	150	0	34	71	.3	.0	-	.15	.36	.02	.02	.00	.09	.0	.0	.2	.03	297	300	110	0	57	2.9
23daa	Spring (improved)	5-28-63	S	-	24m	1,180	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26aad	do	5-28-63	S	-	-	974	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(C-11-7)10bd	Desert Spring	6-17-63	S	-	2e	1,180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23/10caa	Reservoir	8-19-64	S	-	-	1,230	7.7	61	1.5	120	38	82	2.3	228	0	182	194	.5	.3	.01	.05	.44	.00	.00	.00	.06	.0	.4	.4	.04	786	734	456	269	28	1.7
(C-11-8)12bab-1	Antelope Springs (improved)	5-21-63	S	-	1m	2,050	-	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12bab-2		5-21-63	S	-	6m	1,690	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-19-64			2m	1,850	7.9	63	14	160	45	160	2.5	126	0	235	409	1.3	.3	-	.11	1.5	.03	.00	.03	.10	.0	1.3	.8	.05	1,240	1,090	584	481	37	2.9
18dcb-1	Well	8-4-64	I	200	1,150r	1,190	7.5	63	29	97	32	93	4.2	194	0	70	252	.3	.8	-	.02	.07	.01	.00	.01	.04	.0	.0	.5	.04	780	676	372	213	35	2.1
(C-11-9)1bca-1	do	7-22-64	I	448	650e	983	7.4	-	28	86	29	72	3.6	191	0	65	179	.1	14	-	.16	.19	.00	.01	.00	.10	.0	.0	.4	.04	633	573	333	176	32	1.7
		9-15-65			-	1,040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1cdb-1	do	7-22-64	I	445	800e	1,420	7.3	61	31	116	37	110	5.5	202	0	120	288	.2	5.8	-	.01	.21	.00	.02	.02	.09	.0	.0	.7	.06	956	815	444	278	35	2.3
1/35	Willow Spring (improved)	5-23-63	S	-	.5m	1,560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8-4-64			-	1,450	7.2	-	35	147	29	106	5.3	293	0	59	300	.1	5.5	-	.12	-	.00	-	-	-	.0	-	.4	.07	998	836	488	248	32	2.1
		4-1-65			-	1,510	7.3	-	35	157	31	104	5.3	296	0	60	320	.3	5.9	.02	.10	-	-	-	-	-	.0	-	.7	.06	964	866	518	275	30	2.0
(C-11-10)5abb	East Dugway Reservoir	7-28-64	S	-	-	749	7.6	74	33	36	10	121	11	194	0	173	43	.8	.3	.06	.46	.44	.04	.00	.02	.13	.0	.0	.2	.12	529	525	133	0	64	4.6
34dc	Spring (improved)	9-1-64	S	-	-	3,370	7.4	-	30	309	61	293	8.3	124	0	160	982	1.1	1.0	-	.25	-	-	-	-	-	.0	2.2	1.0	.16	2,300	1,910	1,020	921	38	4.0
1/(C-11-11)12aba-1	Dugway Topaz Well	12-24-64	S	306	15-20e	9,030	8.2	-	28	176	53	1,680	137	248	0	95	2,960	2.7	6.3	.00	.56	-	-	-	-	-	2.2	7.7	6.6	.35	5,470	5,280	658	454	81	28
1/(C-12-9)8bb	Keg Spring(improved)	7-30-64	S	-	-	3,220	7.4	-	16	226	112	271	4.3	193	0	152	920	.1	1.1	-	.19	-	-	-	-	-	.0	7.5	2.0	.15	2,130	1,810	1,020	867	36	3.7
1/(C-12-10)35ba	Kane Spring(improved)	7-28-64	S	-	-	2,580	7.1	-	24	236	47	227	6.3	132	0	129	720	1.4	2.4	-	.16	-	-	-	-	-	.0	2.0	1.8	.07	1,790	1,460	785	677	38	3.5
		4-1-65			-	2,590	7.0	-	24	241	49	199	6.2	120	0	139	710	1.6	3.2	-	.13	-	-	-	-	-	.0	.9	1.1	.05	1,740	1,430	805	707	35	3.1

1/ Sample collected from storage tank.
2/ Sodium plus potassium are calculated and reported as sodium.
3/ Flowing.
4/ Canal is fed by Pass Canyon Spring.
5/ Sampled from north flowing canal; major source of water from springs at (C-3-8)16ad.
6/ Sampled from west flowing canal; major source of water from series of springs at (C-3-8)10cd.
7/ Source of water believed to be from a spring in the Stansbury Mountains.
8/ Piped and ditched from mouth of Big Creek Canyon.
9/ Sampled below confluence of Middle Lost Creek and South Lost Creek.
10/ Reservoir is approximately 20'x30'x3' and is constructed for storing diverted overland runoff. It was filled 3-5 days prior to date of sampling. Approximately one-tenth of the original volume of water remained at the time of sampling.
11/ Sampled pond at spring site; no outflow observed.
12/ Sample collected from Stockton public supply.
13/ East flowing tributary of Bear Fork.
14/ East flowing tributary of Morgan Canyon stream.
15/ Major source of Clover Creek.
16/ Several springs flow into pond; sample collected from edge of pond.
17/ Sample collected from tap at U.S. Post Office in Vernon.
18/ Sample collected from irrigation pipe system; source of water from Lee Creek and unnamed canyon stream north of Lee Canyon.
19/ Sample collected from pipe system at (C-9-7)9dd.
20/ Sample collected from pipe system below Lee Creek.
21/ Sample collected from storage tank overflow at (C-8-8)35aac.
22/ Sample collected 12-24-64 from storage tank; sample collected 12-29-65 from discharge pipe of pumping well.
23/ Reservoir fed by Desert Spring.

Table 1. Continued

(Concentrations of chemical constituents are in parts per million unless noted otherwise)

Location	Source	Date of collection	Use	Reported depth of well (feet)	Discharge (gallons per minute)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature (°F)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Iron (Fe)	Manganese (Mn)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Lithium (Li)	Strontium (Sr)	Bromide (Br)	Iodide (I)	Dissolved solids: Residue on evaporation at 180°C	Dissolved solids: Calculated	Hardness as $CaCO_3$: Calcium magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio
SKULL VALLEY DRAINAGE BASIN--Continued.																																				
