Selected Data from Thermal-Spring Areas, Southwestern Montana

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SELECTED DATA FROM THERMAL-SPRING AREAS, SOUTHWESTERN MONTANA

By Robert B. Leonard, Tordis M. Brosten, and Norman A. Midtlyng

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FACTORS FOR CONVERTING ENGLISH UNITS TO METRIC UNITS

The following factors can be used to convert English units in this report to the International System of Units (SI).

Multiply English units	By	To obtain SI units
acre	0.4047	square hectometer (hm^2)
acre-ft (ac-ft)	1233	cubic meter (m^3)
cubic foot per second (ft^3/s)	28.32	liter per second (L/s)
foot (ft)	.3048	meter (m)
gallon per minute (gal/min)	.06309	liter per second (L/s)
mile (mi)	1.609	kilometer (km)

temperature, degrees Celsius (^oC) = 0.556 (^oF-32)

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INTRODUCTION

During 1975-77 the Montana district of the U.S. Geological Survey collected and assembled data describing the flow, temperature, and chemical characteristics of thermal and related waters. The work was part of an assessment of the geothermal resources of southwestern Montana, excluding Yellowstone Park. The purpose of this report is to present representative data from 24 thermal springs and 3 deep wells where water temperatures exceed 38°C (100°F).

Initially, the data base included references reported by Waring (1965). The data base also included unpublished chemical analyses of water samples and related data collected during 1959-73 by the Montana State Board of Health (now Montana Department of Health and Environmental Sciences), the Montana Bureau of Mines and Geology, and by graduate students for theses. Results of analyses and engineering reports were collected from landowners, and additional published and unpublished data were collected by Geological Survey investigators during 1967-75 (see Selected references).

Tabulation of the data revealed wide discrepancies in reported parameters for some sites. Inadequate description of the sampling sites limited the value of much of the previously reported data, because most of the thermal springs were characterized by multiple outlets. The rate, temperature, and chemical composition of flow at the various outlets commonly differs and may fluctuate seasonally as a result of dilution by shallow ground water. Therefore, most of the sites were revisited to obtain information needed to expand, evaluate, and fill omissions in the data base. Special effort was made to augment data collected during the summer of 1974 at 21 hot springs by other Geological Survey investigators with similar data collected during other seasons.

Field measurements of rate, specific conductance, pH, and temperature of flow at the various outlets, particularly those having the highest temperatures, were compared with previously reported determinations. At some sites partial analyses for chloride or other relatively stable constituents sufficed to confirm similarities or dissimilarities with previously sampled waters. At other sites, more detailed analyses were needed to describe a source initially or to replace dissimilar, and possibly erroneous, information in the preliminary listing. Where correlation

was established, new data were merged with existing data according to location. Samples of associated cool waters were collected to evaluate the possibility that they compose part of the thermal effluent. Some questionable existing data were retained because they were the sole source of information that may describe long-term fluctuations in the chemical and physical properties of the thermal waters.

Chemical analyses and associated data are grouped in tables 1-27 by hot-spring areas, arranged in downstream order according to major river basins, and indexed numerically in figure 1. Locations of individual sites within each area are described by name and by a station number composed of latitude and longitude. Names formerly used to identify the hot springs are shown in parentheses.

