

INTRODUCTION

This atlas presents data on ground-water quality for the Nevada part of the Death Valley 1° x 2° quadrangle. The basic data were compiled as part of the Great Basin Regional Aquifer-Systems Analysis of the U.S. Geological Survey (Harrill and others, 1983).

The data herein were obtained from various sources, including published reports and computerized data files. The computer files accessed for this effort are: (1) WATSTORE, the National Water-Data Storage and Retrieval system maintained by the Water Resources Division of the U.S. Geological Survey; (2) WADS, a system created by the Desert Research Institute, University of Nevada; and (3) RASS, a system maintained by the Geologic Division of the U.S. Geological Survey. Other potential major sources of data are: the National Uranium Resource Evaluation (NURE), a U.S. Department of Energy project; reports of sampling efforts begun in 1980 by the U.S. Bureau of Land Management; and U.S. Geological Survey reports on various hydrographic areas. Only those analyses that pass certain quality-control criteria are included herein. A chemical analysis is excluded if (1) determinations do not exist for all of the principal ions, or (2) the analytical results do not meet the following criterion for electrical balance: total cations and total anions must agree within 10 percent, using the formula:

$$\text{Imbalance (in percent)} = \frac{(\text{cations} - \text{anions})}{(\text{cations} + \text{anions})} \times 100,$$

where the concentrations are expressed in milliequivalents per liter. This electrical imbalance should be small for comprehensive analyses and it therefore serves as a check on the quality of the analytical results.

Where sample sites are closely spaced, or where more than one analysis is available for a single site, areal averaging is applied to prevent overprinting of information on the map (see side 1). Furthermore, if data for a deep well or for a thermal water are available within an area containing other data (shallow or nonthermal), the other data are not included in the averaging. Finally, if data for both a deep well (1,000 feet or greater) and a thermal water (30 °C or greater) are available, only the deep data are used. The averaging is done over a map area of 0.5 inch by 0.5 inch at a scale of 1:250,000, which is equivalent to about 4 square miles. One consequence of this procedure is that the actual map location corresponding to the sampling site does not necessarily coincide exactly with the computer-plotted location on the map (which is at the center of the 4-square-mile averaging area). Thus, the plotted data for springs may be offset from the spring locations shown on the topographic base map.

The general chemical character of each water (that is, the relative proportions of principal cations and anions) is shown in the trilinear diagrams (side 1) and indicated by a letter code on the map (see "Explanation"). The characteristics and uses of trilinear diagrams are discussed by Hem (1985, p. 178-180). Both the map and the trilinear diagrams used the same depth-and-temperature symbols. The bar graph (side 1) indicates the relative proportion of major cations and anions for the indicated ranges of dissolved-solids concentration.

REFERENCES CITED

Harrill, J. R., Welch, A. H., Prudic, D. E., Thomas, J. M., Carman, R. L., Plume, R. W., Gates, J. S., and Mason, J. L., 1983, Aquifer systems in the Great Basin Region of Nevada, Utah, and adjacent states--a study plan: U.S. Geological Survey Open-File Report 82-445, 49 p.

Hem, J. D., 1985, Study and interpretation of the chemical characteristics of natural water (3d ed.): U.S. Geological Survey Water-Supply Paper 2254, 263 p.

Malmberg, G. T., and Eakin, T. E., 1962, Ground-water appraisal of Sarcobatus Flat and Oasis Valley, Nye and Esmeralda Counties, Nevada: Nevada Department of Conservation and Natural Resources, Ground-Water Resources - Reconnaissance Report 10, 39 p.

Schoff, S. L., and Moore, J. E., 1964, Chemistry and movement of ground water, Nevada Test Site: U.S. Geological Survey Open-File Report TEI-838, 75 p.

Walker, G. E., and Eakin, T. E., 1963, Geology and ground water of Amargosa Desert, Nevada-California: Nevada Department of Conservation and Natural Resources, Ground-Water Resource - Report 14, 45 p.

CONVERSION FACTORS AND ABBREVIATIONS

"Inch-pound" units of measure used in this report may be converted to International System (metric) units by using the following factors:

Multiply	By	To obtain
Feet (ft)	0.3048	Meters (m)
Inch (in.)	25.40	Millimeters (mm)
Square miles (mi <sup>2</sup> )	2.590	Square kilometers (km <sup>2</sup> )

For temperature, degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) by using the formula °F = [(1.8)(°C)] + 32.