(C-6-8)11ddc-1	Well	8-16-63	S	295	3/-	1,710	8.1	59	68	107	73	189	16	591	0	79	288	0.8	3.4	-	0.38	0.81	0.08	0.03	0.00	0.05	0.4	0.7	0.0	0.05	1,100	1,120	566	81	41	3.5
10/12cad	Reservoir	5-29-65	S	-	-	547	7.9	-	.0	23	24	2/62		228	0	23	56	-	.3	0.17	-	-	-	-	-	-	.0	.0	.1	.05	298	301	156	0	46	2.1
15ab	Spring-fed pond	8-15-63	I	-	200e	1,220	7.5	-	18	55	32	145	8.3	228	0	51	245	.5	1.5	-	.12	.37	.00	.00	.00	.10	.2	.1	.0	.00	696	669	268	81	53	3.8
15abd-1	Well	9-15-65	H	300	10e	1,220	7.9	55	18	61	31	2/149		236	0	50	254	-	.9	-	-	-	-	-	-	-	-	-	-	-	738	680	280	86	54	3.9
15cac	Spring	8-15-63	I,S	-	150e	1,220	7.4	60	19	59	32	142	7.7	238	0	49	245	.4	1.5	-	.12	.70	.00	.00	.02	.15	.2	.1	.0	.00	706	673	278	83	52	3.7
23acb	Spring-fed pond	8-15-63	S	-	-	1,290	7.2	-	32	80	30	145	9.6	296	0	55	242	.7	6.2	-	.16	.48	.00	.02	.00	.20	.2	.3	.0	.00	779	747	324	81	48	3.5
23bac-1	do	8-15-63	S	-	-	1,290	7.5	-	19	60	33	152	10	249	0	57	262	.8	1.4	-	.20	.58	.00	.03	.00	.20	.2	.3	.0	.01	748	718	284	80	53	3.9
23bac-2	Willow Patch Spring	8-15-63	S	-	-	1,570	7.4	-	32	79	39	187	12	334	0	54	318	.8	3.1	-	.24	.23	.00	.03	.00	.10	.2	.4	.0	.01	926	889	360	86	52	4.3
25bbb	Scribner Spring	8-15-63	S	-	-	1,290	7.8	56	24	65	33	152	8.9	254	0	64	260	.7	1.2	-	.15	.98	.01	.03	.00	.10	.2	.1	.0	.00	751	735	298	90	52	3.8
11/C-6-9)6dbb	White Rock Spring	5-29-65	-	-	-	358	8.1	-	2.7	30	4.4	34	6.5	116	0	16	47	.3	.2	.24	.08	.71	.09	.02	.02	.04	.0	.0	.1	.03	200	199	94	0	42	1.5
(C-7-8)9dad-1	Well	10-15-52	P	400	1,000r	1,610	7.5	54	48	110	32	180	11	208	0	299	230	.2	19	-	-	-	-	-	-	-	-	-	-	-	1,060	1,030	406	236	48	3.9
		11-4-53			1,000r	1,080	7.6	54	45	57	19	129	7.1	194	0	51	210	.5	3.0	-	-	-	-	-	-	-	-	-	-	-	628	617	220	61	55	2.5
		10-6-54			870r	1,660	7.3	56	45	112	33	192	10	199	0	266	260	.3	19	-	-	-	-	-	-	-	-	-	-	-	1,070	1,040	415	252	49	4.1
		12-12-55			750r	1,060	7.3	54	51	55	19	132	9.0	183	0	45	216	.4	2.0	-	-	-	-	-	-	-	-	-	-	-	636	619	215	65	56	3.9
		9-11-56			720r	1,650	7.5	52	50	116	31	187	11	198	0	278	260	.2	17	-	-	-	-	-	-	-	-	-	-	-	1,070	1,050	418	256	48	4.0
		9-19-57			830r	1,100	7.9	52	46	59	15	137	7.5	194	0	58	210	.4	4.4	-	-	-	-	-	-	-	-	-	-	-	641	632	210	51	58	4.1
		10-14-58			790r	1,090	7.5	53	38	57	16	190	8.3	190	0	49	215	.4	3.8	-	-	-	-	-	-	-	-	-	-	-	633	618	209	53	58	4.1
		9-15-60			750r	1,640	7.5	55	50	112	30	187	10	197	0	277	258	.3	14	-	-	-	-	-	-	-	-	-	-	-	1,080	1,040	405	243	49	4.0
		12-4-62			750r	1,130	7.6	54	45	64	16	2/139		190	0	55	220	.3	4.3	-	-	-	-	-	-	-	-	-	-	-	670	637	225	69	57	4.0
		9-6-63			700r	1,450	7.3	-	45	91	25	170	8.9	201	0	179	255	.2	3.1	-	.19	.02	.00	.00	.00	.05	.3	1.0	1.0	.01	924	876	330	165	52	4.1
		9-29-65			620r	1,200	8.3	55	41	69	20	2/143		178	5	53	245	.4	11	-	-	.11	.00	-	-	-	-	-	-	-	738	675	255	101	55	3.9
9dca-1	do	7-31-51	P	345	1,000r	1,290	7.8	56	53	70	18	162	12	212	0	132	215	.3	8.5	-	-	-	-	-	-	-	-	-	-	-	778	775	248	75	57	4.5
		12-12-55			-	1,340	7.3	-	55	80	20	165	12	204	0	174	214	.3	9.3	-	-	-	-	-	-	-	-	-	-	-	842	830	282	114	55	4.3
		9-11-56			800r	1,430	7.3	53	50	94	21	178	11	206	0	219	218	.2	12	-	-	-	-	-	-	-	-	-	-	-	909	904	322	153	54	4.3
		9-19-57			1,040r	1,440	7.8	53	48	93	22	176	11	206	0	236	215	.3	14	-	-	-	-	-	-	-	-	-	-	-	935	916	322	153	53	4.3
		10-14-58			1,000r	1,450	7.6	54	43	89	22	185	14	206	0	219	220	.2	17	-	-	-	-	-	-	-	-	-	-	-	914	910	315	146	55	4.5
		9-15-60			960r	1,410	7.5	56	50	91	21	174	10	202	0	200	225	.3	9.3	-	-	-	-	-	-	-	-	-	-	-	898	880	314	148	54	4.3
		10-5-61			970r	1,520	7.5	56	48	119	14	2/185		210	0	236	234	.2	13	-	-	-	-	-	-	-	-	-	-	-	992	952	356	184	53	4.3
