

RECORDS OF WELLS IN SANDSTONE AND ALLUVIAL AQUIFERS AND CHEMICAL DATA FOR WATER FROM SELECTED WELLS IN THE NAVAJO AQUIFER IN THE VICINITY OF THE GREATER ANETH OIL FIELD, SAN JUAN COUNTY, UTAH

By Lawrence E. Spangler

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CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATED WATER-QUALITY UNITS

Multiply	By	To obtain
foot	0.3048	meter
mile	1.609	kilometer
square mile	2.59	square kilometer
gallon per minute	0.06308	liter per second

Water temperature is given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the following equation:

$$^{\circ}\text{F} = 1.8 (^{\circ}\text{C}) + 32.$$

Sea level: In this report, “sea level” refers to the National Geodetic Vertical Datum of 1929—a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Chemical concentration and water temperature are reported in metric units. Chemical concentration is reported in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. For concentrations less than 7,000 milligrams per liter, the numerical value is about the same as for concentrations in parts per million. Specific conductance is reported in microsiemens per centimeter (µS/cm) at 25 degrees Celsius.

U.S. Geological Survey Classification of Natural Water

[After Heath, 1989, table 2, p. 65]

Salinity	Dissolved-solids concentration (milligrams per liter)
Fresh	0 to 1,000
Slightly saline	1,000 to 3,000
Moderately saline	3,000 to 10,000
Very saline	10,000 to 35,000
Briny	Greater than 35,000

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INTRODUCTION

This report contains hydrologic data for wells finished in sandstone and alluvial aquifers in southeastern San Juan County, Utah, and chemical data for water from selected wells in the Navajo aquifer. Temperature, specific conductance, pH, and discharge data from 1989-91 for water from selected wells in all aquifers are also presented.

Data presented in this report were compiled from previously published reports (Goode, 1958; Sumsion, 1975; Avery, 1986; Kimball, 1987; Howells, 1990); data bases of the U.S. Geological Survey, the Navajo Tribe, the U.S. Bureau of Land Management, the Utah Division of Water Rights, and the Utah Division of Oil, Gas, and Mining; and from information obtained from oil companies in the Greater Aneth Oil Field.

Results of investigations by Avery (1986) during 1982-83 indicated that water from many wells in the Navajo aquifer in the vicinity of the Greater Aneth Oil Field was moderately saline and that in some wells, salinity appeared to increase over time. The purpose of this study is to assess the physical extent and concentration of saline water in the Navajo and other aquifers in this area. The purpose of this report is to present available water-quality data for water from wells in the Navajo aquifer and present records for selected wells in the Navajo and other aquifers.

Location and Description of Study Area

The study area includes about 800 square miles in the southeast corner of San Juan County, Utah (fig. 1). Most of the area is part of the Navajo

Indian Reservation (fig. 2). In the study area, the San Juan River and its largest tributary, McElmo Creek, flow west and are the only perennial streams. Montezuma Creek and numerous smaller streams are intermittent. The Greater Aneth Oil Field covers about 125 square miles in the central part of the area and is surrounded by numerous smaller oil and gas fields, such as the South Ismay-Flodine Park Field. Topographic relief throughout the region averages 400 to 600 feet and consists of highly dissected mesas.

Data Collection

Data collection for the present investigation was initiated in 1989. Selected water wells in sandstone and alluvial aquifers were located, well logs and additional information on wells with minimal or no data were obtained, and temperature, specific conductance, pH, and discharge of water from wells in the vicinity of the Greater Aneth Oil Field were measured. Water samples from 16 flowing wells in the Navajo aquifer and 2 samples of brine from the Paradox Formation were collected and analyzed for common constituents, selected trace elements, and the stable isotopes oxygen 18/16, hydrogen 2/1, sulfur 34/32, and strontium 87/86.

Data collection during 1990 was limited to collection of seven water samples from previously selected flowing wells in the Navajo aquifer. Analysis was limited to nine common ions and trace elements. The number of water samples collected during 1991 was increased to 12, with the same analyses as were done in 1990. Records of wells, water-quality analyses, and measurements of temperature, specific conductance, pH, and discharge of water from selected wells in sandstone and alluvial aquifers are presented in tables 1 through 8. The well-numbering system is shown in figure 3.

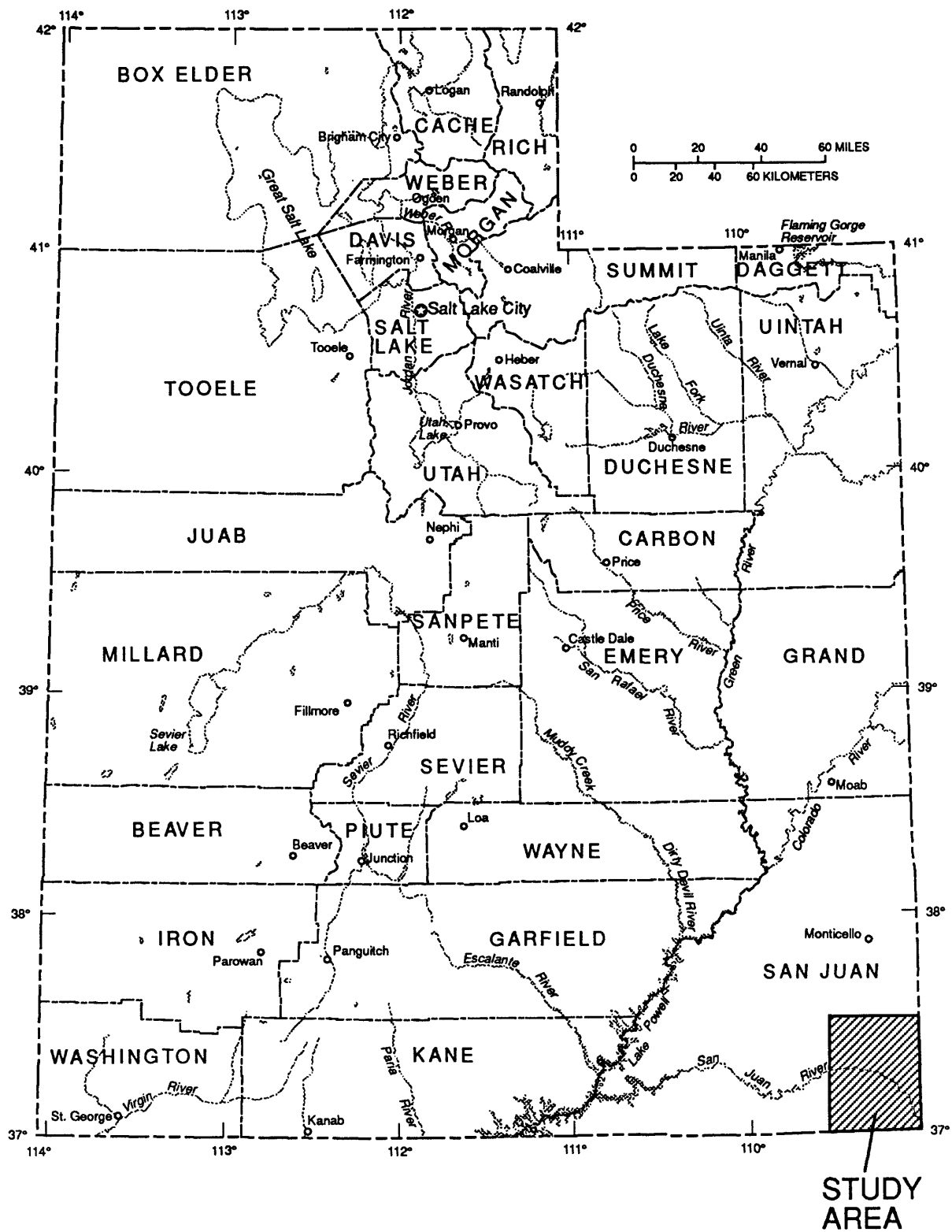


Figure 1.--Location of study area.

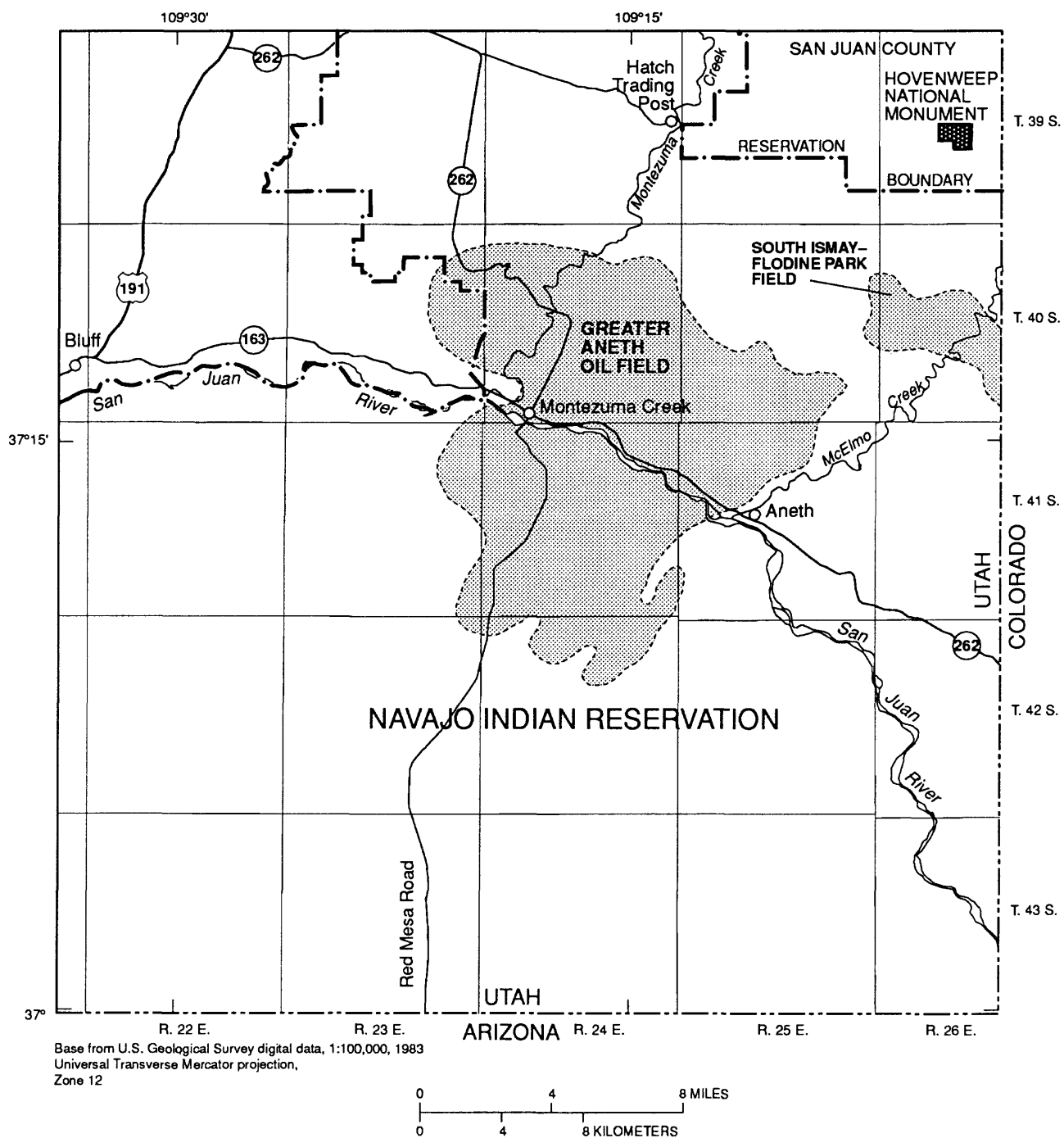
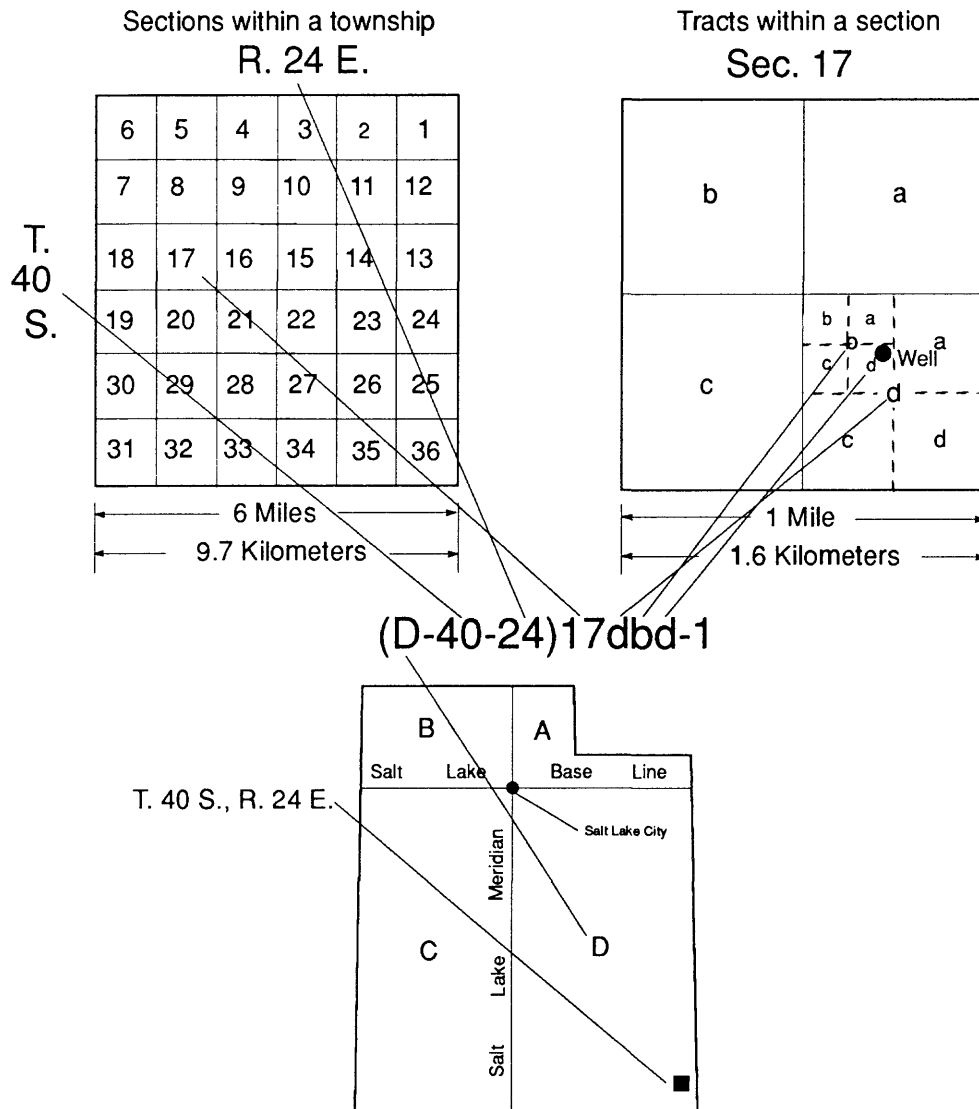


Figure 2.--Location of Greater Aneth Oil Field and vicinity.