Site designation <sup>1</sup>	Latitude, longitude (deg-min-sec) <sup>2</sup>	Type of site	Temperature (degrees Celsius)	pH (units)	Specific conductance (microsiemens per centimeter at 25°C)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Dissolved solids <sup>3</sup> (mg/L)	Cation-anion balance <sup>4</sup>	Sampling date (year-month-day)	Well depth (feet)	Source of data <sup>5</sup>
S18 E51 7C	362359 1161653	Well	28	7.4	680	52	20	69	8.4	300	0	79	23	1.2	23	420	2	62-08-22	---	Schoff and Moore, 1964
KING SPRING	362402 1161658	Spring	---	7.2	680	49	21	69	7.7	310	0	80	21	1.4	23	420	0	49-02-28	---	Walker and Eakin, 1963
NOT SPECIFIED	362451 1162541	Well	24	7.4	730	29	12	120	9.7	350	0	74	20	3.7	59	500	0	72-11-18	---	WATSTORE
NOT SPECIFIED	362459 1162510	Well	---	6.9	545	17	5.4	110	8.4	270	0	52	12	4.5	62	400	4	72-11-18	---	WATSTORE
S17 E49 35D	362535 1162442	Well	---	7.9	372	14	4.4	46	8.0	160	0	40	6.5	2.3	82	280	-5	74-03-06	---	WATSTORE
KWICHUP SPRING	362821 1160216	Spring	12	6.9	1,690	130	120	94	2.8	410	0	660	21	0.3	29	1,300	-1	72-11-16	---	WATSTORE
NOT SPECIFIED	362833 1160206	Well	16	7.0	1,820	150	150	74	2.8	390	0	770	26	0.3	27	1,400	0	72-11-16	---	WATSTORE
S17 E49 15B	362839 1162637	Well	---	8.1	321	21	4.0	32	8.2	120	0	35	10	1.4	73	240	0	74-03-06	---	WATSTORE
S17 E49 08D	362904 1162808	Well	---	8.0	299	21	2.7	36	7.5	120	0	27	6.4	1.4	81	240	6	74-03-06	---	WATSTORE
S17 E48 12B	362920 1163110	Well	---	7.7	1,290	74	24	160	16	400	0	180	78	6.8	46	780	2	74-03-03	---	WATSTORE
MECCA CLUB	362936 1162515	Well	---	8.1	798	40	14	97	14	210	0	160	28	2.9	53	510	1	74-03-07	---	WATSTORE
LYLE RECORD	362938 1163001	Well	---	8.0	363	24	1.8	48	7.3	150	0	31	9.5	1.7	80	280	4	74-03-01	---	WATSTORE
B. COPELAND	362940 1162658	Well	---	7.9	422	25	3.6	48	9.7	130	0	69	10	1.2	70	300	0	74-03-01	---	WATSTORE
S17 E48 01A	363028 1163025	Well	---	8.0	307	19	1.5	40	7.1	140	0	25	6.3	1.7	79	240	0	74-03-05	---	WATSTORE
BETTY SMITH	363128 1163024	Well	---	7.9	301	17	2.0	40	6.1	130	0	25	6.9	1.6	79	240	1	74-03-04	---	WATSTORE
JACOBS WEST	363219 1163024	Well	---	7.9	324	19	0.8	43	7.3	130	0	28	9.3	1.3	72	240	2	74-03-05	---	WATSTORE
ARMY 3	363236 1164648	Well	---	7.9	321	27	21	6.8	1.4	190	0	11	6.0	0.1	6.6	170	-2	59-01-28	---	Schoff and Moore, 1964
ARMY 2	363246 1165156	Well	---	7.8	377	35	23	5.6	1.2	200	0	15	5.0	---	14	200	2	61-05-03	---	Schoff and Moore, 1964
JACOBS EAST	363249 1162919	Well	---	7.9	324	24	1.1	36	8.2	130	0	33	6.6	1.0	75	250	1	74-03-05	---	WATSTORE
NOT SPECIFIED	363313 1163025	Well	27	7.0	321	18	0.7	54	6.9	150	0	30	7.8	1.5	79	270	3	72-11-17	---	WATSTORE
S16 E49 18D	363323 1162944	Well	---	8.0	340	20	2.7	42	8.8	150	0	28	7.4	1.2	59	240	0	74-03-01	---	WATSTORE
ELEM SCHOOL	363410 1162735	Well	---	7.6	430	23	2.6	56	9.0	140	0	67	10	0.9	72	310	1	74-03-01	---	WATSTORE
NOT SPECIFIED	363418 1162742	Well	24	7.4	432	33	3.3	56	9.4	140	0	76	14	0.8	75	340	4	72-11-18	---	WATSTORE
ARMY 6A (WELL 66-69)	363437 1160113	Well	---	8.0	1,130	24	16	220	11	490	0	170	23	0.8	9.3	710	1	---	---	Schoff and Moore, 1964
NOT SPECIFIED	363456 1162841	Well	23	7.0	314	30	2.6	37	5.6	150	0	30	7.7	0.7	54	240	2	72-11-17	---	WATSTORE