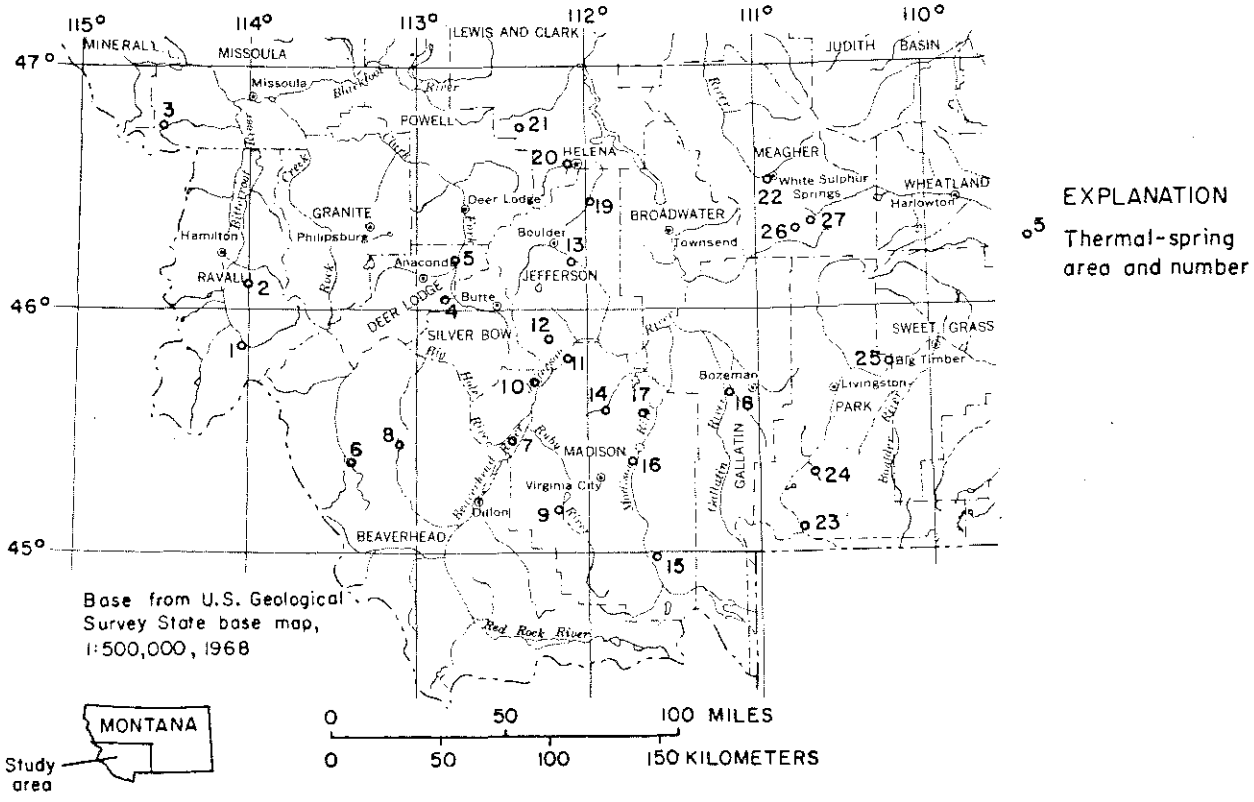

Figure 1.--Location of study area.

Reported rates of flow, particularly at commercially developed springs, vary widely according to the observer or use of the water. A large part of the flow normally occurs as seepage. Where feasible for this study, flow was measured directly using the Hoff or Pygmy current meter, a Parshall flume, or a container of known volume and a stopwatch.

Many apparent discrepancies in data collected in the past at a given site are attributable to different sampling, analytical, or reporting techniques. For example, pH values normally were determined in the field by USGS and in the laboratory by other investigators. Changes in the pH and the concentrations of bicarbonate and calcium commonly accompany cooling and prolonged storage of untreated thermal waters before analysis. The concentrations of dissolved solids for samples collected by USGS are the calculated sum of constituents; although roughly comparable some of the earlier determinations are of the residue on evaporation. Most of the chemical analyses in this report are of samples collected after 1973 by Geological Survey personnel according to techniques outlined by Presser and Barnes (1974) and analyzed by the Survey either in the National Water Quality Laboratory in Denver, Colo., or in research laboratories in Menlo Park, Calif.

All the included data describing composition of gases, stable isotopes, radioactivity, and subsurface temperatures were collected by the U.S. Geological Survey during 1974-77 (tables 28-31). Analysis of samples collected during the current investigation for determination of the composition of gases associated with the thermal waters (table 28) and for their content of the stable isotopes, oxygen-18 (^{18}O) and deuterium (D) (table 29), was expedited by Mariner to ensure comparibility with the results of his previous investigation (Mariner and others, 1976).