Well-numbering System Used in Utah

The system of numbering wells in Utah is based on the cadastral land-survey system of the U.S. Government. The number, in addition to designating the well, describes its position in the land net. The land-survey divides the State into four quadrants separated by the Salt Lake Base Line and Salt Lake Meridian. These quadrants are designated by the uppercase letters A, B, C, and D, indicating the northeast, northwest, southwest, and southeast quadrants, respectively. Numbers designating the township and range, in that order, follow the quadrant letter, and all three are enclosed in parentheses. The number after the parentheses indicates the section, and is followed by three letters indicating the quarter section, the quarter-quarter section, and the quarter-quarter-quarter section — generally 10 acres¹. The lowercase letters, a, b, c, and d indicate, respectively, the northeast, northwest, southwest, and southeast quarters of each subdivision. The number after the letters is the serial number of the well, spring, or miscellaneous site within the 10-acre tract. Thus, (D-40-24)17dbd-1 designates the first well constructed or visited in the southeast 1/4, northwest 1/4, southeast 1/4, section 17, T. 40 S., R. 24 E.



¹ Although the basic land unit, the section, is theoretically 1 square mile, many sections are irregular. Such sections are subdivided into 10-acre tracts, generally beginning at the southeast corner, and the surplus or shortage is taken up in the tracts along the north and west sides of the section.

Figure 3.--Well-numbering system used in Utah.

Acknowledgments

Data collected for this investigation were derived in part from the Navajo Tribe water-well data base. Appreciation is extended to Raymond Roesel and Greg Robinson for their help in obtaining information on tribal wells. Grateful appreciation is also extended to personnel at Mobil, Texaco, and Phillips Oil Companies for help in obtaining well logs, locating flowing wells, and collecting water samples.

RECORDS OF WELLS IN SANDSTONE AND ALLUVIAL AQUIFERS

Sandstone aquifers in southeastern San Juan County are present, in stratigraphic order, in the Jurassic Morrison Formation and the Bluff, Entrada, and Navajo Sandstones. These aquifers are generally separated by confining units. Aquifers in alluvium are present locally. Records for 96 wells in the aquifers are presented in tables 1, 4, 5, 6, and 7. Locations of wells in the Navajo aquifer are shown in figure 4. Locations of wells in all other aquifers and two anode wells are shown in figure 5.

The principal aquifers in the study area, in terms of decreasing use of water, are the Navajo, Bluff, Entrada, and Morrison aquifers, and aquifers in alluvium. About half of the 96 wells selected for tabulation yield water primarily from the Navajo aquifer (table 1). Most wells completed in or penetrating the Navajo aquifer flow at the land surface. Water from many wells is unused. At least 12 of the wells were initially drilled as petroleum test holes and were subsequently converted to water wells.

Records for 20 wells in the Bluff aquifer are presented in table 4. Most wells in the Bluff aquifer are Navajo tribal wells drilled for domestic and stock use and are pumped by windmills. At least four of these wells were originally drilled as petroleum test holes. Records for 13 wells in the Entrada aquifer are presented in table 5. Most of these wells also are Navajo tribal wells. Records for seven wells in the Morrison aquifer are presented in table 6. All wells completed in the Morrison aquifer were drilled by the Navajo Tribe for stock and domestic use. In addition to wells in the sandstone aquifers, five wells with hand pumps were located that are presumed to yield water from alluvium (ta-

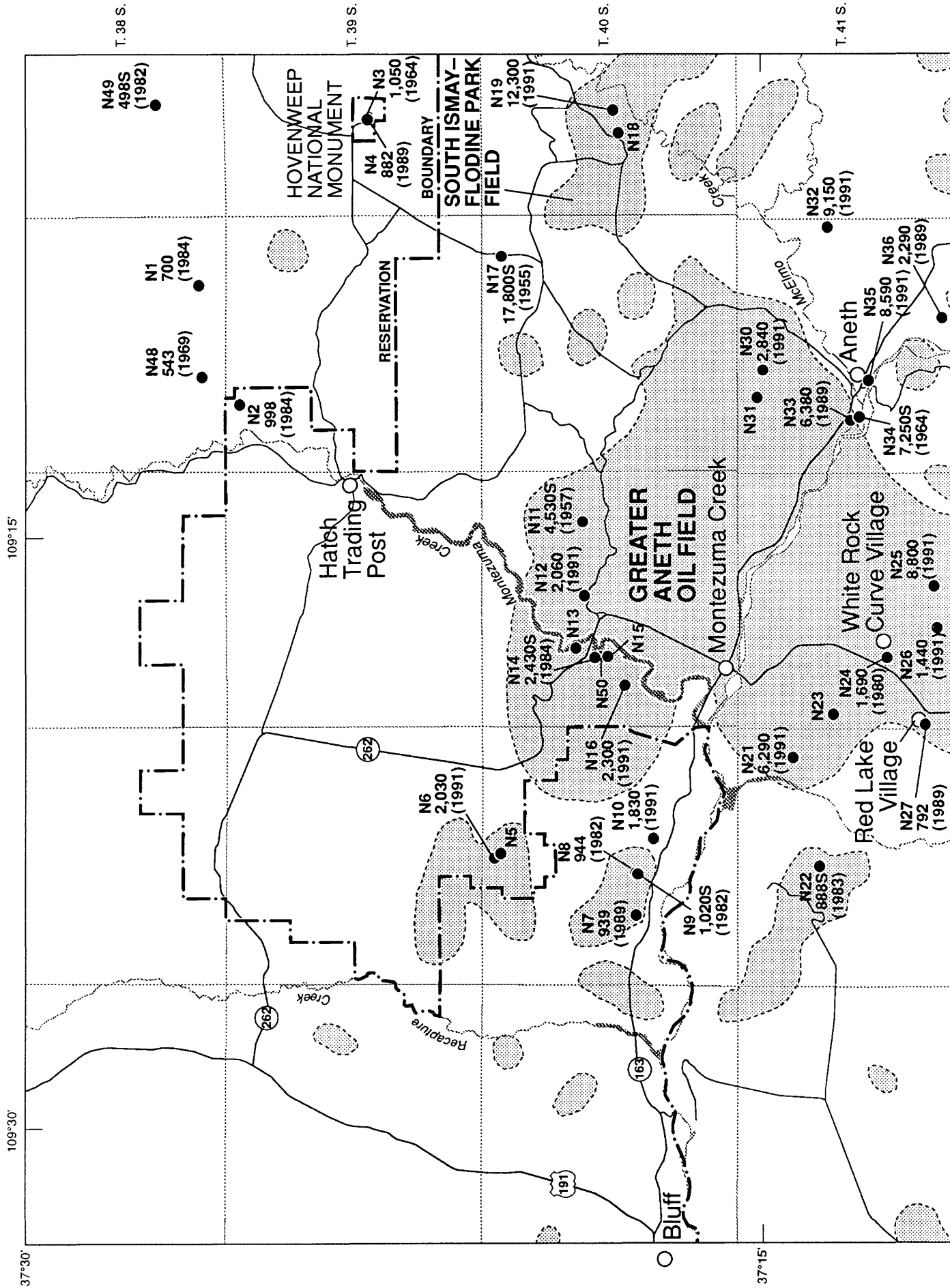
ble 7). Two of these wells appear to be capped springs. A sixth well in alluvium was located along the San Juan River.

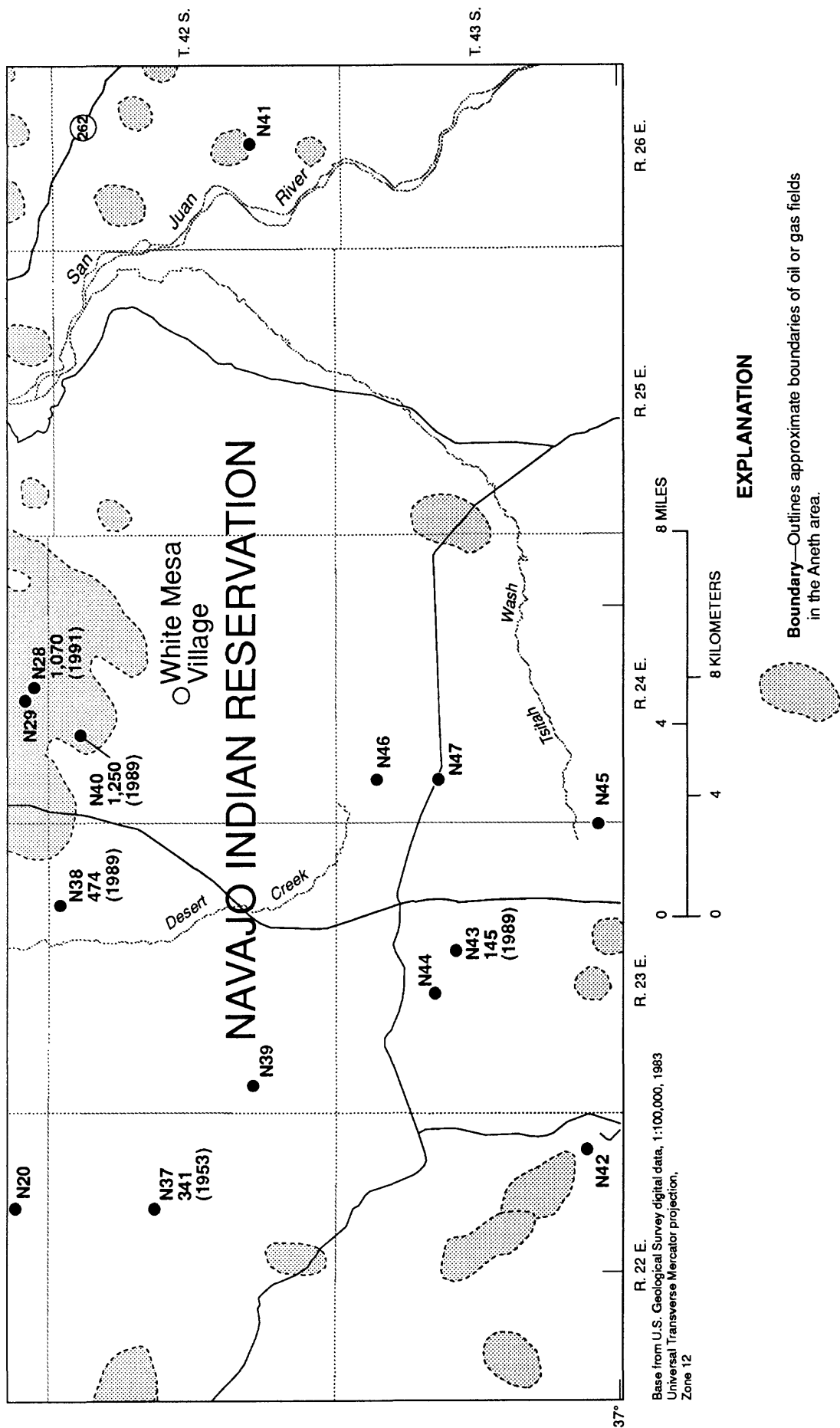
Records for wells in the sandstone aquifers are separated on the basis of primary contributing aquifer. Many wells are perforated in multiple intervals; therefore, wells yielding water primarily from the Entrada aquifer may also yield water secondarily from the overlying Bluff aquifer. Flowing wells may yield water from several horizons, depending upon depth and construction of the well. Wells yielding water primarily from the Navajo aquifer may also yield water from the overlying Entrada and Bluff aquifers. Ground water likely flows from the Navajo aquifer in petroleum test holes that have been converted to water wells.

WATER QUALITY IN THE NAVAJO AQUIFER

Dissolved-solids concentrations in water from known wells in the Navajo aquifer ranged from 150 mg/L to 17,800 mg/L (table 2). According to the U.S. Geological Survey classification of natural water based on salinity, water from these wells would be characterized as fresh to very saline (Heath, 1989, p. 65). Dissolved-solids concentrations for water from selected wells in the Navajo aquifer are shown in figure 4. Values are from most recent analyses (generally 1982-91). Some of the largest dissolved-solids concentrations in water occur in the vicinity of Aneth and the South Ismay-Flodine Park Field.

Analyses of water from several wells in the Aneth area have indicated anomalous changes in dissolved-solids concentration over relatively short periods. Water from well N17 had a dissolved-solids concentration of 3,550 mg/L in 1952, 10,100 mg/L in 1953, and 17,800 mg/L in 1955. Water from well N19 had a dissolved-solids concentration of 6,740 mg/L in 1989, 11,900 mg/L in 1990, and 12,300 mg/L in 1991. Dissolved-solids concentration in water from other wells, however, decreased or remained relatively stable with time. Water from most wells in the Navajo aquifer to the north, west, and south of the Greater Aneth Oil Field contained dissolved-solids concentrations less than 1,000 mg/L.





EXPLANATION

Boundary—Outlines approximate boundaries of oil or gas fields in the Aneth area.