		9-6-63			960r	1,610	7.5	57	46	107	25	199	11	208	0	265	255	.2	15	-	.22	.03	.00	.04	.00	.15	.2	1.1	.0	.01	1,040	1,030	372	201	53	4.5
15bcb-1	do	7-20-54	U	500	254r	1,140	7.5	54	52	54	19	146	7.5	184	0	47	236	.5	5.2	-	.20	-	-	-	-	-	-	-	-	-	668	658	212	62	59	4.4
15cba-1	do	7-28-58	P	432	1,000r	1,110	7.7	59	48	58	24	125	7.3	185	0	46	230	.6	3.4	-	-	-	-	-	-	-	-	-	-	-	675	632	245	93	52	3.5
		9-15-60			890r	1,110	7.7	55	49	57	25	129	6.6	188	0	45	235	.6	1.8	-	-	-	-	-	-	-	-	-	-	-	670	641	244	90	53	3.6
		10-5-61			910r	1,140	7.5	56	48	73	18	2/134		196	0	59	228	.7	3.4	-	-	.07	-	-	-	-	-	-	-	-	702	660	256	95	53	3.7
		9-6-63				1,070	7.4	-	46	43	27	134	5.1	199	0	37	220	.3	2.0	-	.15	.10	.00	.00	.02	.05	.3	.2	1.0	.01	636	613	220	57	56	3.9
		9-29-64			920r	1,140	7.5	55	43	59	25	2/140		194	0	48	243	.6	.7	-	-	.06	.03	-	-	-	-	-	-	-	696	654	250	91	55	3.8
22adb-2	do	7-28-58	P	545	1,000r	1,080	7.7	59	47	38	29	136	5.4	200	0	39	220	.4	1.0	-	-	-	-	-	-	-	-	-	-	-	627	614	216	52	57	4.0
		10-3-59			900r	1,100	7.8	54	43	38	32	130	5.1	202	0	35	215	.4	1.4	-	-	-	-	-	-	-	-	-	-	-	615	599	226	60	55	3.8
		9-15-60			810r	1,050	7.7	55	47	37	29	139	4.7	201	0	35	218	.5	1.3	-	-	-	-	-	-	-	-	-	-	-	614	611	213	48	58	4.1
		12-4-62			810r	1,090	7.7	54	44	46	30	2/127		195	0	41	222	.5	1.3	-	-	-	-	-	-	-	-	-	-	-	646	608	241	81	53	3.6
		9-6-63			800r	1,090	7.3	-	45	40	28	134	4.9	203	0	36	222	.4	1.6	-	.14	.50	.00	.00	.04	.15	.3	.0	.0	.02	627	613	216	49	57	4.0
		9-29-65			800r	1,080	7.8	54	43	37	31	2/135		200	0	34	220	.6	1.2	-	-	-	-	-	-	-	-	-	-	-	632	600	220	56	57	3.9
		1-12-66				1,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.02	-	.04	-	-	-	-	-	-	-	-	-	-
(C-8-7)13	Reservoir	9-6-63	-	-	-	481	6.9	-	15	62	13	27	12	284	0	11	22	1.0	1.1	-	.19	-	-	-	-	-	.1	.1	.0	.04	318	304	206	0	21	.8
RUSH VALLEY DRAINAGE BASIN																																				
12/(C-4-5)24cd	Soldier Creek	9-26-64	P	-	-	403	8.0	-	6.0	62	15	6.4	0.5	245	0	16	8.3	0.2	5.2	-	0.03	0.12	0.03	0.01	0.00	0.06	0.0	0.2	0.0	0.01	225	241	215	14	6	0.2
32ddc-1	Well	9-25-64	I,S	96	900e	713	7.9	54	16	83	21	35	1.7	254	0	29	99	.2	1.2	-	.05	.00	.00	.00	.00	.04	.0	.0	.3	.01	416	412	293	85	20	.9
33cca-1	do	9-25-64	I,S	43	1,100e	769	7.9	53	14	76	24	41	2.2	242	0	33	106	.2	2.8	0.00	.05	.43	.01	.06	.05	.03	.0	.6	.3	.01	452	420	290	92	23	1.0
35cba	Spring (improved)	9-22-64	I,S	-	60e	570	7.6	56	18	62	23	23	1.2	232	0	38	52	.3	.9	.00	.04	.52	.01	.01	.00	.03	.0	.6	.1	.02	368	334	250	60	17	.6
(C-4-7)25dcb	Spring	9-21-64	-	-	50e	490	7.9	40	10	69	16	13	2.6	276	0	14	23	.2	1.2	.02	.04	.34	.03	.00	.00	.02	.0	.6	.1	.02	283	286	238	12	11	.4
13/36daa	Stream	9-21-64	-	-	10e	426	8.0	40	11	57	13	16	1.3	199	0	27	27	.2	.2	-	.04	.00	.00	.00	.00	.02	.0	.2	.1	.02	248	251	196	33	15	.5
(C-5-3)30dbb	Spring (improved)	9-25-64	S	-	1-5e	491	7.9	47	8.0	67	14	15	.4	211	0	68	13	.2	2.4	-	.06	.10	.03	.00	.01	.13	.0	1.1	.1	.01	291	294	227	54	12	.4
30dcd	do	9-25-64	S	-	1.2m	479	7.9	45	9.3	52	20	21	.4	223	0	33	26	.2	9.0	-	.05	.02	.01	.00	.01	.03	.0	1.0	.1	.02	274	283	212	29	18	.6
(C-5-4)28cdb	Ophir Creek	9-25-64	-	-	2,700e	382	7.9	46	5.9	55	16	5.8	.6	228	0	14	7.5	.1	3.0	.00	.02	.26	.02	.00	.00	.03	.0	.4	.0	.01	213	221	203	16	6	.2
		5-29-65			2,000e	415	8.2	50	6.4	55	12	2/8.6		204	0	17	14	-	.1	.00	-	.37	.02	.02	.03	.07	.0	.0	.0	.01	200	213	186	19	9	.3
		9-15-65			7,000e	412	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(C-5-5)2bcc-1	Well	9-22-64	S	34	40-50e	876	7.7	51	16	69	46	47	2.0	226	0	92	130	.4	3.0	-	.06	.32	.10	.00	.01	.17	.0	1.4	.3	.01	531	519	360	175	22	1.1
2bcc-2	do	9-22-64	H	75	25m	605	7.7	-	17	59	32	22	1.5	212	0	62	58	.4	1.9	-	.03	.00	.02	.00	.00	.82	.0	.1	.2	.02	380	359	280	106	15	.6