The isotopic data are expressed in the delta (δ) notation:

$$\delta_X = \frac{R_X - R_{std}}{R_{std}} \times 10^3$$

where
δ_X = reporting unit in parts per thousand,
R_X = ratio of isotopic concentration of the sample (D/H or $^{18}O/^{16}O$), and
R_{std} = ratio of isotopic concentration of the standard (Standard Mean Ocean Water, or SMOW, in this report).

Most of the major hot springs and some associated cooler waters were sampled by the Geological Survey for determination of gross alpha and gross beta activity by the Montana Department of Health and Environmental Sciences. Results of the analyses (Larry Lloyd, written commun., 1976, 1977) are included in table 30. Additional samples for determination of dissolved uranium, radium-226, and radon by the National Water Quality Laboratory were collected mainly at sites where the Montana Department

of Health and Environmental Sciences analyses revealed abnormal levels of radioactivity (see table 19).

Subsurface temperatures in selected wells were measured with a thermistor-Wheatstone bridge combination capable of measuring temperatures with a precision of ±0.1 degree Celsius at depths of 3,000 feet (table 31).

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DATA

Tables 1-27 are presented in an identical format. Table numbers correspond to hot-spring areas shown on figure 1. Column headings, location numbers, and abbreviations that are not self-explanatory are described below.

The station number is based on the grid system of latitude and longitude. The station number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude; the next 7 digits denote the degrees, minutes, and seconds of longitude; and the last 2 digits form a sequential number for stations within the same 1-second grid. Thus, if two stations have the same coordinates for latitude and longitude, sequential numbers 01 and 02 are assigned.

Station letters identify the data according to source (station name). Station letters and the date of sample collection are continued for each line of data in the tables to facilitate identification of the source of the sample.

Local station-location numbers are shown to the right of some station names. The location numbers are based on the Federal system of land subdivision. The first number indicates the township north (N) or south (S) of the Montana base line; the second, the range east (E) or west (W) of the principal meridian; and the third, the section. The first letter following the section number denotes the quarter section (160-acre tract); the second, the quarter-quarter section (40-acre tract); and the third, the quarter-quarter-quarter section (10-acre tract). Letters are assigned in a counterclockwise direction, beginning with "A" in the northeast quadrant. Consecutive numbers beginning with 2 are added if more than one station is located within a 10-acre tract. For example, hot spring 04N19W07DCD2 is the second station inventoried in the SE¼SW¼SE¼ sec. 7, T.4 N., R.19 W.

Abbreviations used in column headings of tables 1-27 are:

AC-FT	Acre-feet
CFS	Cubic feet per second
DEG C	Degrees Celsius
FT	Feet
GPM	Gallons per minute
MG/L	Milligrams per liter
MICROMHOS	Micromhos per centimeter at 25°C
PC/L	Picocuries per liter
UG/L	Micrograms per liter

Codes used in the column SAMPLED BY are:

FR	R. O. Fournier and E. C. Robertson, written commun.
H	Hackett and others (1960), table 31
K	Kaczmarek (1974), table 3
M	Mariner, Presser, and Evans (1976), tables 1, 2.
MBMG	Montana Bureau of Mines and Geology.
MSBH	Montana State Board of Health (now Montana Department of Health and Environmental Sciences).
RFS	Robertson, Fournier, and Strong (1976), table 2 and unpublished data.
USGS	Data collected for this report.

TABLE 1.--CHEMICAL ANALYSES OF WATER FROM THE MEDICINE HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
455047114020600	A	MEDICINE HOT SPRINGS 01N20W12CCD	64-08-05	MSBH	100	--	--
	A	MEDICINE HOT SPRINGS 01N20W12CCD	72-08-09	MBMG	100	377	8.1
	A	MEDICINE HOT SPRINGS 01N20W12CCD	74-08-16	M	105	343	8.6
	A	MEDICINE HOT SPPINGS 01N20W12CCD	76-07-23	USGS	85	526	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	64-08-05	49.0	--	15	0	6.0	.0	--	--	--	54	--	110
A	72-08-09	--	--	18	0	6.6	.4	77	89	7.9	--	1.5	130
A	74-08-16	45.0	.6	--	--	1.9	<.1	80	--	--	--	1.4	120
A	76-07-23	47.2	--	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)
A	64-08-05	0	--	90	--	22	7.0	9.0	--	--	--	.00	.00
A	72-08-09	0	0	110	1.7	38	7.3	12	54	328	.45	.00	.00
A	74-08-16	3	--	103	.5	33	6.7	14	60	--	--	--	--
A	76-07-23	--	--	--	--	36	7.8	14	51	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	64-08-05	--
A	72-08-09	--
A	74-08-16	<.10
A	76-07-23	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	64-08-05	--	--	--	--	--	--	0	--	--	--
A	72-08-09	--	--	--	210	--	--	20	--	0	--
A	74-08-16	7	120	<10	200	<50	<10	<20	<100	<20	<.1