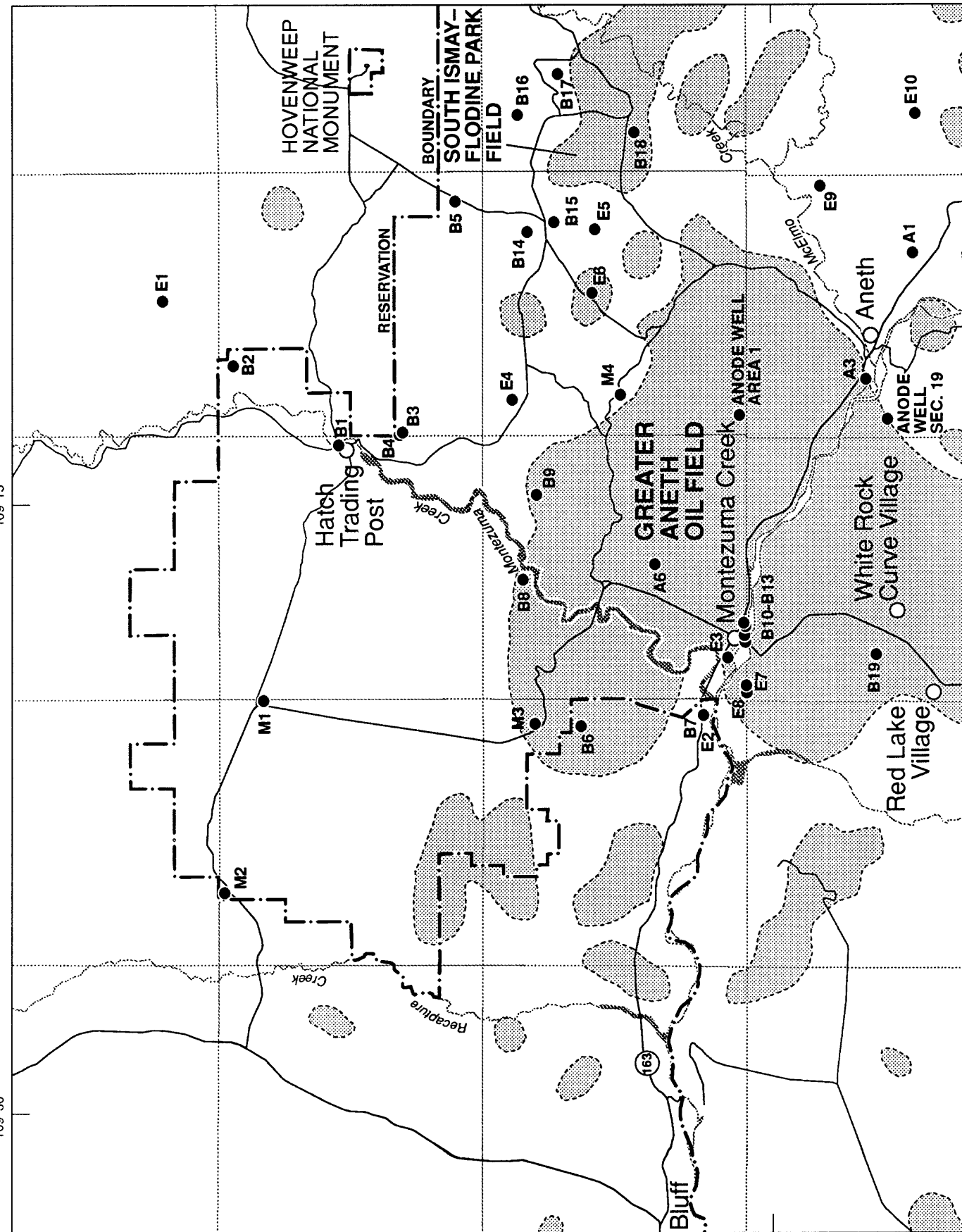
Well—Number preceded by letter (N34) refers to Map Number in table 1. For selected wells, the number below the Map Number is the dissolved-solids concentration, in milligrams per liter. Values of dissolved-solids concentration are from most recent analysis (shown in parentheses) and reported in table 2. Values are determined by evaporation at 180 degrees Celsius, or by sum of constituents, denoted by S.

Dry wash

Figure 4.--Location of selected wells in the Navajo aquifer and dissolved-solids concentration in ground water.

109°15'

109°30'



T. 38 S.

T. 39 S.

T. 40 S.

T. 41 S.

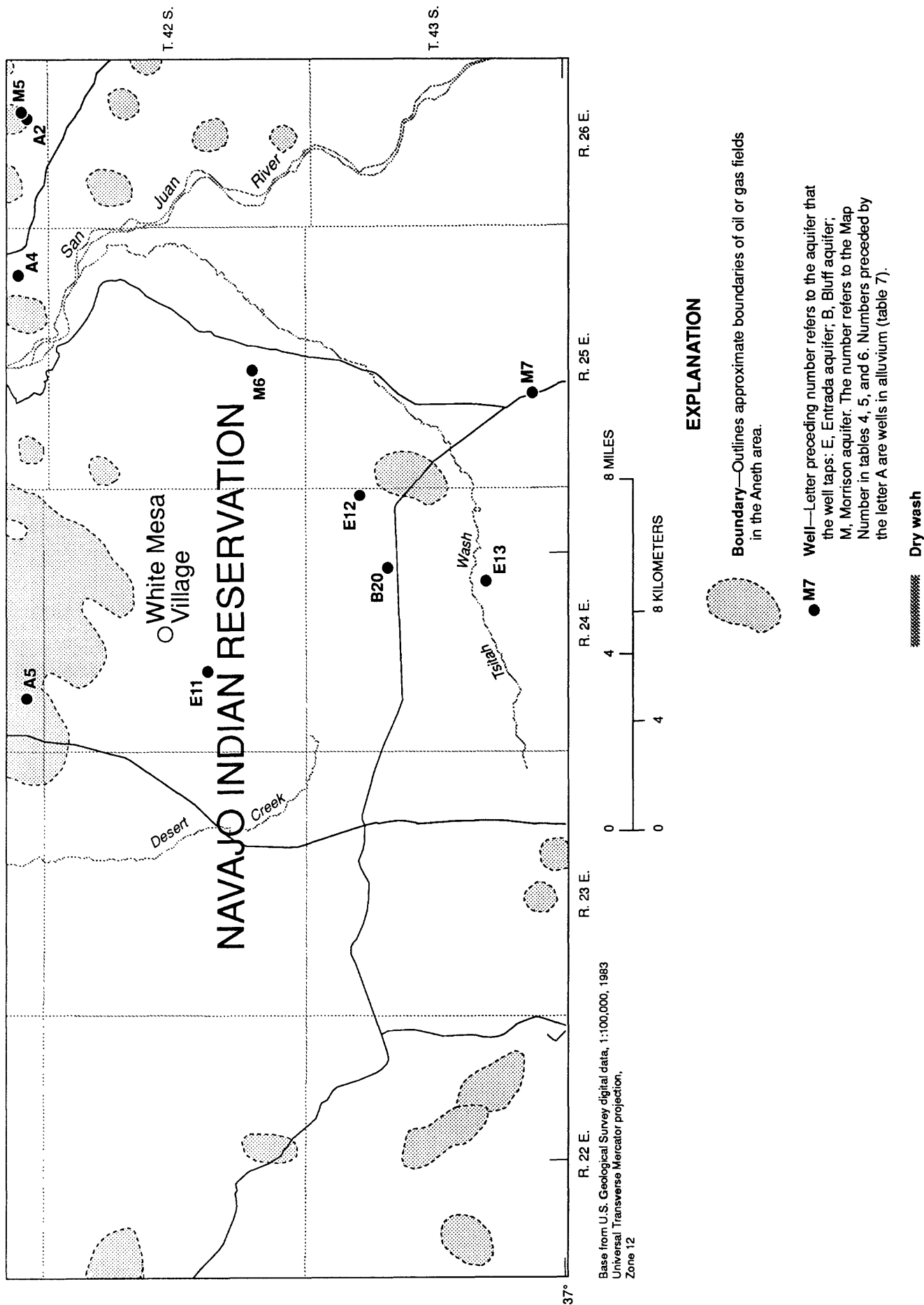


Figure 5.--Location of selected wells completed in the Bluff, Entrada, Morrison, and alluvial aquifers.

Comparisons of dissolved-solids concentrations with elemental and isotopic ratios in water samples collected in 1989 from selected wells in the Navajo aquifer and two samples of brine from the Paradox Formation are presented in figures 6 to 9. Hydrogen 2/1 and oxygen 18/16 ratios for water from wells in the Navajo aquifer and two samples of brine are plotted in reference to the global meteoric water line in figure 10. Relations between certain elemental and isotopic ratios in water can be used to determine sources of salinity in aquifers that otherwise contain freshwater (Kimball, 1987).

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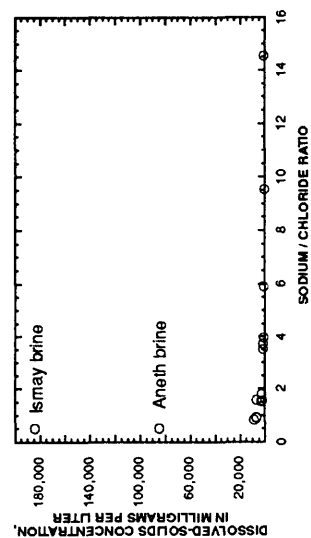
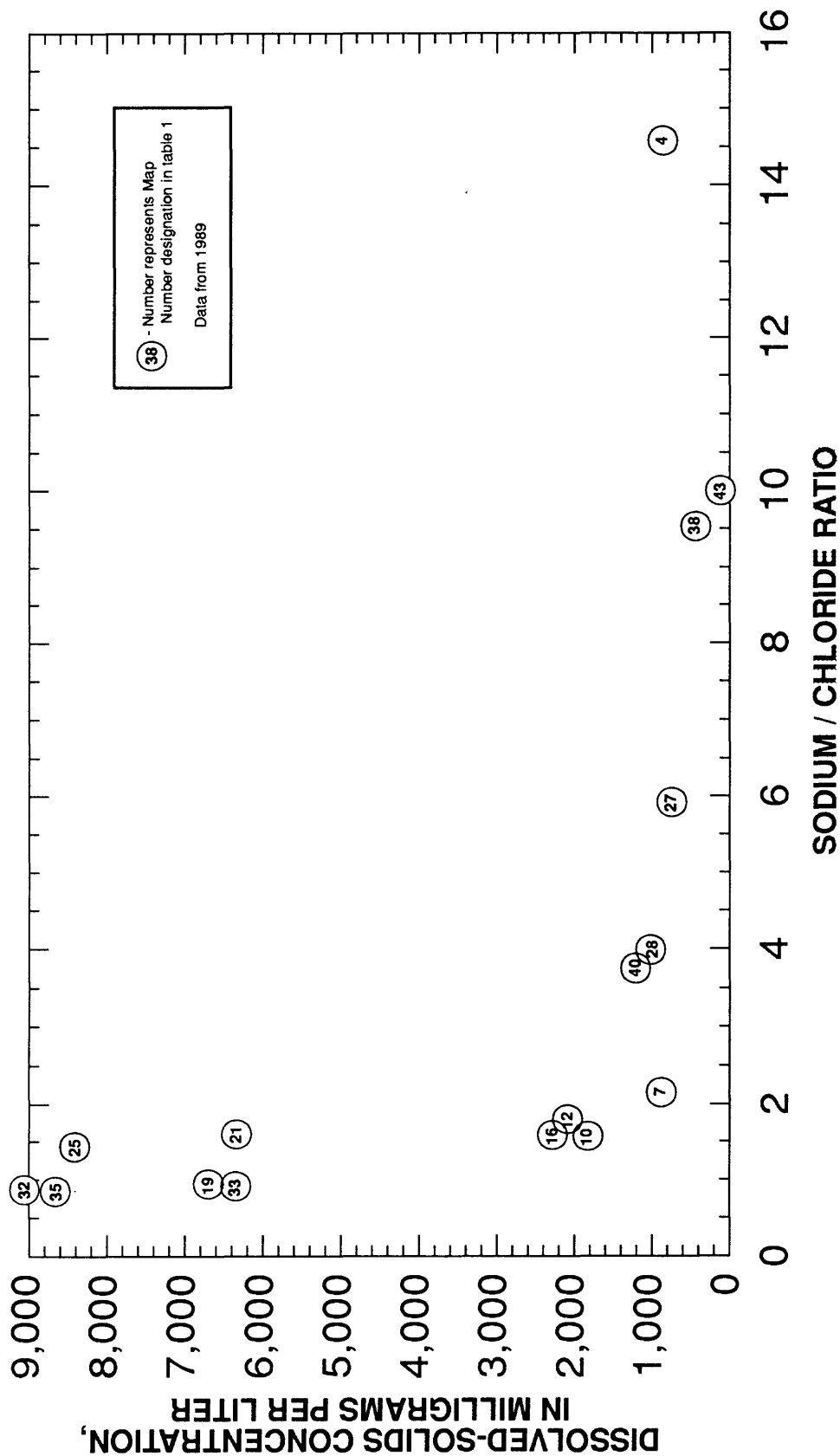
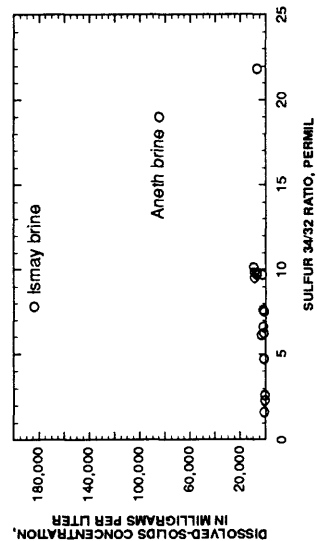
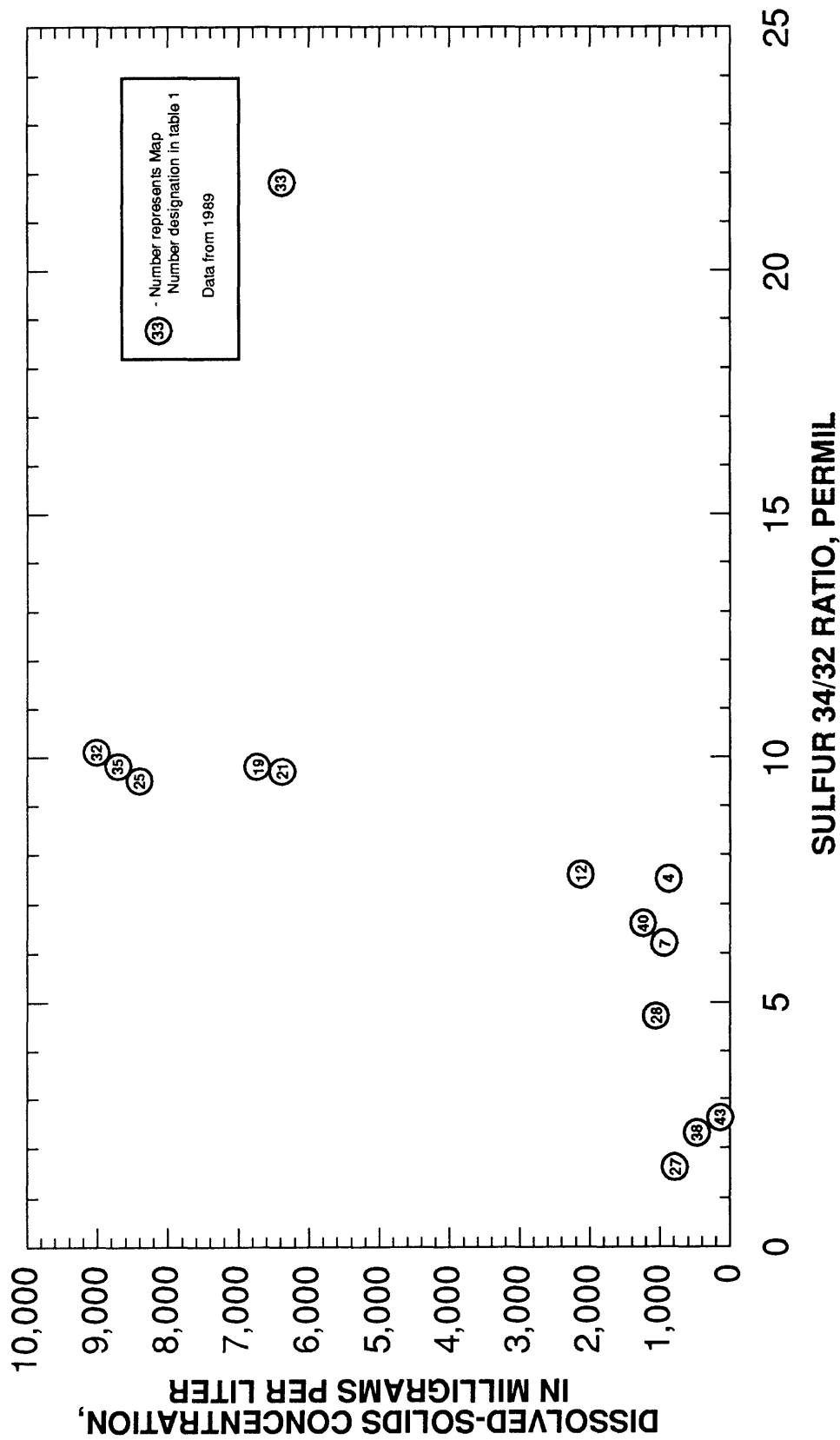


Figure 6.--Relation between dissolved-solids concentration and sodium / chloride ratio for water from wells in the Navajo aquifer.