3ada	Spring	9-22-64	S	-	0-1e	647	7.9	56	17	34	48	28	2.1	216	0	62	74	.4	2.5	-	.05	.15	.01	.00	.00	.03	.0	.7	.2	.02	388	375	280	103	18	.7
9cba-1	Warm Spring	9-22-64	I	-	1,000e	981	8.0	75	20	58	24	110	11	174	0	90	179	1.0	.4	-	.17	.88	.02	.01	.01	.02	.0	1.4	.6	.05	594	583	242	99	48	3.1
9cba-2	Spring (improved)	9-22-64	H	-	2m	1,600	8.4	56	42	69	52	176	17	164	6	172	330	1.1	.3	-	.42	.00	.18	.02	.04	.16	.0	2.8	.9	.09	1,040	952	384	240	49	3.9
15aad-1	Well	12-22-64	H	150	-	947	7.9	-	17	66	42	78	1.8	299	0	66	142	.4	1.0	-	.05	.21	.04	.03	.01	-	.0	1.3	.4	.03	561	564	335	90	33	1.9
17aaa	Spring-pond outflow	9-22-64	I	-	-	789	7.8	57	18	52	20	74	14	176	0	59	135	1.3	.4	.01	.14	.53	.01	.00	.01	.02	.0	2.1	.4	.03	463	464	211	67	41	2.2
17aad-1	Well	9-22-64	H	20	50m	1,210	7.9	-	50	73	44	106	28	314	0	107	176	2.8	3.6	-	.25	.06	.06	.00	.02	.03	.0	3.6	.5	.05	762	750	364	107	37	2.4
(C-5-6)6bbd-1	Morgan Canyon stream	9-21-64	-	-	10e	376	7.9	40	7.6	60	6.8	11	.8	202	0	13	14	.2	.5	.00	.04	.30	.02	.00	.00	.03	.0	.2	.0	.01	206	214	178	12	12	.4
14/6bbd-2	Stream	9-21-64	-	-	10e	435	7.9	40	8.9	70	9.0	11	.7	239	0	21	15	.2	.7	-	.03	.27	.02	.00	.00	.02	.0	1.0	.0	.01	252	256	212	16	10	.3
20bba	Chokecherry Spring (improved)	9-21-64	S	-	1e	551	7.6	55	12	75	12	27	.8	272	0	38	30	.3	.0	-	.04	.00	.00	.00	.00	.01	.0	.1	.1	.01	338	329	235	12	20	.8
15/32bba	Spring	9-21-64	-	-	4,500e	393	7.8	45	7.6	63	10	8.7	.3	238	0	8.2	11	.2	.2	-	.03	.00	.02	.00	.00	.01	.0	.2	.0	.01	223	227	200	5	9	.3
		5-29-65			5,000e	373	7.9	-	4.6	63	5.8	2/10		213	0	7.4	14	-	.2	.01	-	.44	.01	.01	.00	.04	.0	.2	.1	.01	203	211	180	5	11	.3
		3-18-66			2,000e	391	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(C-6-4)5bdb-1	Well	5-5-48	H,I	404	360r	686	7.9	49	14	85	35	2/17		398	0	38	12	.1	11	-	.00	-	-	-	-	-	-	-	-	-	399	408	356	30	9	.4
		11-7-49			360r	761	7.7	49	12	94	36	21	2.9	420	0	40	23	.1	9.0	-	.04	-	-	-	-	-	-	-	-	-	440	445	382	38	11	.5
		10-4-50			360r	781	7.2	51	12	96	38	21	1.3	417	0	40	34	.3	9.1	-	.03	-	-	-	-	-	-	-	-	-	453	457	396	54	10	.5
		8-2-51			360r	815	7.6	54	13	97	38	23	3.5	412	0	40	46	.2	9.7	-	-	-	-	-	-	-	-	-	-	-	484	473	398	60	11	.5
		9-24-52			-	844	7.3	50	11	98	39	25	1.3	406	0	38	58	.1	9.4	-	-	-	-	-	-	-	-	-	-	-	486	480	405	73	12	.5
		9-8-53			335r	863	7.3	50	13	102	41	22	.9	396	0	43	62	.1	12	-	-	-	-	-	-	-	-	-	-	-	496	491	423	98	10	.5
		10-11-54			335r	850	7.3	50	12	103	41	25	1.0	398	0	41	64	.1	12	-	-	-	-	-	-	-	-	-	-	-	497	495	426	100	11	.5
		4-15-60			335r	700	7.3	50	13	87	33	19	1.3	387	0	35	17	.1	12	-	-	-	-	-	-	-	-	-	-	-	404	407	352	35	11	.4
5bdd-1	do	5-6-48	H,I	428	360r	739	7.8	49	13	87	34	2/27		408	0	39	24	.1	8.7	-	.00	-	-	-	-	-	-	-	-	-	421	433	357	22	14	.6
		11-6-49			360r	787	7.6	49	12	89	34	34	2.9	406	0	44	37	.1	8.3	-	.02	-	-	-	-	-	-	-	-	-	451	461	362	30	17	.8
		10-5-50			360r	794	7.2	51	13	90	36	34	1.3	399	0	40	46	.3	9.3	-	.03	-	-	-	-	-	-	-	-	-	458	467	372	46	17	.8

Table 1. Continued

(Concentrations of chemical constituents are in parts per million unless noted otherwise)

Location	Source	Date of collection	Use	Reported depth of well (feet)	Discharge (gallons per minute)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature (°F)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Iron (Fe)	Manganese (Mn)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Lithium (Li)	Strontium (Sr)	Bromide (Br)	Iodide (I)	Dissolved solids: Residue on evaporation at 180°C	Dissolved solids: Calculated	Hardness as $CaCO_3$: Calcium magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio
RUSH VALLEY DRAINAGE BASIN--Continued.																																				