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	64-08-05	--	--	--	--
A	72-08-09	--	--	--	--
A	74-08-16	<20	<10	<100	<20

TABLE 2.--CHEMICAL ANALYSES OF WATER FROM THE SLEEPING CHILD (WEEPING CHILD) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
460549114001500	A	SLEEPING CHILD HOT SPRINGS 04N19W07DCD 2	72-08-10	MBMG	115	568	8.0
	A	SLEEPING CHILD HOT SPRINGS 04N19W07DCD 2	74-08-15	M	>528	505	8.1
460549114001501	B	SLEEPING CHILD HOT SPRINGS 04N19W07DCD	64-08-04	MBBH	115	--	--
	B	SLEEPING CHILD HOT SPRINGS 04N19W07DCD	74-08-15	M	>528	538	8.2
	B	SLEEPING CHILD HOT SPRINGS 04N19W07DCD	76-07-23	USGS	27	674	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	72-08-10	--	--	14	0	5.5	.2	120	94	14	--	2.7	170
A	74-08-15	43.0	<1.0	16	0	6.2	.2	110	92	12	--	2.6	160
B	64-08-04	51.0	--	20	0	8.0	.0	--	--	--	108	--	170
B	74-08-15	52.0	.8	--	--	5.4	<.1	120	--	--	--	2.9	170
B	76-07-23	50.0	--	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)
A	72-08-10	0	0	126	2.7	93	9.2	14	60	479	.65	.05	.20
A	74-08-15	1	--	133	2.1	81	8.8	14	60	563	.77	--	--
B	64-08-04	6	--	149	--	88	5.0	16	--	--	--	.00	.00
B	74-08-15	2	--	143	1.8	87	9.5	15	66	--	--	--	--
B	76-07-23	--	--	--	--	82	9.7	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	72-08-10	--
A	74-08-15	--
B	64-08-04	--
B	74-08-15	<.10
B	76-07-23	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	72-08-10	--	--	--	210	--	--	30	--	10	--
A	74-08-15	--	330	<10	170	<50	<10	<20	<100	<20	--
B	64-08-04	--	--	--	--	--	--	0	--	--	--
B	74-08-15	4	350	<10	180	<50	<10	<20	<100	<20	<.1

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
A	72-08-10	--	--
A	74-08-15	<20	<10
B	64-08-04	--	--
B	74-08-15	<20	<10

TABLE 3.--CHEMICAL ANALYSES OF WATER FROM THE LOLO (GRANITE) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
464508114315800	A	LOLO HOT SPRINGS	64-08-04	MSBH	--	--	--
	A	LOLO HOT SPRINGS	72-08-09	MBMG	50	234	7.9
	A	LOLO HOT SPRINGS	74-08-15	M	26	225	9.3

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	64-08-04	46.0	--	10	0	4.0	.0	--	--	--	50	--	31
A	72-08-09	--	--	6	0	2.0	.2	50	94	9.0	--	1.2	88
A	74-08-15	44.0	<.5	--	--	1.8	<.1	52	--	--	--	1.2	70

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	64-08-04	30	--	75	--	18	8.0	8.3	--	--	.00	.00	--
A	72-08-09	0	0	72	1.8	20	5.5	6.4	71	245	.07	.30	--
A	74-08-15	8	--	71	.1	18	6.1	6.4	72	--	--	--	<.10