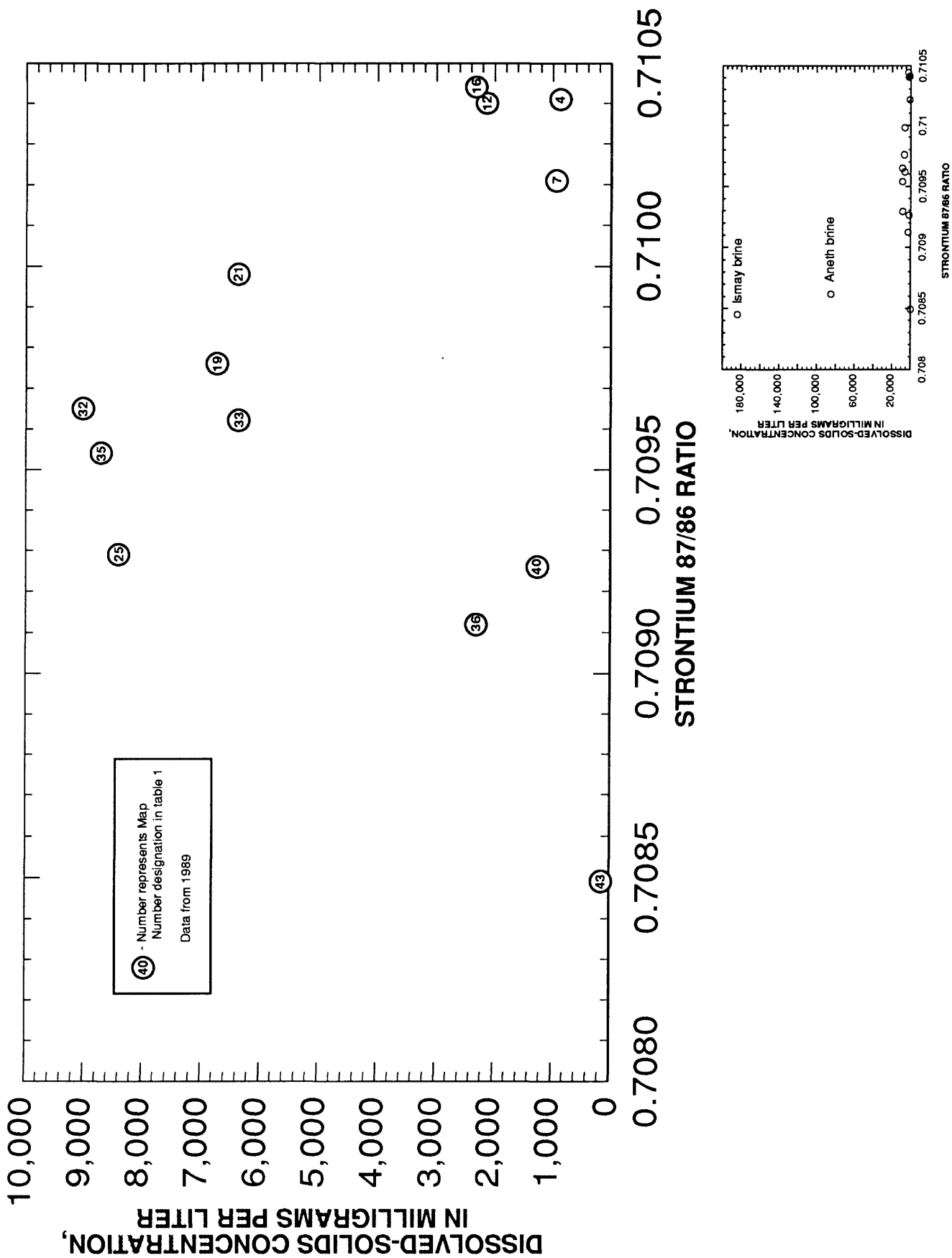


Figure 8.--Relation between dissolved-solids concentration and strontium 87/86 ratio for water from wells in the Navajo aquifer.

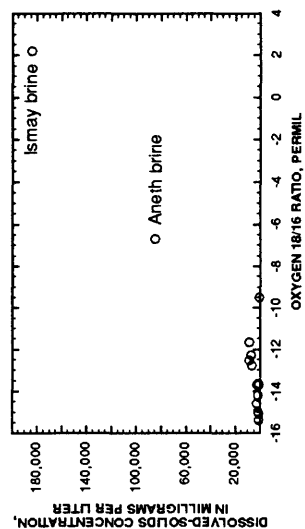
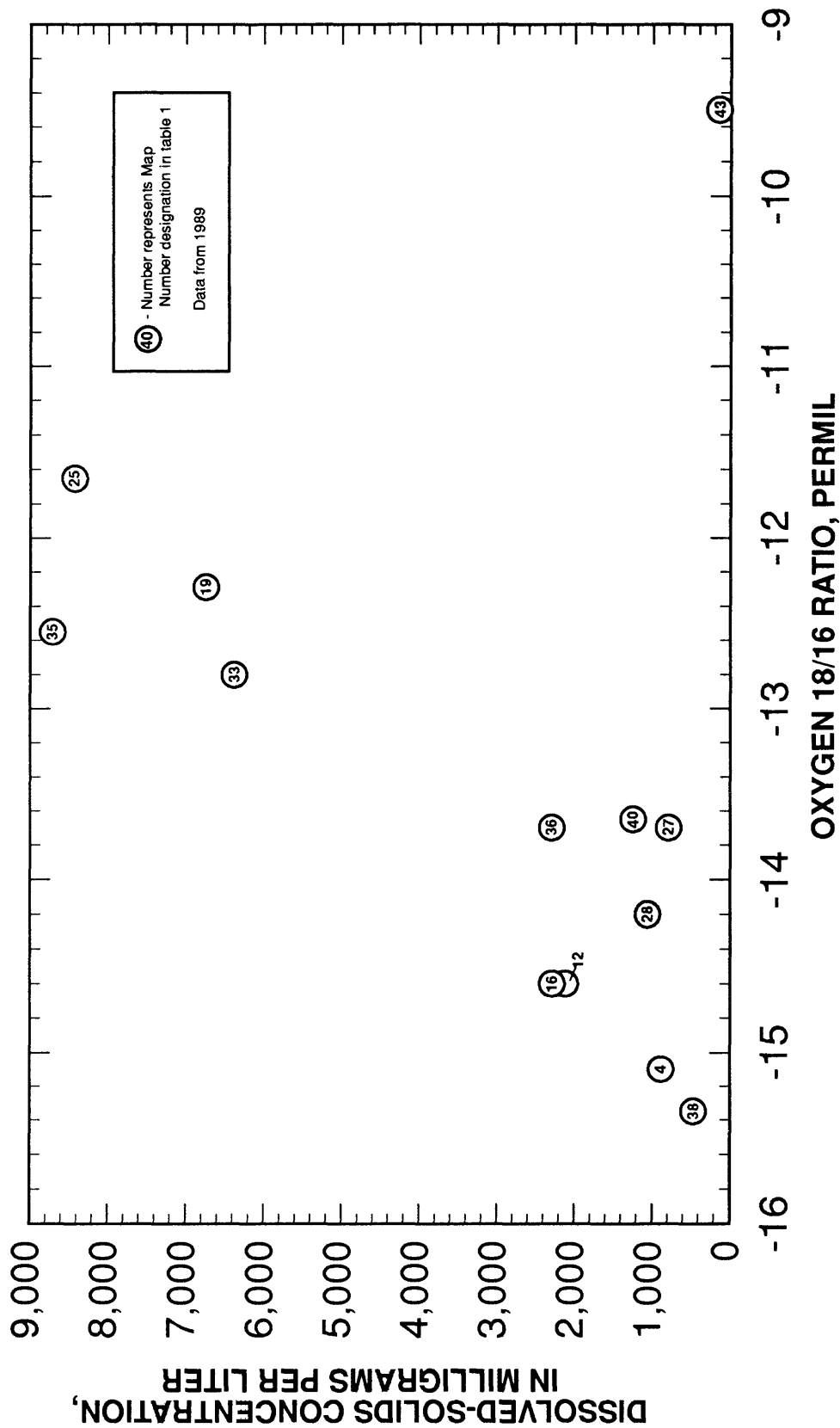


Figure 9.--Relation between dissolved-solids concentration and oxygen 18/16 ratio for water from wells in the Navajo aquifer.

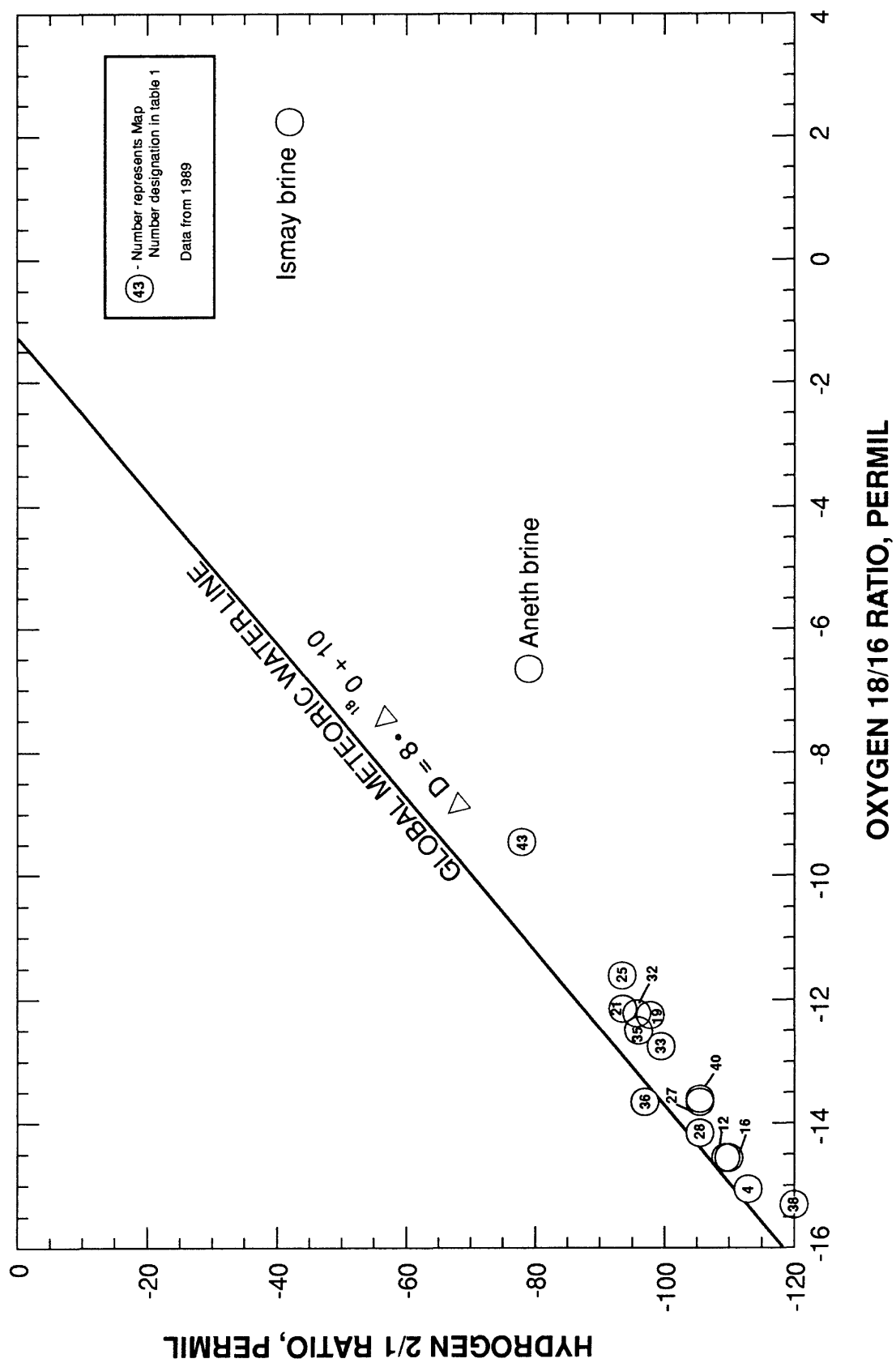


Figure 10.--Relation between hydrogen 2/1 ratio and oxygen 18/16 ratio for water from wells in the Navajo aquifer.

Table 1.—Records of selected wells

[—,

Map number: Refer to well identification in figure 4.

Well number: Refer to section on well-numbering system.

Property owner: Current owner or former lease holder.

Altitude of land surface: In feet above sea level.

Primary use of water: S, stock; H, household; P, public supply; N, industrial; U, unused.

Water level: In feet above (-) or below land surface; F, flowing, height unknown.

Discharge: gal/min, gallons per minute; <, less than; e, estimated.