(C-6-4)5bdd-1	Well	8-2-51	H,I	-	360r	806	7.5	54	12	86	35	37	2.6	399	0	40	46	0.2	9.2	-	-	-	-	-	-	-	-	-	-	-	462	465	358	32	18	0.8
		9-24-52			350r	834	7.4	50	11	94	36	32	1.3	394	0	41	57	.1	9.6	-	-	-	-	-	-	-	-	-	-	-	472	476	382	60	15	.7
		9-8-53			335r	830	7.3	50	11	92	37	30	1.4	388	0	43	57	.4	9.7	-	-	-	-	-	-	-	-	-	-	-	482	473	382	64	14	.7
		9-29-54			335r	774	7.2	50	11	90	35	32	1.0	382	0	41	45	.1	9.2	-	-	-	-	-	-	-	-	-	-	-	446	452	368	56	16	.7
		2-11-57			335r	716	7.2	-	10	83	31	26	1.1	369	0	36	29	.1	9.7	-	-	-	-	-	-	-	-	-	-	-	411	408	336	33	14	.6
		4-15-60			350r	682	7.3	50	12	86	31	18	.9	357	0	42	21	.1	10	-	-	-	-	-	-	-	-	-	-	-	398	397	340	47	10	.4
		5-2-62			350r	744	7.4	50	11	97	28	2/34		392	0	52	31	.1	14	-	-	-	-	-	-	-	-	-	-	-	425	460	356	35	17	.8
		6-10-63			335r	666	7.2	50	11	96	27	2/12		374	0	40	14	.1	11	-	-	-	-	-	-	-	-	-	-	-	382	395	350	43	7	.3
(C-6-6)1bbc	Spring (improved)	9-21-64	S	-	1m	1,150	7.7	57	17	75	25	139	.7	260	0	149	158	.3	4.6	0.01	0.05	0.90	0.01	0.01	0.05	0.05	0.0	0.7	0.4	0.02	717	699	292	79	51	3.6
1cba	Spring	9-21-64	S	-	5-10e	602	7.9	55	15	83	17	23	.8	282	0	20	52	.2	.0	-	.03	.33	.03	.00	.00	.02	.0	.1	.1	.01	378	351	278	46	15	.6
1/(C-7-4)14aac-1	Well	3-30-65	S	875	-	894	8.2	-	50	20	24	145	9.2	334	0	113	61	1.4	2.1	.05	.35	.15	.04	.01	.00	-	.0	.7	.2	.07	600	591	148	0	66	5.2
16/(C-7-5)28	Spring-fed pond	12-22-64	I,S	-	-	2,430	7.6	-	23	116	115	235	7.8	384	0	165	555	.6	.3	.02	.22	.19	.03	.02	.04	.03	.0	1.2	1.2	.07	1,490	1,410	762	448	40	3.7
28bbc-1	Well	12-22-64	H	150	-	1,290	8.1	-	22	63	54	129	3.5	298	0	81	238	.6	1.3	.06	.09	.15	.01	.05	.01	-	.0	.6	.6	.04	767	741	378	134	42	2.9
32a	Spring-pond outflow	12-22-64	I,S	-	600e	725	7.8	68	14	46	38	47	2.8	237	0	35	106	.3	1.4	.00	.06	.12	.07	.00	.01	.02	.0	.5	.3	.01	412	409	270	76	27	1.2
32a-1	Well	12-22-64	H	200	3/1-5e	845	7.7	-	15	64	41	52	7.4	309	0	34	120	.3	.5	-	.07	.40	.01	.00	.00	-	.0	.5	.3	.07	503	488	330	77	25	1.2
(C-8-4)30dcd-1	do	3-29-65	S	322	3m	1,330	7.6	54	40	117	54	58	5.4	194	0	25	325	.5	8.0	-	.12	.00	.00	.00	.00	.46	.0	1.6	.6	.05	868	731	515	356	19	1.1
1/(C-8-5)6ddb-1	do	12-22-64	H,I,S	534	4,500r	558	7.6	-	13	40	27	36	2.8	192	0	28	70	.6	.0	-	.09	.33	.01	.00	.00	-	.0	.1	.2	.05	344	313	210	53	27	1.1
2/29ba-1	do	12-22-64	H	300	20m	848	7.7	-	16	91	30	35	1.8	188	0	38	171	.2	2.3	-	.05	.31	.01	.02	.01	-	.0	.5	.4	.02	559	480	350	196	18	.8
17/31dbc-1	do	12-22-64	P	126	50e	602	7.6	-	16	67	18	29	1.5	198	0	29	80	.2	2.4	.01	.04	.40	.01	.04	.09	-	.0	.1	.2	.01	386	341	242	80	20	.8
(C-8-6)10aaa-1	do	3-30-65	S	420	20m	782	7.9	54	5.0	59	39	29	3.4	124	0	19	177	.5	.2	.00	.09	.18	.07	.00	.00	.04	.0	.8	.8	.04	513	395	305	203	17	.7
(C-9-4)2aa-1	do	12-21-64	H,S	-	5-10e	737	8.0	54	56	38	29	72	8.0	226	0	39	115	1.0	.5	-	.14	.71	.01	.02	.01	.24	.0	1.0	.4	.05	460	473	216	31	41	2.1
15c	Spring (improved)	12-21-64	H,	-	-	956	7.6	-	65	51	44	71	9.2	222	0	29	184	.8	1.4	-	.14	-	.00	.03	.00	.05	.0	.0	.4	.05	610	566	308	126	33	1.8
20dd	do	12-21-64	H	-	-	538	7.8	-	12	55	19	34	1.2	226	0	36	47	.2	.7	-	.04	.33	.00	.00	.00	.07	.0	.1	.2	.02	342	317	218	32	25	1.0
35bbb	Boulter Spring	3-29-65	-	-	1e	891	8.2	55	31	81	39	42	3.5	274	0	32	140	.6	1.0	.00	.11	.29	.09	.01	.03	.05	.0	.7	.6	.03	614	507	362	138	20	1.0
(C-10-5)2cca	Vernon Creek	3-29-65	-	-	850m	427	8.1	52	12	51	13	22	1.2	196	0	24	34	.3	.0	.02	.03	.07	.02	.03	.02	.05	.0	.0	.1	.01	266	254	180	19	21	.7
11dcc	Little Valley Creek	3-29-65	-	-	600e	388	7.7	52	11	49	9.2	19	1.1	182	0	18	28	.3	.2	.00	.04	.04	.01	.00	.02	.03	.0	.0	.1	.01	267	225	160	11	20	.7