TEST WELL 4	363458 1164745	Well	25	7.5	337	34	17	13	2.5	200	0	17	6.1	---	20	210	-1	62-09-13	---	Schoff and Moore, 1964
A. E. SASSE	363528 1162842	Well	---	7.8	307	29	2.2	35	5.2	140	0	26	6.0	1.0	62	230	4	74-03-04	---	WATSTORE
NOT SPECIFIED	363537 1160139	Well	33	7.1	544	47	21	37	5.2	260	0	53	16	0.9	21	330	0	62-07-10	---	Walker and Eakin, 1963
DH AM 101 AMARGOSA	363715 1162445	Well	42	7.8	339	22	1.6	48	2.9	150	0	36	7.3	0.8	19	210	0	73-03-30	---	WATSTORE
DH AM 101 AMARGOSA	363715 1162445	Well	46	8.0	348	22	1.0	50	2.2	150	0	40	7.6	0.9	22	220	-1	73-04-03	---	WATSTORE
BR SUPPLY	363740 1162639	Well	---	7.8	337	28	2.1	39	4.9	150	0	33	6.7	1.0	49	230	1	74-03-04	---	WATSTORE
NOT SPECIFIED	363750 1161960	Well	---	6.7	325	27	2.0	43	4.6	150	0	33	8.5	0.9	49	240	2	72-11-20	---	WATSTORE
NOT SPECIFIED	364505 1162556	Well	26	8.2	266	9.6	1.9	45	5.2	120	0	24	7.0	140	26	180	1	58-04-25	---	Walker and Eakin, 1963
TEST WELL F	364533 1160658	Well	22	7.3	492	13	1.0	99	6.4	200	0	34	32	0.4	32	320	3	61-05-30	---	Schoff and Moore, 1964
TEST WELL F	364534 1160659	Well	65	---	666	46	17	60	8.3	260	0	89	10	3.4	37	400	1	75-05-21	3,400	WATSTORE
WELL J-12 NEV TEST SITE	364553 1162324	Well	---	7.4	276	14	1.5	42	4.4	120	0	24	8.0	1.8	49	200	1	59-02-19	---	Schoff and Moore, 1964
WELL J-12 (73-58)	364554 1162324	Well	---	7.6	285	15	2.2	38	4.6	120	0	23	7.7	1.6	58	210	1	74-05-01	1,140	WATSTORE
NOT SPECIFIED	364625 1161925	Well	33	7.8	1,210	85	14	160	16	100	0	480	20	0.9	67	890	2	57-09-18	---	Walker and Eakin, 1963
NOT SPECIFIED	364947 1162543	Well	40	7.7	295	12	0.3	53	2.0	140	0	22	7.0	2.1	53	220	0	84-03-13	3,000	WATSTORE
NOT SPECIFIED	364947 1162543	Well	40	7.7	295	12	0.4	54	2.1	140	0	22	7.1	2.0	54	220	1	84-03-13	3,000	WATSTORE
NOT SPECIFIED	365245 1164518	Well	---	7.3	1,480	38	5.6	290	10	440	0	250	100	6.3	67	980	0	72-11-19	---	WATSTORE
NOT SPECIFIED	365507 1164438	Spring	24	8.2	---	14	1.9	110	5.8	190	0	69	27	4.0	68	390	4	56-02-22	---	Malmberg and Eakin, 1962
WELL C-1 NEV TEST SITE	365508 1160034	Well	26	7.8	1.050	74	29	120	14	580	0	66	34	1.2	29	650	-1	64-06-14	---	B. P. Robinson, USGS, written commun., 1965
HOT SPRINGS	365835 1164317	Spring	37	7.9	---	18	1.0	170	7.4	260	0	120	45	5.0	65	550	3	56-02-22	---	Malmberg and Eakin, 1962
WELL 3 NEV TEST SITE	365943 1160329	Well	22	8.0	379	19	13	39	7.4	190	0	21	6.0	0.9	74	270	2	57-09-18	---	Schoff and Moore, 1964

<sup>1</sup> Sample-site designations having format S16 E49 18D indicate township, range, and section, respectively; letter following section number indicates quarter section, as follows: A, northeast; B, northwest; C, southwest; D, southeast. Townships and ranges are referenced to Mount Diablo base line and meridian.

<sup>2</sup> Data are listed in order of increasing latitude and, for identical latitudes, increasing longitude.

<sup>3</sup> Computed sum (with bicarbonate multiplied by 0.492 to make results comparable with residue-on-evaporation values).

<sup>4</sup> Computed as described in introductory text. Negative value indicates that anions exceed cations.

<sup>5</sup> WATSTORE is U.S. Geological Survey's National Water Data Storage and Retrieval System. Citations for other sources are listed under "References Cited."