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth drilled (feet)	Depth of well (feet)
N48	(D-38-25)33bdc-1	Unknown	—	S	—	—
N49	(D-38-26)28acd-1	Hathaway Co.	01-17-53	S	5,681	600
N1	(D-38-25)35bdd-1	L.M. Glasco	02-09-54	S	8,054	1,465
N2	(D-39-25) 5aca-2	Redd Ray	01-14-52	H	7,620	1,335
N3	(D-39-26)21bdb-1	National Park Service	09-07-63	P	—	1,425
N4	(D-39-26)21bdb-2	National Park Service	09-07-63	P	—	1,440
N5	(D-40-23) 3bcc-1	Unknown	—	S	—	—
N6	(D-40-23) 4ada-1	Unknown	—	S	—	—
N7	(D-40-23)20dbc-1	Ladd Petroleum	01-30-63	S	5,520	—
N8	(D-40-23)21dbc-1	El Paso Natural Gas	08-15-60	N	—	777
N9	(D-40-23)21dbc-2	El Paso Natural Gas	04-20-59	N	1,040	908
N10	(D-40-23)27baa-1	El Paso Natural Gas	—	N	—	672

in the Navajo aquifer

no data]

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/mIn)	Date discharge measured	Remarks
4,780	-6	06-10-82	28	08-06-69	
			7.5	06-10-82	
5,030	-84	08-21-83	15	06-09-82	Former oil test
	-47	09-21-82			
	-49	08-21-83			
4,850	-82	08-21-83	106	08-21-83	Former oil test
4,760	-460	08-01-51	420	08-00-51	Former oil test
	-335	01-00-54	3.0	06-15-89	
5,220	112.3	09-07-63	32	09-07-63	Hovenweep Well
	207	03-10-82			
5,240	131	09-07-63	29	09-07-63	Hovenweep Well
	203	08-04-82			
4,560	F	06-14-82	7.5	06-14-82	
			7.5	05-16-89	
4,560	F	06-14-82	2.1	06-14-82	Former oil test
			2.0	05-16-89	
4,520	F	06-21-89	7.5	06-21-89	Flows from abandoned production well
4,520	-2	08-15-60	378	08-00-60	El Paso Well #9
			175	08-17-76	
			267	08-04-81	
4,520	40	08-09-79	250	04-26-59	El Paso Well #8
			75	08-17-76	
			209	08-04-81	
4,520	-74	05-18-83	19	06-14-82	El Paso Well #7
			87	02-19-83	

Table 1.—Records of selected wells

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth drilled (feet)	Depth of well (feet)
N10	(D-40-23)27baa-1	El Paso Natural Gas				
N11	(D-40-24)14adb-1	Superior Oil	03-31-57	U	—	1,070
N12	(D-40-24)15bcc-1	Texaco	1956	U	—	1,100
N13	(D-40-24)17aac-1	Texaco	04-22-74	S	5,590	—
N14	(D-40-24)17dbd-1	Texaco	05-01-56	U	1,890	925
N50	(D-40-24)17dca-1	Texaco	—	U	—	—
N15	(D-40-24)17dcd-1	Texaco	—	S	—	—
N16	(D-40-24)19ada-1	Texaco	—	S	—	—
N17	(D-40-25) 1bcc-1	Navajo Tribe	08-07-52	U	—	1,404
N18	(D-40-26)20adb-1	Texaco	04-17-66	U	—	1,254
N19	(D-40-26)21abb-1	Texaco	1966	U	—	1,174
N20	(D-41-22)34ada-1	Navajo Tribe	—	H,S	—	—
N21	(D-41-23)12bda-1	Shell Oil	12-02-56	S	—	612
N22	(D-41-23)16aaa-1	Southland Royalty	07-09-64	U	—	932
N23	(D-41-24)18bdb-1	Phillips Petroleum	10-08-56	U	—	1,110
N24	(D-41-24)20dba-1	Phillips Petroleum	05-27-58	P	—	604
N25	(D-41-24)27cac-1	Mobil Oil	06-14-57	U	5,584	—
N26	(D-41-24)28cdb-1	Mobil Oil	12-01-57	U	5,712	—
N27	(D-41-24)30cba-1	Navajo Tribe	04-08-66	H,S	—	662
N28	(D-41-24)33dad-1	Mobil Oil	01-23-58	S	5,630	—
N29	(D-41-24)33dbb-1	Mobil Oil	10-12-57	H	5,630	—
N30	(D-41-25) 4cad-1	Texaco	02-18-58	S	—	1,098

in the Navajo aquifer—Continued

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/min)	Date discharge measured	Remarks
4,840	—	—	20	05-16-89	Abandoned for use
4,600	-97	02-19-83	—	—	
			124	03-29-63	
			85	02-19-83	
4,540	F	05-17-89	7.5	05-15-89	Former oil test
			1.5	05-17-89	
4,600	F	05-01-56	131	03-29-63	
			9.0	03-11-82	
			5.0	05-15-89	
4,560	F	06-16-89	1.0	06-16-89	Leaking from drill site
4,520	F	05-17-89	1.0	05-17-89	
4,560	F	05-17-89	3.0	05-17-89	
5,200	271	03-00-55	22	08-00-52	Abandoned windmill site; 12T-312
			1.8	03-10-55	
4,960	0	04-18-66	300	—	Abandoned for use
	60	07-22-82			
4,920	F	04-25-66	5.0	04-28-66	
			20	06-20-89	
5,040	230.2	03-10-83	—	—	Tribal Well 9T-506
4,640	F	12-02-56	31.5	12-02-56	
			5.4	01-18-83	
			2.0	06-21-89	
4680	-14	07-09-64	195	—	
			5.4	03-10-83	
51,20	200	10-14-56	14	10-14-56	Abandoned windmill site
	376.1	01-18-83			
4,800	105	—	30	05-27-58	Abandoned for use
4,640	F	05-17-57	20	10-11-89	Flows from production well
4,720	-23	03-08-83	3.0	10-11-89	Former oil test
4,840	111	04-08-66	2.0	01-19-83	Tribal Well 9T-559
4,720	F	05-13-89	3.0	05-13-89	Flows from injection well
4,720	-73	03-08-83	6.0	05-13-89	Former oil test
4,720	F	02-17-58	60	02-17-58	
			8.8	04-15-83	

Table 1.—Records of selected wells

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth drilled (feet)	Depth of well (feet)
N30	(D-41-25) 4cad-1	Texaco				
N31	(D-41-25) 5adc-1	Superior Oil	04-07-58	U	—	1,122
N32	(D-41-25)13aax-1	Unknown	—	U	5,854	1,917
N33	(D-41-25)17cac-1	Superior Oil	08-27-64	U	—	717
N34	(D-41-25)17cdb-1	Superior Oil	08-10-64	U	5,480	1,050
N35	(D-41-25)21bba-1	Navajo Tribe	07-00-42	U	1,163?	1,163
N36	(D-41-25)27dca-1	Superior Oil	—	S	—	—
N37	(D-42-22)14bbc-1	Navajo Tribe	10-00-51	U	—	590
N38	(D-42-23) 2bdb-1	Shell Oil	04-12-54	H	—	460
N39	(D-42-23)30acb-1	Navajo Tribe	09-25-71	H,S	—	759
N40	(D-42-24) 5dac-1	Mobil Oil	03-03-60	S	5,686	—
N41	(D-42-26)28bba-1	Davis Oil	10-24-60	U	—	1,880
N42	(D-43-22)36bbd-1	Arco	09-00-49	H	—	331
N43	(D-43-23)15cab-1	Navajo Tribe	01-20-54	H,S	—	508
N44	(D-43-23)16bb -1	Navajo Tribe	1961	S	—	150
N45	(D-43-23)36add-1	Navajo Tribe	09-22-71	H,S	—	240
N46	(D-43-24) 6ddb-1	Navajo Tribe	04-04-55	H,S	—	950
N47	(D-43-24)18aad-1	Navajo Tribe	02-18-35	H,S	—	735

in the Navajo aquifer—Continued

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/min)	Date discharge measured	Remarks
			7.5	05-11-89	
4,720	-172	03-26-58	<1	08-25-89	
4,800	F	04-15-83	18	04-15-83	Former oil test; leaking at base of marker
			<1	10-10-89	
4,480	-180	06-15-64	60	06-15-64	Abandoned for use
	-121	05-21-80	114	—	
	-274	08-23-83	122	—	
			157	—	
44,80	-130	03-09-64	76	03-09-64	Former oil test
	-231	08-00-83	97	—	
			125	—	
4,530	F	09-09-54	75	09-09-54	Flows from hilltop; 12K-308
			100	08-23-83	
			10 e	08-23-89	
4,520	F	05-17-89	<1	10-09-89	Flows intermittently
5,120	315	12-03-53	15	10-00-51	Tribal Well 9K-214
	332.6	03-09-83			
4,760	F	10-21-54	35	04-12-54	
	-18.6	05-06-82	7.5	05-06-82	
			<1	06-19-89	
5,160	270	—	40	—	Tribal Well 9T-574
4,760	F	05-13-89	1.0	05-13-89	Former oil test
4,760	F	08-23-89	3 e	08-23-89	Former oil test
5,180	20	—	—	—	
	85	01-20-83			
5,200	133	01-20-54	20	01-20-54	Tribal Well 9K-219
	136.4	05-06-82	3.3	01-19-83	
5,120	20	—			Tribal Well 9T-508
5,350	150	09-22-71	15	09-22-71	Tribal Well 9T-575
5,475	585	04-04-55	20	04-04-55	Tribal Well 9T-538
	540	05-06-82			
5,320	309	02-18-51	10	02-18-35	Tribal Well 9Y-32
	354	05-05-81			

**Table 2.—Selected properties and chemical constituents
and in brine from**

[°C, degrees Celsius; g/ml, grams per milliliter;

Map number: Refer to well identification in table 1 and figure 4.

Well number: Refer to section on well-numbering system.

Specific conductance: $\mu\text{S/cm}$, microsiemens per centimeter at 25 degrees Celsius.

Map number	Well number	Date sampled	Spe- cific con- duct- ance ($\mu\text{S/cm}$)	pH (stand- ard units)	Water temper- ature (°C)	Density (g/ml at 20 °C)	Carbon dioxide, dis- solved (mg/L as CO_2)	Hard- ness, total (mg/L as CaCO_3)	Alka- linity, field (mg/L as CaCO_3)	Alka- linity, lab (mg/L as CaCO_3)	Solids, sum of consti- tuents, dis- solved (mg/L)
Navajo aquifer											
N48	(D-38-25)33bdc-1	08-06-69	—	8.5	17.0	—	—	50	—	—	—
N1	(D-38-25)35bdd-1	06-10-82	1,550	8.4	15.5	—	—	41	—	617	926
		06-20-84	1,140	8.0	18.5	—	—	29	494	484	704
N49	(D-38-26)28acd-1	08-07-69	—	8.2	18.0	—	—	66	—	—	—
		06-09-82	560	8.2	18.0	—	—	28	—	253	363
N2	(D-39-25) 5aca-2	09-21-82	850	7.6	18.0	—	—	41	—	344	498
		07-19-52	1,290	8.2	—	—	6.5	110	529	—	791
		07-31-52	1,270	—	—	—	—	74	541	—	804
		08-12-53	1,200	8.3	—	—	—	50	—	—	780
		06-19-84	1,980	8.0	19.5	—	—	44	504	507	1,010
N3	(D-39-26)21bdb-1	06-14-63	2,040	7.5	—	—	22	490	359	—	1,460
		06-25-63	1,450	8.7	—	—	2.3	32	580	—	960
		07-00-63	1,200	8.5	—	—	3.3	44	539	—	756
		08-20-63	1,150	—	—	—	—	—	—	—	—
		08-26-63	1,170	—	—	—	—	620	—	—	—
N4	(D-39-26)21bdb-2	09-07-63	1,740	8.1	18.5	—	8.9	63	577	—	1,140
		09-07-63	1,820	7.9	21.0	—	15	75	619	—	1,200
		03-10-64	1,630	8.4	21.0	—	4.3	63	553	—	1,070
		10-07-89	1,460	7.8	19.0	0.998	—	84	—	503	907
		07-30-91	3,180	7.7	17.0	—	—	270	—	287	2,030
N6	(D-40-23) 4ada-1	07-30-91	3,180	7.7	17.0	—	—	270	—	287	2,030
N7	(D-40-23)20dbc-1	10-03-89	1,560	8.0	19.0	.998	—	32	—	529	946
N8	(D-40-23)21dbc-1	01-19-78	—	8.0	—	—	9.9	46	505	502	914
		01-31-82	—	8.1	—	—	8.0	46	505	505	928
N9	(D-40-23)21dbc-2	01-19-78	—	8.1	—	—	7.9	41	512	504	954
		01-14-82	—	8.1	—	—	8.0	53	512	512	1,020
N10	(D-40-23)27baa-1	07-15-60	3,110	7.8	—	—	21	96	690	690	2,940
		06-14-82	3,070	7.8	17.0	—	—	120	—	766	1,860
		06-16-83	3,000	7.6	20.0	—	—	110	—	823	1,900
		03-08-84	2,900	9.5	14.0	—	—	—	—	—	—
		09-02-86	3,120	7.7	21.0	—	—	91	—	763	1,820

***in water from wells in the Navajo aquifer
the Paradox Formation***

mg/L, milligrams per liter; —, no data; <, less than stated value]

Solids, residue at 180 °C, dis- solved, (mg/L)	Calcium, dis- solved (mg/L as Ca)	Magne- sium, dis- solved (mg/L as Mg)	Sodium, dis- solved (mg/L as Na)	Potas- sium, dis- solved (mg/L as K)	Sodium+ potas- sium, dis- solved (mg/L as Na)	Bicar- bonate, field (mg/L as HCO ₃)	Car- bonate, field (mg/L as CO ₃)	Sulfate, dis- solved (mg/L as SO ₄)	Chlo- ride, dis- solved (mg/L as Cl)	Fluo- ride, dis- solved (mg/L as F)	Bro- mide, dis- solved (mg/L as Br)	Iodide, dis- solved (mg/L as I)	Silica, dis- solved (mg/L as SiO ₂)	Nitro- gen, nitrate, dis- solved (mg/L as N)
Navajo aquifer														
543	16	2.6	180	19	—	—	—	52	16	—	—	—	9.0	—
—	11	3.3	350	16	—	—	—	67	100	1.0	—	—	7.5	—
700	6.7	2.7	260	13	—	—	—	62	57	1.1	0.09	—	8.8	—
408	21	3.3	110	18	—	—	—	44	12	—	—	—	9.2	—
—	6.8	2.6	130	9.7	—	—	—	44	8.2	0.70	—	—	8.8	—
—	9.7	4.1	170	13	—	—	—	55	30	.60	—	—	8.5	—
794	28	10	260	17	—	620	12	99	45	1.7	—	—	9.3	0.020
—	21	5.2	—	—	290	660	0	96	48	1.8	—	—	13	.110
756	12	4.9	270	21	—	650	16	100	21	1.9	—	—	11	—
998	11	4.0	360	16	—	—	—	110	190	1.7	.55	—	10	—
1,460	120	48	—	—	310	440	0	730	33	—	—	—	7.8	.090
952	13	0.0	—	—	350	650	26	180	26	—	—	—	18	.270
758	10	4.6	—	—	290	610	21	110	12	—	—	—	9.9	.230
—	—	—	—	—	—	—	—	—	44	—	—	—	—	—
—	100	89	—	—	—	—	—	170	38	—	—	—	18	.320
1,130	17	5.1	—	—	410	700	0	310	46	—	—	—	9.9	.200
1,200	18	7.3	420	22	—	760	0	300	56	1.2	—	—	10	.160
1,050	13	7.5	—	—	390	640	15	300	28	—	—	—	9.7	.050
882	19	8.2	290	24	—	—	—	230	20	1.2	.11	0.006	9.4	—
2,030	56	31	570	21	—	—	—	780	390	.50	.29	—	—	—
939	8.1	2.7	350	5.7	—	—	—	88	160	1.3	.54	.021	11	—
564	10	5.0	340	6.0	—	610	5	92	140	.80	—	—	11	.200
944	7.0	7.0	330	7.0	—	620	0	100	150	1.7	—	—	12	—
940	13	2.0	340	7.0	—	600	12	110	160	1.6	—	—	11	.130
—	13	5.0	390	9.0	—	620	0	120	160	1.7	—	—	13	.040
1,740	28	6.4	630	20	—	830	3	210	410	1,200	—	—	9.2	—
—	27	12	670	14	—	—	—	190	480	1.4	—	—	11	—
—	24	11	680	15	—	—	—	210	450	1.5	1.1	.038	11	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	20	10	660	13	—	—	—	170	470	1.3	—	—	11	—