GOVERNMENT CREEK VALLEY DRAINAGE BASIN																																				
(C-7-9)32ccd-1	Well	7-31-51	P	335	250r	1,070	7.8	56	51	46	28	125	12	228	0	48	200	0.4	6.5	-	-	-	-	-	-	-	-	-	-	-	616	629	230	43	55	3.6
		12-12-55			250r	1,070	7.3	55	56	44	29	130	8.6	224	0	48	198	.2	5.5	-	-	-	-	-	-	-	-	-	-	-	627	629	229	46	54	3.7
		9-11-56			310r	1,070	7.5	54	50	49	27	128	8.4	224	0	58	197	.3	5.1	-	-	-	-	-	-	-	-	-	-	-	623	633	235	51	53	3.6
		9-19-57			310r	1,070	7.8	54	48	48	26	126	7.9	226	0	48	195	.4	6.7	-	-	-	-	-	-	-	-	-	-	-	614	617	226	41	54	3.7
		10-14-58			310r	1,060	7.8	55	44	46	27	126	9.9	224	0	47	190	.3	8.0	-	-	-	-	-	-	-	-	-	-	-	618	608	228	44	53	3.6
		10-3-59			330r	1,060	7.8	57	46	46	28	123	7.6	225	0	46	188	.4	5.6	-	-	-	-	-	-	-	-	-	-	-	605	602	231	46	53	3.5
		12-4-62			300r	1,060	7.7	57	46	48	27	2/128		227	0	49	190	.3	6.1	-	-	-	-	-	-	-	-	-	-	-	616	606	232	46	55	3.7
		9-29-64			300r	1,020	8.0	57	44	48	27	2/131		226	0	51	194	.4	4.7	-	-	-	-	-	-	-	-	-	-	-	619	611	232	47	55	3.8
(C-7-10)25ccd-1	do	10-18-50	P	317	125r	1,760	7.9	54	50	40	22	289	14	264	0	91	385	.2	9.2	-	0.08	-	-	-	-	-	-	-	-	-	1,010	1,030	190	0	75	9.1
		10-15-52			125r	1,770	7.9	54	47	39	21	300	13	260	0	91	378	.2	9.1	-	-	-	-	-	-	-	-	-	-	-	1,010	1,030	184	0	76	9.6
		10-6-54			180r	1,740	7.5	56	45	38	21	300	11	261	0	91	362	.2	8.0	-	-	-	-	-	-	-	-	-	-	-	997	1,000	182	0	77	9.7
		9-11-56			172r	1,740	7.5	54	45	42	18	303	13	254	0	105	368	.3	9.4	-	-	-	-	-	-	-	-	-	-	-	988	1,030	176	0	77	9.9
		10-14-58			172r	1,740	7.9	55	44	38	20	303	13	261	0	90	385	.3	8.9	-	-	-	-	-	-	-	-	-	-	-	996	1,030	176	0	77	9.9
25ccd-2	do	10-3-59	P	336	140r	1,840	7.8	57	48	34	19	323	11	261	0	88	390	.4	8.2	-	-	-	-	-	-	-	-	-	-	-	1,040	1,050	163	0	80	11
		10-5-61			130r	1,810	7.8	57	46	49	12	2/319		266	0	86	390	.2	7.4	-	-	-	-	-	-	-	-	-	-	-	1,050	1,040	170	0	80	11
		9-29-64			130r	1,780	7.9	56	42	34	19	2/326		262	0	90	395	.2	5.5	-	-	-	-	-	-	-	-	-	-	-	1,040	1,040	161	0	81	11
25cdd-1	do	10-15-52	P	328	125r	1,730	7.9	54	44	27	15	319	12	270	0	87	370	.5	6.9	-	-	-	-	-	-	-	-	-	-	-	995	1,010	129	0	83	12
		10-6-54			140r	1,780	7.6	56	45	31	15	329	11	266	0	89	378	.5	7.5	-	-	-	-	-	-	-	-	-	-	-	1,020	1,040	139	0	82	12
		12-12-55			140r	1,780	7.4	54	53	27	15	326	12	262	0	88	378	.6	8.8	-	-	-	-	-	-	-	-	-	-	-	1,020	1,040	129	0	83	12
		9-19-57			144r	1,750	7.9	54	44	27	12	324	11	264	0	91	370	.6	7.4	-	-	-	-	-	-	-	-	-	-	-	1,000	1,020	118	0	84	13
		10-14-58			144r	1,760	8.0	57	41	26	14	333	12	263	0	93	375	.5	6.8	-	-	-	-	-	-	-	-	-	-	-	1,000	1,030	121	0	84	13
		9-15-60			170r	1,740	7.8	56	45	27	13	326	11	261	0	86	370	.6	6.0	-	-	-	-	-	-	-	-	-	-	-	1,010	1,010	123	0	84	13
		10-7-63			170r	1,720	7.7	57	45	31	11	2/338		263	0	103	375	.5	7.4	-	-	-	-	-	-	-	-	-	-	-	996	1,040	124	0	86	13
36bab-1	do	7-31-51	P	330	250r	1,740	7.6	55	47	32	18	303	13	270	0	88	365	.4	7.2	-	-	-	-	-	-	-	-	-	-	-	992	1,010	154	0	79	11
		11-3-53			250r	1,800	7.9	56	47	18	11	348	13	272	0	91	375	.6	6.2	-	-	-	-	-	-	-	-	-	-	-	1,030	1,040	90	0	88	16
		12-12-55			250r	1,780	7.7	54	54	32	18	314	13	267	0	89	378	.4	9.5	-	-	-	-	-	-	-	-	-	-	-	1,030	1,040	154	0	80	11
		9-11-56			370r	1,790	7.6	54	48	34	16	321	12	270	0	96	375	.4	7.5	-	-	-	-	-	-	-	-	-	-	-	1,020	1,040	150	0	81	11
		9-19-57			370r	1,800	7.9	54	46	32	16	326	12	274	0	94	385	.5	10	-	-	-	-	-	-	-	-	-	-	-	1,030	1,060	146	0	81	12
		10-14-58			370r	1,790	7.9	55	45	32	16	321	15	273	0	86	380	.5	8.9	-	-	-	-	-	-	-	-	-	-	-	1,020	1,040	146	0	81	12