**Table 2.—Selected properties and chemical constituents
and in brine from**

Map number	Well number	Date sampled	Spe- cific con- duct- ance ($\mu\text{S}/\text{cm}$)	pH (stand- ard units)	Water temper- ature ($^{\circ}\text{C}$)	Density (g/ml at 20 $^{\circ}\text{C}$)	Carbon dioxide, dis- solved (mg/L as CO_2)	Hard- ness, total (mg/L as CaCO_3)	Alka- linity, field (mg/L as CaCO_3)	Alka- linity, lab (mg/L as CaCO_3)	Solids, sum of consti- tuents, dis- solved (mg/L)
N10	(D-40-23)27baa-1	03-03-86	3,100	—	18.5	—	—	—	—	—	—
		03-09-87	3,000	7.4	15.0	—	—	—	—	—	—
		03-01-88	3,000	7.4	19.0	—	—	—	—	—	—
		09-07-88	3,000	7.6	19.0	—	—	—	—	—	—
		03-02-89	3,000	7.5	19.0	—	—	97	—	766	1,810
		09-07-89	3,000	7.5	20.0	—	—	—	—	—	—
		03-07-90	3,000	7.5	18.5	—	—	—	—	—	—
		09-06-90	2,850	7.8	22.5	—	—	—	—	—	—
		07-18-90	3,100	7.4	19.5	—	—	97	—	760	1,810
		08-26-91	3,030	7.5	19.0	—	—	—	—	—	—
N11	(D-40-24)14adb-1	07-30-91	3,120	7.4	19.0	—	—	92	—	764	1,760
		04-00-57	—	7.1	—	—	165	420	1,060	—	4,530
		06-20-89	3,650	7.4	19.5	—	—	100	—	946	2,170
N12	(D-40-24)15bcc-1	07-18-90	3,520	7.4	19.5	—	—	95	—	958	2,060
		07-30-91	3,620	7.4	19.0	—	—	100	—	970	2,050
N14	(D-40-24)17dbd-1	05-00-56	—	7.5	—	—	51	150	824	—	2,390
		06-10-82	3,990	7.5	20.0	—	—	130	—	800	2,550
		06-06-84	4,150	7.6	15.5	—	—	120	805	766	2,430
		10-25-84	—	—	—	—	—	110	—	754	2,430
N16	(D-40-24)19ada-1	10-09-89	3,680	7.5	19.0	0.999	—	100	—	936	2,230
		07-30-91	3,920	7.4	19.0	—	—	100	—	992	2,230
		08-17-52	5,390	—	21.5	—	—	220	1,890	—	3,550
N17	(D-40-25) 1bcc-1	12-09-53	14,300	—	—	1.006	—	650	1,210	—	10,100
		03-10-55	23,400	7.7	16.0	1.011	14	1,400	357	—	17,800
		06-20-89	11,100	7.8	18.5	—	—	460	—	423	7,050
N21	(D-41-23)12bda-1	07-19-90	18,400	7.5	19.0	—	—	550	—	398	11,100
		08-01-91	18,300	7.7	18.5	—	—	570	—	411	12,200
		12-00-56	—	6.0	13.0	—	1,040	430	531	—	6,850
		06-21-89	9,460	7.3	18.5	—	—	290	—	503	6,350
		07-18-90	9,260	7.3	18.5	—	—	290	—	610	6,300
N22	(D-41-23)16aaa-1	07-30-91	9,300	7.3	18.0	—	—	300	—	504	6,240
		03-10-83	1,440	8.8	16.5	—	—	11	—	539	888
N24	(D-41-24)20dba-1	05-07-58	—	8.6	—	—	2.7	38	546	—	2,160
		08-25-80	—	8.7	—	—	2.0	24	461	461	1,660
N25	(D-41-24)27cac-1	05-00-57	—	—	—	—	—	140	484	—	3,890

***in water from wells in the Navajo aquifer
the Paradox Formation—Continued***

Solids, residue at 180 °C, dis- solved (mg/L)	Calcium, dis- solved (mg/L as Ca)	Magne- sium, dis- solved (mg/L as Mg)	Sodium, dis- solved (mg/L as Na)	Potas- sium, dis- solved (mg/L as K)	Sodium+ potas- sium, dis- solved (mg/L as Na)	Bicar- bonate, field (mg/L as HCO ₃)	Car- bonate, field (mg/L as CO ₃)	Sulfate, dis- solved (mg/L as SO ₄)	Chlo- ride, dis- solved (mg/L as Cl)	Fluo- ride, dis- solved (mg/L as F)	Bro- mide, dis- solved (mg/L as Br)	Iodide, dis- solved (mg/L as I)	Silica, dis- solved (mg/L as SiO ₂)	Nitro- gen, dis- solved (mg/L as N)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	23	9.5	650	12	—	—	—	210	430	1.4	—	—	13	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,850	23	8.9	650	16	—	—	—	200	450	—	0.82	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,830	21	9.0	660	12	—	—	—	180	410	1.3	1.1	—	—	—
—	89	48	—	—	1,300	1,300	0	950	820	—	—	—	—	—
2,130	24	9.9	820	19	—	—	—	240	470	1.6	.82	0.038	12	—
2,120	22	9.0	750	18	—	—	—	230	450	—	.84	—	—	—
2,060	23	9.6	780	18	—	—	—	220	410	1.4	.79	—	—	—
—	8.0	32	—	—	1,100	1,010	0	620	710	—	—	—	—	—
—	32	12	950	19	—	—	—	290	750	1.4	—	—	11	—
2,450	28	11	880	17	—	—	—	300	720	1.3	1.9	—	6.7	—
—	27	10	850	18	—	—	—	300	760	1.3	.65	—	10	—
2,310	25	9.2	830	23	—	—	—	240	520	1.4	.85	.041	12	—
2,300	24	9.2	840	20	—	—	—	230	510	1.4	1.0	—	—	—
—	54	20	—	—	1,300	2,300	0	290	690	0.40	—	—	16	0.930
—	130	77	3,400	56	—	1,140	166	2,700	3,000	.40	—	—	10	—
—	330	130	5,700	65	—	440	0	5,800	5,500	.90	—	—	11	2.30
6,740	100	48	2,300	17	—	—	—	1,700	2,600	1.3	1.4	.210	11	—
11,900	86	76	3,600	29	—	—	—	2,800	4,200	—	2.4	—	—	—
12,300	90	79	4,000	35	—	—	—	3,000	4,700	2.3	1.5	—	—	—
—	80	56	—	—	2,100	650	—	2,600	1,400	—	—	—	—	—
6,380	49	37	2,000	34	—	—	—	2,600	1,300	.70	.97	.160	10	—
6,270	50	38	2,000	32	—	—	—	2,500	1,300	—	1.0	—	—	—
6,290	52	38	2,000	34	—	—	—	2,600	1,200	1.1	1.0	—	—	—
—	3.1	0.90	340	4.3	—	—	—	150	52	4.7	.17	.011	9.3	—
—	7.0	5.0	—	—	700	520	72	560	300	—	—	—	—	—
1,690	8.0	1.0	580	9.0	—	530	16	520	260	4.0	—	—	10	.300
—	23	20	—	—	1,200	570	12	1,600	730	—	—	—	—	—

**Table 2.—Selected properties and chemical constituents
and in brine from**

Map number	Well number	Date sampled	Specific conductance (μS/cm)	pH (standard units)	Water temperature (°C)	Density (g/ml at 20 °C)	Carbon dioxide, dissolved (mg/L as CO ₂)	Hardness, total (mg/L as CaCO ₃)	Alkalinity, field (mg/L as CaCO ₃)	Alkalinity, lab (mg/L as CaCO ₃)	Solids, sum of constituents, dissolved (mg/L)
N26	(D-41-24)28cdb-1	10-11-89	12,300	8.3	18.0	1.005	—	190	—	403	8,860
		07-31-91	13,000	8.3	17.5	—	—	170	—	389	8,910
		07-31-91	2,400	8.5	17.0	—	—	19	—	518	1,400
		06-16-89	1,410	8.6	19.5	—	—	10	—	475	818
N27	(D-41-24)30cba-1	06-16-89	1,410	8.6	19.5	—	—	10	—	475	818
N28	(D-41-24)33dad-1	10-06-89	1,690	8.7	19.0	0.998	—	12	—	471	1,060
N30	(D-41-25) 4cad-1	07-18-90	1,780	8.6	19.5	—	—	11	—	380	980
		07-31-91	1,770	8.6	18.0	—	—	11	—	479	1,050
		04-15-83	4,890	7.6	20.0	—	—	140	—	868	3,090
		10-25-84	—	7.6	19.0	—	—	—	—	839	3,030
		07-19-90	4,550	7.5	19.0	—	—	110	—	813	2,810
N32	(D-41-25)13aax-1	07-31-91	4,660	7.5	19.0	—	—	100	—	845	2,780
		10-10-89	14,600	7.3	19.0	1.005	—	510	—	650	9,110
N33	(D-41-25)17cac-1	08-01-91	13,900	7.3	20.0	—	—	530	—	671	8,820
		10-12-64	11,100	7.9	—	—	11	380	448	—	7,080
		08-25-89	11,200	9.9	16.0	—	—	15	—	405	6,220
N34	(D-41-25)17cdb-1	03-18-64	11,200	7.7	—	—	20	470	521	—	7,460
		10-12-64	11,500	7.8	—	1.003	15	450	487	—	7,250
N35	(D-41-25)21bba-1	03-10-55	12,000	7.9	18.5	—	14	570	558	—	8,620
		08-23-89	14,400	7.1	18.5	—	—	430	—	556	8,730
		07-19-90	14,500	7.0	18.5	—	—	430	—	611	8,450
N36	(D-41-25)27dca-1	07-31-91	14,200	7.0	18.0	—	—	470	—	561	8,440
		10-09-89	3,290	8.4	17.0	.999	-	28	—	631	2,290
N37	(D-42-22)14bbc-1	12-03-53	565	—	16.0	—	—	7	193	—	341
N38	(D-42-23) 2bdb-1	03-11-55	846	9.0	16.5	—	0.7	6	355	—	499
		06-19-89	840	9.0	18.0	—	—	4	—	352	473
N40	(D-42-24) 5dac-1	10-06-89	1,940	8.7	17.5	.998	—	15	—	413	1,290
N43	(D-43-23)15cab-1	01-20-54	—	—	16.5	—	—	23	337	—	—
		03-11-55	274	7.5	15.0	—	7.6	51	124	—	—
		08-24-89	250	7.8	20.0	—	—	51	—	105	150
Paradox Formation											
Aneth brine sample		06-22-89	105,000	7.1	36.0	1.054	—	20,000	—	72	78,800
Ismay brine sample		10-09-89	171,000	6.8	24.0	1.116	—	26,000	—	75	174,000

***in water from wells in the Navajo aquifer
the Paradox Formation—Continued***

Solids, residue at 180 °C, dis- solved (mg/L)	Calcium, dis- solved (mg/L as Ca)	Magne- sium, dis- solved (mg/L as Mg)	Sodium, dis- solved (mg/L as Na)	Potas- sium, dis- solved (mg/L as K)	Sodium+ potas- sium, dis- solved (mg/L as Na)	Bicar- bonate, field (mg/L as HCO ₃)	Car- bonate, field (mg/L as CO ₃)	Sulfate, dis- solved (mg/L as SO ₄)	Chlo- ride, dis- solved (mg/L as Cl)	Fluo- ride, dis- solved (mg/L as F)	Bro- mide, dis- solved (mg/L as Br)	Iodide, dis- solved (mg/L as I)	Silica, dis- solved (mg/L as SiO ₂)	Nitro- gen, nitrate, dis- solved (mg/L as N)
8,410	33	24	2,900	18	—	—	—	3,600	2,000	1.0	14	2.7	9.2	—
8,800	26	22	2,900	17	—	—	—	3,500	2,200	1.6	1.1	—	—	—
1,440	5.0	1.4	520	3.1	—	—	—	400	150	4.4	0.19	—	—	—
792	2.5	0.95	310	2.8	—	—	—	150	53	2.9	.20	0.015	10	—
1,060	3.2	.81	380	2.2	—	—	—	280	97	3.5	.15	.010	9.2	—
1,060	3.2	.78	390	2.0	—	—	—	260	96	—	.16	—	—	—
1,070	3.0	.79	400	2.0	—	—	—	260	95	3.6	.16	—	—	—
—	35	13	1,100	15	—	—	—	710	680	0.80	.51	.075	12	—
—	30	13	1,000	16	—	—	—	690	760	—	.33	—	10	—
2,840	26	9.6	1,000	15	—	—	—	600	670	—	.63	—	—	—
2,840	23	9.3	1,000	15	—	—	—	610	610	1.0	.55	—	—	—
9,010	97	62	3,000	32	—	—	—	2,000	3,500	.50	1.0	.190	10	—
9,150	99	63	2,900	35	—	—	—	1,800	3,500	.90	1.5	—	—	—
—	85	41	—	—	2,500	550	0	1,400	2,800	.30	—	—	10	—
6,380	2.1	1.9	2,300	21	—	—	—	950	2,700	.40	3.0	.400	1.0	—
7,330	110	46	—	—	2,600	640	0	1,300	3,100	—	—	—	5.3	0.020
—	110	41	—	—	2,600	590	0	1,300	3,000	.40	—	—	9.7	.050
8,640	100	74	2,900	28	—	680	0	1,600	3,500	.10	—	—	10	.560
8,710	97	42	2,900	27	—	—	—	1,600	3,700	.40	3.4	.360	11	—
8,870	92	43	2,900	27	—	—	—	1,400	3,600	—	3.2	—	—	—
8,590	110	42	2,900	31	—	—	—	1,400	3,600	1.1	2.4	—	—	—
2,290	5.5	3.3	780	4.5	—	—	—	1,000	100	3.7	.11	.011	8.6	—
341	2.0	.50	130	1.9	—	180	29	50	26	.80	—	—	14	.090
500	1.3	.70	200	0.80	—	340	45	52	21	.80	—	—	14	.110
474	1.0	.31	190	0.90	—	—	—	47	20	1.1	.12	.022	1.1	—
1,250	3.9	1.2	480	2.4	—	—	—	410	130	2.8	.21	.015	11	—
480	5.5	2.2	—	—	180	370	22	51	10	1.6	—	—	29	.250
171	8.7	7.2	—	—	43	150	0	12	5.0	.60	—	—	19	.320
145	10	6.1	38	1.6	—	—	—	10	3.8	.30	.05	.003	17	—
<u>Paradox Formation</u>														
84,700	5,700	1,300	22,000	430	—	—	—	830	48,000	1.6	280	17	25	—
184,000	7,700	1,600	52,000	1,100	—	—	—	1,10	110,000	.90	400	47	5	—

Table 3.—Selected trace elements in water from the
[μg/L, micrograms per liter; permil, per thousand; pCi/L, picocuries]

Map number: Refer to well identification in table 1 and figure 4.

Well number: Refer to section on well-numbering system.

Map number	Well number	Date sampled	Arsenic, total (μg/L as As)	Barium, dissolved (μg/L as Ba)	Boron, dissolved (μg/L as B)	Iron, dissolved (μg/L as Fe)	Lithium, dissolved (μg/L as Li)	Manganese, dissolved (μg/L as Mn)
Navajo aquifer								
N48	(D-38-25)33bdc-1	08-06-69	—	—	—	—	—	—
N1	(D-38-25)35bdd-1	06-10-82	—	—	—	—	—	—
		06-20-84	—	64	850	42	480	8
N49	(D-38-26)28acd-1	08-07-69	—	—	—	—	—	—
		06-09-82	—	—	—	—	—	—
		09-21-82	13	100 T	—	150 T	340	10 T
N2	(D-39-25) 5aca-2	07-19-52	—	—	30	90	—	—
		07-31-52	—	—	—	—	—	—
		08-12-53	—	—	30	50	—	0
		06-19-84	14 D	38	650	86	560	8
N3	(D-39-26)21bdb-1	06-14-63	—	—	—	—	—	—
		06-25-63	—	—	—	—	—	—
		07-00-63	—	—	—	—	—	—
		08-20-63	—	—	—	—	—	—
		08-26-63	—	—	—	—	—	—
		09-07-63	—	—	—	—	—	—
		09-07-63	—	—	230	130	—	—
		03-10-64	—	—	—	—	—	—
N4	(D-39-26)21bdb-2	10-07-89	—	27	280	900	—	—
N6	(D-40-23) 4ada-1	07-30-91	—	—	—	—	—	—
N7	(D-40-23)20dbc-1	10-03-89	—	34	680	160	—	—
N8	(D-40-23)21dbc-1	01-19-78	5 D	70	600	740	—	77
		01-31-82	27	—	1,200	—	—	15 T
N9	(D-40-23)21dbc-2	01-19-78	—	40	700	67	—	48
		01-14-82	24	—	1,200	310 T	—	20 T
N10	(D-40-23)27baa-1	07-15-60	50	—	1,400	570	—	0
		06-14-82	20	—	—	—	—	—
		06-16-83	18	100 T	—	960 T	970 T	20 T
		03-08-84	—	—	—	—	—	—
		09-02-86	—	—	1,500	4,400	—	150

Navajo aquifer and in brine from the Paradox Formation

per liter; —, no data; <, less than stated value; D, dissolved; T, total]

Strontium, dis- solved (µg/L as Sr)	Vana- dium, dis- solved (µg/L as V)	Zinc, dis- solved (µg/L as Zn)	Carbon 14 percent modern	C-13 / C-12 stable isotope ratio (permil)	H-2 / H-1 stable isotope ratio (permil)	O-18 / O-16 stable isotope ratio (permil)	S-34 / S-32 stable isotope ratio (permil)	Sr-87/ Sr-86 stable isotope ratio	Tritium, total (pCi/L)
<u>Navajo aquifer</u>									
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
620	—	5	1.8	-6.00	-114.0	-15.40	-0.2	—	3.0
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
700 T	—	10 T	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
2	—	54	1.6	-5.70	-112.0	-15.00	0	—	<1.0
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
2,300	<1	—	—	—	-113.0	-15.10	7.50	.71041	—
5,000	—	—	—	—	—	—	—	—	—
750	2	—	—	—	—	—	6.20	.71021	—
—	—	9	—	—	—	—	—	—	—
—	—	30 T	—	—	—	—	—	—	—
—	—	10	—	—	—	—	—	—	—
—	—	80 T	—	—	—	—	—	—	—
—	—	0	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
2,100 T	—	10 T	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—

Table 3.—Selected trace elements in water from the Navajo

Map number	Well number	Date sampled	Arsenic, total (µg/L as As)	Barium, dissolved (µg/L as Ba)	Boron, dissolved (µg/L as B)	Iron, dissolved (µg/L as Fe)	Lithium, dissolved (µg/L as Li)	Manganese, dissolved (µg/L as Mn)
		03-03-86	—	—	—	—	—	—
		03-09-87	—	—	—	—	—	—
		03-01-88	—	—	—	—	—	—
		09-07-88	—	—	—	—	—	—
		03-02-89	—	—	1,400	830	—	20
		09-07-89	—	—	—	—	—	—
		03-07-90	—	—	—	—	—	—
		09-06-90	—	—	—	—	—	—
		07-18-90	—	—	—	—	—	—
		08-26-91	—	—	—	—	—	—
N11	(D-40-24)14adb-1	07-30-91	—	—	—	—	—	—
		04-00-57	—	—	—	—	—	—
N12	(D-40-24)15bcc-1	06-20-89	—	100	1,600	380	—	—
		07-18-90	—	—	—	—	—	—
		07-30-91	—	—	—	—	—	—
N14	(D-40-24)17dbd-1	05-00-56	—	—	—	0	—	—
		06-10-82	—	—	—	—	—	—
		06-06-84	29 D	<100	1,400	470	1,100	20
		10-25-84	—	—	—	80	—	20
N16	(D-40-24)19ada-1	10-09-89	—	<100	1,700	260	—	—
		07-30-91	—	—	—	—	—	—
N17	(D-40-25) 1bcc-1	08-17-52	—	—	—	—	—	—
		12-09-53	—	—	—	—	—	—
		03-10-55	—	—	—	40	42,000	20
N19	(D-40-26)21abb-1	06-20-89	—	100	2,800	100	—	—
		07-19-90	—	—	—	—	—	—
		08-01-91	—	—	—	—	—	—
N21	(D-41-23)12bda-1	12-00-56	—	—	—	0	—	—
		06-21-89	—	100	310	2,500	—	—
		07-18-90	—	—	—	—	—	—
		07-30-91	—	—	—	—	—	—
N22	(D-41-23)16aaa-1	03-10-83	23	—	—	—	—	—
N24	(D-41-24)20dba-1	05-07-58	—	—	—	—	—	—
		08-25-80	—	—	210	240 T	—	—
N25	(D-41-24)27cac-1	05-00-57	—	—	—	1,000	—	—

aquifer and in brine from the Paradox Formation—Continued

Stron- tium, dis- solved (µg/L as Sr)	Vana- dium, dis- solved (µg/L as V)	Zinc, dis- solved (µg/L as Zn)	Carbon 14 percent modern	C-13 / C-12 stable isotope ratio (permil)	H-2 / H-1 stable isotope ratio (permil)	O-18 / O-16 stable isotope ratio (permil)	S-34 / S-32 stable isotope ratio (permil)	Sr-87/ Sr-86 stable isotope ratio	Tritium, total (pCi/L)
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
2,400	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
2,600	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
2,600	10	—	—	—	-109.5	-14.60	7.60	.71040	—
2,400	—	—	—	—	—	—	—	—	—
2,700	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
3,100	—	20	—	-4.90	-110.0	-14.60	9.70	—	2.0
2,800	—	—	0.90	—	—	—	—	—	—
2,700	9	—	—	—	-107.0	-14.60	—	.71044	—
2,700	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	70	—	—	—	—	—	—	—
11,000	20	—	—	—	-97.9	-12.29	9.80	.70976	—
20,000	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
10,000	38	—	—	—	-93.5	-12.15	9.70	.70998	—
11,000	—	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—

Table 3.—Selected trace elements in water from the Navajo

Map number	Well number	Date sampled	Arsenic, total (µg/L as As)	Barium, dis-solved (µg/L as Ba)	Boron, dis-soived (µg/L as B)	Iron, dis-solved (µg/L as Fe)	Lithium, dis-solved (µg/L as Li)	Manga-nese, dis-solved (µg/L as Mn)	
N26	(D-41-24)28cdb-1	10-11-89	—	<100	1,000	40	—	—	
		07-31-91	—	—	—	—	—	—	
		07-31-91	—	—	—	—	—	—	
		N27 (D-41-24)30cba-1	06-16-89	—	3	890	180	—	—
		N28 (D-41-24)33dad-1	10-06-89	—	13	1,100	69	—	—
N30	(D-41-25) 4cad-1	07-18-90	—	—	—	—	—	—	
		07-31-91	—	—	—	—	—	—	
		04-15-83	40	—	—	—	—	—	
		10-25-84	—	100	160	1,600	820	50	
		07-19-90	—	—	—	—	—	—	
N32	(D-41-25)13aax-1	07-31-91	—	—	—	—	—	—	
		10-10-89	—	<100	230	11,000	—	—	
N33	(D-41-25)17cac-1	08-01-91	—	—	—	—	—	—	
		10-12-64	—	—	—	—	—	—	
		08-25-89	—	100	200	30	—	—	
N34	(D-41-25)17cdb-1	03-18-64	—	—	—	—	—	—	
		10-12-64	—	—	—	—	—	—	
N35	(D-41-25)21bba-1	03-10-55	—	—	—	130 T	—	—	
		08-23-89	—	100	430	1,400	—	—	
		07-19-90	—	—	—	—	—	—	
N36	(D-41-25)27dca-1	07-31-91	—	—	—	—	—	—	
		10-09-89	—	<100	400	30	—	—	
N37	(D-42-22)14bbc-1	12-03-53	—	—	—	—	—	—	
N38	(D-42-23) 2bdb-1	03-11-55	—	—	—	10 T	—	—	
		06-19-89	—	6	200	30	—	—	
N40	(D-42-24) 5dac-1	10-06-89	—	<100	1,200	360	—	—	
N43	(D-43-23)15cab-1	01-20-54	—	—	—	—	—	—	
		03-11-55	—	—	—	—	—	—	
		08-24-89	—	31	50	110	—	—	
Paradox Formation									
Aneth brine sample		06-22-89	—	1,100	32,000	850	—	—	
Ismay brine sample		10-09-89	—	1,000	120,000	1,400	—	—	

aquifer and in brine from the Paradox Formation—Continued

Stron- tium, dis- solved (µg/L as Sr)	Vana- dium, dis- solved (µg/L as V)	Zinc, dis- solved (µg/L as Zn)	Carbon 14 percent modern	C-13 / C-12 stable isotope ratio (permil)	H-2 / H-1 stable isotope ratio (permil)	O-18 / O-16 stable isotope ratio (permil)	S-34 / S-32 stable isotope ratio (permil)	Sr-87/ Sr-86 stable isotope ratio	Tritium, total (pCi/L)
11,000	11	—	—	—	-93.5	-11.65	9.50	.70929	—
9,300	—	—	—	—	—	—	—	—	—
540	—	—	—	—	—	—	—	—	—
240	<1	—	—	—	-105.5	-13.70	1.60	—	—
250	<1	—	—	—	-105.5	-14.20	4.70	—	—
250	—	—	—	—	—	—	—	—	—
250	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
3,800	—	40	0.80	-5.40	-104.0	-13.30	6.10	—	<1
3,600	—	—	—	—	—	—	—	—	—
3,700	—	—	—	—	—	—	—	—	—
8,500	12	—	—	—	-95.4	-12.25	10.10	.70965	—
19,000	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
1,200	47	—	—	—	-99.5	-12.80	21.80	.70962	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
12,000	37	—	—	—	-96.0	-12.55	9.80	.70954	—
18,000	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—
910	1	—	—	—	-97.0	-13.70	—	.70912	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
53	<1	—	—	—	-120.0	-15.35	2.30	—	—
400	1	—	—	—	-105.5	-13.65	6.60	.70926	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
450	17	—	—	—	-78.0	-9.50	2.60	.70849	—
<u>Paradox Formation</u>									
180,000	340	—	—	—	-79.0	-6.70	19.00	.70862	—
200,000	2,400	—	—	—	-42.0	+2.19	7.80	.70845	—

Table 4.—Records of selected wells
[—,

Map number: Refer to well identification in figure 5.

Well number: Refer to section on well-numbering system.

Property owner: Current owner or former lease holder.

Primary use of water: S, stock; I, irrigation; H, household; P, public supply; U, unused.

Altitude of land surface: In feet above sea level.

Water level: In feet above (-) or below land surface; F, flowing, height unknown.

Discharge: gal/min, gallons per minute.