		9-15-60			340r	1,790	7.8	56	47	32	16	326	11	271	0	86	380	.4	5.5	-	-	-	-	-	-	-	-	-	-	-	1,040	1,040	144	0	82	12
		12-4-62			340r	1,830	7.8	56	45	37	15	2/322		272	0	91	375	.5	6.4	-	-	-	-	-	-	-	-	-	-	-	1,050	1,030	152	0	82	11
		9-29-65			330r	1,820	8.5	57	42	32	16	2/333		239	16	84	392	.7	5.2	-	-	-	-	-	-	-	-	-	-	-	1,090	1,040	146	0	83	12
(C-8-10)10dda-1	do	7-31-51	H,S	120	15e	1,500	7.8	60	56	54	38	176	18	230	0	57	328	.4	5.8	-	-	-	-	-	-	-	-	-	-	-	877	847	290	102	55	4.5
		10-6-54			15e	1,500	7.5	62	43	59	39	183	17	232	0	58	325	.4	5.0	-	-	-	-	-	-	-	-	-	-	-	870	844	308	118	55	4.5
		9-11-56			13e	1,480	7.4	60	49	59	38	178	19	231	0	70	325	.3	5.9	-	-	-	-	-	-	-	-	-	-	-	864	858	304	115	54	4.4
18/(C-9-7)7aa	Pipeline	7-15-64	H,I	-	-	610	7.9	63	13	51	22	47	1.2	250	0	29	62	.0	.1	-	.05	0.38	0.01	0.00	0.01	0.06	0.0	0.0	0.1	0.01	340	350	218	13	32	1.4
18/7dac	do	7-15-64	H,I	-	100e	585	8.0	65	13	45	21	48	.9	231	0	30	62	.1	.1	.30	.05	.37	.01	.00	.00	.09	.0	.0	.1	.01	327	335	200	11	34	1.5
		3-30-65			-	648	8.0	47	12	63	22	44	1.1	288	0	30	58	.3	.4	.25	.05	.12	.02	.02	.01	.05	.0	.1	.2	.01	381	374	248	11	28	1.2
19/11cc	Copper Spring (improved)	8-12-64	S	-	-	576	7.6	-	5.5	56	18	43	.5	265	0	25	49	.1	1.4	-	.09	.33	.00	.00	.01	-	.0	.0	.1	.03	338	331	214	0	30	1.3
		3-30-65	S	-	1e	563	7.8	-	12	59	18	39	.7	266	0	27	39	.3	4.0	.00	.05	-	.03	.02	.00	-	.0	.0	.1	.02	337	331	220	2	28	1.1
28bc	Government Creek	7-17-64	-	-	100e	572	8.0	83	16	42	16	54	1.7	182	0	26	81	.3	.5	-	.06	.22	.01	.01	.00	.12	.0	.0	.2	.02	325	330	171	22	40	1.8
28bc	Spring (improved)	7-17-64	H,S	-	1.5e	898	7.7	64	23	85	26	68	2.0	343	0	30	113	.1	1.8	-	.12	.09	.00	.00	.00	.08	.0	.0	.3	.03	528	519	318	37	32	1.7
		3-30-65			1e	875	7.7	-	23	86	26	67	2.2	346	0	36	106	.4	1.6	.00	.08	.16	.03	.01	.05	.06	.0	.5	.4	.00	541	519	320	36	31	1.6
28cac	Spring	7-17-64	S	-	40e	790	7.9	64	22	78	21	59	1.9	306	0	30	95	.3	2.0	-	.10	.11	.03	.01	.00	.12	.0	.0	.2	.02	465	461	282	31	31	1.5
20/30cd	Lee Canyon stream (improved)	7-15-64	H,I	-	450e	645	8.0	61	12	66	20	46	.8	290	0	29	61	.3	.2	-	.05	.40	.05	.00	.01	.06	.0	.0	.1	.01	372	379	248	10	29	1.3
31dbb	Spring (improved)	7-15-64	-	-	.2e	343	9.1	79	5.7	14	16	36	.6	95	10	18	45	.3	.1	-	.06	.55	.01	.00	.00	.03	.0	.0	.1	.01	186	194	99	5	44	1.6
35b	Spring	7-20-64	I,S	-	100e	421	7.6	66	14	50	8.0	28	2.8	189	0	17	38	.1	.3	-	.06	.11	.01	.00	.00	.08	.0	.0	.1	.07	264	252	158	3	27	1.0
21/(C-9-8)15dbc and 15dbd	Winter Springs (improved)	7-20-64	S	-	-	581	7.3	-	12	51	11	57	1.2	222	0	17	69	.1	2.0	-	.05	.25	.01	.02	.00	2.0	.0	.0	.2	.05	324	333	172	0	42	1.9
		3-31-65			-	573	7.4	-	12	52	9.1	55	1.1	208	0	26	67	.4	2.1	.00	.07	.00	.02	.03	.01	1.1	.0	.0	.3	.02	352	328	168	0	41	1.8
		12-29-65			3r	589	-	39	-	-	-	-	-	-	-	-	-	-	-	.01	.10	.68	.01	.04	.02	1.6	.0	.2	-	-	-	-	-	-	-	-
18adb	Simpson Springs (improved)	7-30-64	S	-	-	1,090	7.4	63	15	86	16	121	2.1	321	0	34	182	.2	.3	-	.11	.32	.01	.00	.00	.07	.0	.0	.4	.08	620	617	280	17	48	3.1
		12-29-65			4m	1,010	-	55	-	-	-	-	-	-	-	-	-	-	-	.00	-	1.0	.00	.01	.03	.08	.0	.3	-	-	-	-	-	-	-	-

Table 2. Spectrographic analyses of water in a part of western Utah

The concentrations: The > indicates that the concentration of the element is greater than the amount indicated; The < indicates that the concentration of the element is less than the amount indicated; the ≦ indicates that the concentration is equal to, but slightly less than the amount indicated.