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth drilled (feet)	Depth of well (feet)
B1	(D-39-24)13dac-1	Hatch Sherman	04-24-58	S,I		566
B2	(D-39-25) 5aca-1	Redd Ray	08-00-51	H		372
B3	(D-39-25)30bbc-1	Navajo Tribe	04-10-56	H,S		685
B4	(D-39-25)30bbc-2	Navajo Tribe	05-00-56	H,I		690
B5	(D-39-25)36bdb-1	Navajo Tribe	03-31-66	H,S		869
B6	(D-40-23)13bad-1	Texaco	05-26-57	U		547
B7	(D-40-23)36abb-2	Wheeler Lloyd	11-00-62	H		260
B8	(D-40-24) 4dcd-1	Navajo Tribe	07-18-62	H,I		807
B9	(D-40-24)11abd-1	Navajo Tribe	03-02-56	H,S		585
B10	(D-40-24)32cdd-2	Navajo Tribe	02-18-81	P		350
B11	(D-40-24)32dcb-1	Montezuma Trailer Park	11-25-67	P		260
B12	(D-40-24)32dcc-2	Navajo Tribe	03-30-81	P		352
B13	(D-40-24)32dcd-1	State Of Utah	04-08-72	H		290
B14	(D-40-25)11ab -1	Public Health Service	05-14-78	P	6,185	1,077
B15	(D-40-25)11da -1	Public Health Service	06-09-58	P	6,196	905
B16	(D-40-26) 5cdb-1	Navajo Tribe	01-00-56	H,S	7,938	843
B17	(D-40-26) 9cbd-1	Navajo Tribe	11-26-62	H,S		792
B18	(D-40-26)19adc-1	Texaco	07-09-65	U	7,410	779
B19	(D-41-24)20bbb-1	Moran Brothers	03-02-58	U		521
B20	(D-43-24)11ccb-1	Navajo Tribe	02-23-72	H,S		540

in the Bluff aquifer

no data]

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/min)	Date discharge measured	Remarks
4,680	F	04-01-58	30.0	04-24-58	
4,760	-149	07-01-51	168	07-00-51	
	-122	01-00-54	2.0	06-15-89	
	-47	02-19-83			
4,670	F	04-10-56	150	04-10-56	Tribal Well 12T-326
			10.0	06-15-89	
4,880	F	06-15-89	2.0	06-15-89	Tribal Well 12T-332
5,300	576	—	15.0	—	Tribal Well 12T-513
	541	03-11-82			
4,760	110	05-01-57	35.0	05-25-57	
4,440	-10	12-15-62	—	—	
4,790	F	07-18-62	100	07-22-62	Tribal Well 12T-631
			5.0	05-16-89	
4,640	-69	03-02-56	150	03-08-56	Tribal Well 12T-327
4,440	—	—	—	—	9T-599A; Montezuma Creek water supply
4,460	17.5	11-26-67	10.0	—	
	67	05-05-82			
4,440	—	—	—	—	9T-599; Montezuma Creek water supply
4,480	15.0	04-08-72	23.0	04-08-72	
5,260	450	04-16-87			Former oil test; 12T-702; Aneth water supply
5,280	—	—	—	—	Former oil test; 12T-700; Aneth water supply
5,080	200	06-10-67	10.0	06-10-67	Former oil test; 12T-591; Converted to water well 06-67
5,000	F?	—	15.0	11-26-62	Tribal Well 12T-530
4,960	—	—	179	—	Former oil test
4,760	170	03-02-58	25	03-02-58	
5,240	300	02-23-72	—	—	Tribal Well 9T-572

Table 5.—Records of selected wells

[—,

Map number: Refer to well identification in figure 5.

Well number: Refer to section on well-numbering system.

Property owner: Current owner or former lease holder.

Primary use of water: H, household; I, irrigation; S, stock; U, unused.

Altitude of land surface: In feet above sea level.

Water level: In feet above (-) or below land surface; F, flowing, height unknown.

Discharge: gal/min, gallons per minute.

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth of well (feet)
E1	(D-38-25)27ccb-1	Kasper Arthur	—	H,I,S	750
E2	(D-40-23)36abb-3	Howe Leonard	07-10-82	U	380
E3	(D-40-24)31daa-1	El Paso Natural Gas	11-04-58	U	350
E4	(D-40-25) 6dac-1	Navajo Tribe	08-30-62	H,S	1,040
E5	(D-40-25)14dba-1	Navajo Tribe	01-01-62	H,S	900
E6	(D-40-25)15bcc-1	Navajo Tribe	10-05-64	H,S	1,050
E7	(D-41-24) 6bab-1	El Paso Natural Gas	1958	U	406
E8	(D-41-24) 6bba-2	El Paso Natural Gas	1958	U	413
E9	(D-41-25)12dac-1	Navajo Tribe	12-01-58	S	720
E10	(D-41-26)20cdb-1	Navajo Tribe	10-01-62	H,S	1,240
E11	(D-42-24)20ddb-1	Navajo Tribe	03-26-70	U	1,340
E12	(D-43-24)12ada-1	Navajo Tribe	08-09-64	S	660
E13	(D-43-24)27aaa-1	Navajo Tribe	03-00-61	H,S	500

in the Entrada aquifer

no data]

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/min)	Date discharge measured	Remarks
4,835	F	06-09-82	120.0	04-15-66	Converted oil test
4,430	2.0	07-10-82	25.0	—	Well plugged 4-83;
	-36	03-07-83	1.7	03-07-83	saline water
4,480	F	—	—	—	
5,120	332	07-27-62	17.0	08-27-62	Tribal Well 12T-529
	343	04-15-83			
5,070	155	10-30-62	18.0	10-30-62	Tribal Well 12T-531
	227	07-22-82			
5,260	465	10-04-64	18.0	10-04-62	Tribal Well 12T-528
	464	05-07-82			
4,620	F	08-08-58	35.0	08-08-58	
4,620	—	—	35.0	—	
4,770	F	12-03-58	3.00	12-03-58	Tribal Well 12T-504
			.10	05-07-82	
5,160	240	—	1.0	06-21-89	Tribal Well 12T-540
	275	05-07-82			
5,660	970	—	12.0	—	Abandoned windmill;
	842	05-06-82			Tribal Well 9T-564
5,200	430	08-09-64	1.8	05-05-82	Tribal Well 9T-539
5,115	60	03-00-61	15.0	03-00-61	Tribal Well 9T-547
	101	01-19-83			

Table 6.—Records of selected wells

[—,

Map number: Refer to well identification in figure 5.

Well number: Refer to section on well-numbering system.

Primary use of water: H, household; S, stock.

Altitude of land surface: In feet above sea level.

Water level: In feet below land surface.

Discharge: gal/min, gallons per minute.

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth of well (feet)
M1	(D-39-23) 1ddd-1	Navajo Tribe	07-00-40	H,S	625
M2	(D-39-23) 5aac-1	Navajo Tribe	02-00-40	H,S	310
M3	(D-40-23)12bad-1	Navajo Tribe	04-04-73	H,S	750
M4	(D-40-25)19aad-1	Navajo Tribe	01-16-53	H,S	410
M5	(D-41-26)33acd-1	Navajo Tribe	11-00-62	H,S	753
M6	(D-42-25)28dca-1	Navajo Tribe	10-00-58	H,S	403
M7	(D-43-25)33bbd-1	Navajo Tribe	09-00-58	H,S	560

in the Morrison aquifer

no data]

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/min)	Date discharge measured	Remarks
5,195	440	—	1.5	05-08-82	Tribal Well 12T-533
	434	06-03-83			
4,934	137.6	03-07-83	—	—	Tribal Well 12T-534
5,280	645	04-06-73	3.0	04-06-73	Dismantled windmill;
	616	08-22-83	1.7	02-19-83	Tribal Well 12T-605
4,904	231	01-15-53	11.0	01-15-53	Tribal Well 12K-316
	226	03-10-82	2.0	12-09-53	
			1.5	03-10-82	
			1.8	05-08-82	
4,830	200	—	—	—	Tribal Well 12T-541
	247	05-07-82			
4,925	171	—	0.10	05-06-82	Tribal Well 9T-225
	207	05-06-82			
5,216	250	01-00-65	8.0	—	Tribal Well 9T-227

Table 7.—Records of selected wells

[—,

Map number: Refer to well identification in figure 5.

Well number: Refer to section on well-numbering system.

Primary use of water: H, household.

Depth of well: Presumed to be very shallow.

Altitude of land surface: In feet above sea level.

Discharge: gal/min, gallons per minute; <, less than.

Map number	Well number	Property owner	Date of well completion	Primary use of water	Depth of well (feet)
A1	(D-41-25)23cac-1	Navajo Tribe	—	H	<30
A2	(D-41-26)33dbb-1	Navajo Tribe	—	H	<30
A3	(D-41-25)17cdb-1	Mobil Oil	—	H	—
A4	(D-41-25)35ada-1	Navajo Tribe	—	H	<30
A5	(D-41-24)32cbd-1	Navajo Tribe	—	H	<30
A6	(D-40-24)22ccc-1	Navajo Tribe	—	H	<30

in alluvial aquifers

no data]

Altitude of land surface	Water level (feet)	Date water level measured	Discharge (gal/min)	Date discharge measured	Remarks
4,600	—	—	<10	05-12-89	Tribal Well 12R-184A
4,840	—	—	<5	05-17-89	Near Tribal Well 12T-541
4,460	—	—	—	—	Mobil Water Well No. 22
4,720	—	—	<10	08-23-89	Rockwell Spring
4,800	—	—	<10	08-24-89	
4,680	—	—	<10	10-03-89	Pussywillow Spring

**Table 8.—Temperature, specific conductance, pH,
and discharge of water from selected wells
in the Navajo, Bluff, Entrada, Morrison,
and alluvial aquifers, 1989-91**

[—, not measured]

Map number: Refer to well identification in figures 4 and 5.

Specific conductance: $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius.

Discharge: gal/min, gallons per minute; <, less than; e, estimated.

Map number	Date measured	Water temperature (degrees Celsius)	Specific conductance ($\mu\text{S}/\text{cm}$)	pH (standard units)	Discharge (gal/min)
E6	05-10-89	21.0	880	—	1
N30	05-11-89	19.0	4,780	7.5	7.5
A1	05-12-89	17.0	670	7.6	<10
N21	05-13-89	18.5	9,100	—	2
N40	05-13-89	17.0	2,500	—	1
N28	05-13-89	19.0	1,760	8.9	3
N29	05-13-89	17.5	2,400	8.5	6
N14	05-15-89	19.5	4,120	7.4	5
N12	05-15-89	19.5	3,620	7.4	7.5
N8/9	05-16-89	21.5	1,570	8.0	—
N5	05-16-89	19.0	570	8.3	7.5
N6	05-16-89	17.0	3,150	7.7	2
N10	05-16-89	19.5	3,100	7.4	20 e
B8	05-16-89	19.0	1,980	7.7	5
E9	05-16-89	18.0	3,280	8.4	<1
A2	05-17-89	16.0	870	—	<5
N13	05-17-89	17.0	650	7.7	1.5
N16	05-17-89	19.0	3,860	7.4	3
B1	06-15-89	18.0	580	7.5	<5
B2	06-15-89	17.5	870	—	2
N2	06-15-89	19.0	1,520	—	3
N48	06-15-89	18.0	890	—	2.5
B3	06-15-89	19.0	670	7.4	10
B4	06-15-89	40.0	640	—	2
N27	06-16-89	19.5	1,410	8.6	2
N50	06-16-89	25.5	3,840	—	1
N15	06-16-89	17.0	2,220	7.4	1
N38	06-19-89	18.0	840	9.0	<1
N19	06-20-89	18.5	11,100	7.8	20 e
N12	06-20-89	19.5	3,650	7.4	7.5

**Table 8.—Temperature, specific conductance, pH,
and discharge of water from selected wells
in the Navajo, Bluff, Entrada, Morrison,
and alluvial aquifers, 1989-91—Continued**

Map number	Date measured	Water temperature (degrees Celsius)	Specific conductance (μ S/cm)	pH (standard units)	Discharge (gal/min)
N7	06-20-89	19.0	1,620	7.9	7.5
A3	06-21-89	17.0	830	—	—
E10	06-21-89	18.5	3,250	—	1
N21	06-21-89	18.5	9,460	7.3	2
N35	08-23-89	18.5	14,400	7.1	10 e
N41	08-23-89	20.0	4,220	—	3 e
A4	08-23-89	23.0	640	—	<10
A5	08-24-89	24.0	580	—	<10
N22	08-24-89	19.5	1,420	8.4	<1
N43	08-24-89	20.0	250	7.8	5
N49	08-24-89	21.5	225	—	—
N31	08-25-89	26.0	18,600	8.2	<1
N33	08-25-89	16.0	11,200	9.9	—
Anode Sec 19 ¹	08-25-89	17.0	4,610	—	1
N46	08-26-89	24.0	2,500	—	—
Anode Area 1 ²	08-28-89	19.0	1,770	—	1
N34	08-28-89	20.0	12,300	—	—
A6	10-03-89	22.5	670	—	<10
N7	10-03-89	19.0	1,560	8.0	7.5
N28	10-06-89	19.0	1,690	8.7	3
N40	10-06-89	17.5	1,940	8.7	1
N4	10-07-89	19.0	1,460	7.8	—
N36	10-09-89	17.0	3,290	8.4	<1
N16	10-09-89	19.0	3,680	7.5	3
B16	10-09-89	18.0	600	—	2
E5	10-09-89	18.5	1,260	—	2
B5	10-10-89	18.0	1,520	—	—
E4	10-10-89	20.0	840	—	—
N32	10-10-89	19.0	14,600	7.3	<1
N34	10-10-89	21.5	12,800	8.8	—
N25	10-11-89	18.0	12,300	8.3	20 e

**Table 8.—Temperature, specific conductance, pH,
and discharge of water from selected wells
in the Navajo, Bluff, Entrada, Morrison,
and alluvial aquifers, 1989-91—Continued**

Map number	Date measured	Water temperature (degrees Celsius)	Specific conductance (μ S/cm)	pH (standard units)	Discharge (gal/min)
N46	10-11-89	19.0	1,800	—	—
B20	10-11-89	17.5	1,360	—	—
E12	10-11-89	20.0	4,540	—	—
M6	10-11-89	20.0	2,090	—	2
N47	10-11-89	17.5	830	—	—
N10	07-18-90	19.5	3,100	7.4	20 e
N12	07-18-90	19.5	3,520	7.4	7.5
N21	07-18-90	18.5	9,260	7.3	2
N28	07-18-90	19.5	1,780	8.6	3
B8	07-18-90	19.0	2,070	7.7	5
N30	07-19-90	19.0	4,550	7.5	7.5
N19	07-19-90	19.0	18,400	7.5	20 e
N35	07-19-90	18.5	14,500	7.0	15 e
N6	07-30-91	17.0	3,180	7.7	2
N10	07-30-91	19.0	3,120	7.4	20 e
N16	07-30-91	19.0	3,920	7.4	3
N14	07-30-91	19.0	4,160	7.4	5
N12	07-30-91	19.0	3,620	7.4	7.5
N21	07-30-91	18.0	9,300	7.3	2
N28	07-31-91	18.0	1,770	8.6	3
N26	07-31-91	16.5	2,400	8.5	3
N29	07-31-91	19.5	2,540	8.5	5
N25	07-31-91	17.5	13,000	8.3	20 e
N35	07-31-91	18.0	14,200	7.0	15 e
N30	07-31-91	19.0	4,660	7.5	7.5
N19	08-01-91	18.5	18,300	7.7	20 e
N32	08-01-91	20.0	13,900	7.3	<1
N36	08-01-91	22.0	3,420	8.3	<1
N7	08-01-91	19.0	1,620	8.0	7.5

¹Anode well Sec. 19; Mobil cathodic protection well, (D-41-25)19bad

²Anode well Area 1; Mobil cathodic protection well, (D-40-25)31cdd