Location	Date of collection	Parts per billion																
		Aluminum (Al)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Gallium (Ga)	Germanium (Ge)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
SINK VALLEY AREA																		
(B-1-10)21dd-1	1-13-66	30	<0.57	<0.29	<1.4	<1.4	<1.4	<1.4	<5.7	<0.29	>200	-	<1.4	<0.29	3.1	<0.57	31	-
(B-3-10)29dd-1	1-13-66	16	<.57	<.29	<1.4	<1.4	<1.4	<1.4	<5.7	<.29	183	<1.4	<1.4	<.29	2.5	<.57	31	204
SKULL VALLEY DRAINAGE BASIN																		
(C-1-7)31daa-1	9-5-63	6.8	<.50	<.25	<1.2	<1.2	<1.2	<1.2	<5.0	<.25	-	-	-	≦.25	≦.25	<.50	11	-
(C-3-8)28adc-1	7-30-63	15	<.50	<.25	≦1.2	<1.2	≦1.2	-	<5.0	<.25	-	≦1.2	<1.2	<.25	1.0	≦.50	1.0	-
(C-3-9)8c	9-5-63	6.0	<.50	<.25	<1.2	<1.2	<1.2	<1.2	<1.2	<5.0	-	≦1.2	-	2.0	1.6	<.50	<.25	<5.0
(C-5-8)11acc	12-22-65	15	<.57	<.29	<1.4	<1.4	1.0	3.7	<5.7	<.29	5.1	<1.4	<1.4	.5	.3	.4	<.29	10
(C-5-8)34ddb-5	9-27-63	9.2	<.50	<.25	<1.2	<1.2	<1.2	<1.2	<5.0	<.25	-	<1.2	<1.2	7.0	≦.25	<.50	13	-
(C-5-10)15dcc	9-5-63	9.8	<.50	<.25	<1.2	<1.2	<1.2	<1.2	<5.0	<5.0	-	≦1.2	-	6.8	1.2	<.50	<.25	<5.0
(C-7-8)22adb-2	1-12-66	51	<.57	<.29	<1.4	<1.4	<1.4	-	<5.7	<.29	17	<1.4	<1.4	<.29	2.5	<.57	17	-
RUSH VALLEY DRAINAGE BASIN																		
(C-4-5)35cba	12-30-64	5.5	<.61	<.31	<1.5	<1.5	<1.5	<1.5	<6.1	<.31	-	7.9	7.9	1.6	.36	<.61	3.0	-
(C-5-5)9cba-1	9-22-64	6.0	<.50	<.25	<1.2	<1.2	<1.2	<1.2	<5.0	.40	-	-	12	2.2	.30	<.50	.72	-
15aad-1	12-30-64	4.1	<.51	<.26	<1.3	<1.3	<1.3	-	<5.1	<.26	-	<1.3	-	2.4	.31	<.51	1.3	-
17aad-1	12-30-64	≦1.2	<.49	<.24	<1.2	<1.2	<1.2	<1.2	<4.9	<.24	-	-	-	13	.83	<.49	4.9	-
(C-5-6)32bba	9-21-64	5.5	<.50	<.25	<1.2	<1.2	<1.2	≦1.2	<5.0	<.25	7.8	<1.2	-	≦.25	.48	<.50	.55	<5.0
(C-7-4)14aac-1	3-30-65	15	<.51	<.26	<1.3	<1.3	<1.3	-	<5.1	<.26	-	1.3	37	3.1	1.0	1.3	38	-
(C-7-5)28bbc-1	12-22-64	4.4	<.56	<.28	<1.4	<1.4	<1.4	-	<5.6	<.28	-	-	3.9	2.1	.33	<.56	4.4	-
(C-8-4)30dcd-1	3-29-65	3.6	<.48	<.24	<1.2	<1.2	<1.2	<1.2	<4.8	<.24	4.3	1.4	5.7	1.0	.60	<.48	13	-
(C-8-5)6ddb-1	12-30-64	5.8	<.53	<.26	<1.3	<1.3	<1.3	<1.3	<5.3	.47	-	<1.3	<1.3	2.6	.29	<.53	.66	-
29ba-1	12-30-64	5.4	<.57	<.29	<1.4	<1.4	<1.4	-	<5.7	<.29	-	-	-	≦.29	.26	<.57	1.6	-
(C-8-6)10aaa-1	3-30-65	7.1	<.48	<.24	<1.2	<1.2	<1.2	<1.2	<4.8	<.24	-	2.4	48	1.1	.31	1.1	<.24	-
(C-9-4)35bbb	3-29-65	5.9	<.69	<.34	<1.7	<1.7	<1.7	-	<6.9	<.34	-	-	-	2.1	2.2	<.69	8.3	-
(C-10-5)11dcc	3-29-65	3.1	<.51	<.26	<1.3	<1.3	<1.3	<1.3	<5.1	<.26	-	-	5.6	≦.26	.28	<.51	.59	-
GOVERNMENT CREEK VALLEY DRAINAGE BASIN																		
(C-9-8)18adb	12-24-64	3.8	<.50	<.25	<1.2	<1.2	<1.2	4.2	<5.0	<.25	-	-	<1.2	1.0	.50	.50	1.6	-
DUGWAY VALLEY-OLD RIVER BED AREA																		
(C-9-11)33ccb-1	12-29-65	103	<.57	<.29	<1.4	<1.4	17	-	<5.7	<.29	>200	<1.4	143	<.29	5.4	<.57	4.9	-
(C-10-9)8cc-1	12-24-64	5.4	<.83	<.42	<2.1	<2.1	<2.1	-	<8.3	<.42	-	<2.1	-	1.7	.88	<.83	5.8	-
(C-10-10)31bbb-1	3-31-65	-	<.50	<.25	<1.2	<1.2	<1.2	-	<5.0	-	-	-	90	<.25	-	<.50	-	-
	12-29-65	23	<.57	<.29	<1.4	<1.4	<1.4	-	<5.7	12	-	-	-	<.29	1.9	<.57	1.3	-
(C-11-11)12aba-1	12-24-64	≦1.2	<.49	<.24	<1.2	<1.2	<1.2	-	<4.9	<.24	-	-	-	≦.24	1.4	.49	≦.24	-
(C-12-10)35ba	4-1-65	3.0	<.50	<.25	<1.2	<1.2	<1.2	-	<5.0	<.25	-	-	-	≦.25	2.2	<.50	2.2	-