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	64-08-04	--	--	--	--	--	--	340	--	--	--
A	72-08-09	--	--	--	40	--	--	30	--	0	--
A	74-08-15	10	110	<10	30	<50	<10	<20	<100	<20	.1

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	64-08-04	--	--	--	--
A	72-08-09	--	--	--	--
A	74-08-15	<20	10	<100	<20

TABLE 4.--CHEMICAL ANALYSES OF WATER FROM THE GREGSON (FAIRMONT) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
460237112483800	A	GREGSON (FAIRMONT) HOT SPRINGS	65-04-08	MSBH	--	--	--
	A	GREGSON (FAIRMONT) HOT SPRINGS	67-09-21	FR	--	--	8.4
	A	GREGSON (FAIRMONT) HOT SPRINGS	74-08-19	M	264	701	8.4
	A	GREGSON (FAIRMONT) HOT SPRINGS	74-08-21	RFS	40	--	--
	A	GREGSON (FAIRMONT) HOT SPRINGS	76-09-10	USGS	--	852	8.3

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	65-04-08	68.0	--	20	0	4.0	2.0	--	--	--	182	--	170
A	67-09-21	71.0	--	10	0	4.0	.0	180	96	25	--	4.7	160
A	74-08-19	70.0	1.6	--	--	3.9	<.1	170	--	--	--	3.9	160
A	74-08-21	73.0	--	10	0	4.0	.0	180	96	25	--	4.1	190
A	76-09-10	70.0	--	--	--	--	--	--	--	--	--	--	156

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	65-04-08	6	149	--	180	20	18	--	--	.00	.00	--
A	67-09-21	3	136	1.1	180	13	--	77	542	--	--	--
A	74-08-19	3	136	1.1	180	17	18	85	--	--	--	<.10
A	74-08-21	3	161	--	200	9.3	11	83	589	--	--	--
A	76-09-10	--	128	1.1	180	17	--	78	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	65-04-08	--	--	--	--	--	--	0	--	--	--
A	67-09-21	--	360	--	780	--	--	--	--	--	--
A	74-08-19	16	300	<10	640	<50	<10	<20	<100	<20	<.1
A	74-08-21	--	300	--	700	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	65-04-08	--	--	--	--
A	67-09-21	--	--	--	--
A	74-08-19	<20	<10	100	40
A	74-08-21	--	--	--	--

TABLE 5.--CHEMICAL ANALYSES OF WATER FROM THE WARM SPRINGS (STATE HOSPITAL) AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
461040112474000	A	WARM SPRINGS (STATE HOSPITAL)	65-04-08	MBMG	60	--	--
	A	WARM SPRINGS (STATE HOSPITAL)	67-09-21	FR	--	--	7.9
	A	WARM SPRINGS (STATE HOSPITAL)	74-08-19	M	158	1510	6.5
	A	WARM SPRINGS (STATE HOSPITAL)	74-08-21	RFS	30	--	--
	A	WARM SPRINGS (STATE HOSPITAL)	76-09-10	USGS	50	1465	6.6

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	65-04-08	71.0	--	640	430	230	17	--	--	--	150	--	260
A	67-09-21	78.0	--	570	450	180	29	120	30	2.2	--	24	150
A	74-08-19	77.0	.7	640	430	220	22	120	28	2.1	--	26	260
A	74-08-21	78.0	--	570	390	190	22	130	32	2.4	--	23	220
A	76-09-10	78.0	--	--	--	--	--	--	--	--	--	--	254

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	65-04-08	0	213	--	700	9.0	4.0	--	--	.00	.00	--
A	67-09-21	0	123	3.0	680	6.0	--	50	1160	--	--	--
A	74-08-19	<1	215	132	670	5.0	3.9	56	1250	--	--	<.10
A	74-08-21	--	180	--	920	--	2.4	56	--	--	--	--
A	76-09-10	--	208	91	680	5.7	--	53	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	65-04-08	--	--	--	--	--	--	1300	--	--	--
A	67-09-21	--	130	--	380	--	--	--	--	--	--
A	74-08-19	<1	100	<10	360	<50	<10	50	<100	50	<.1
A	74-08-21	--	300	--	420	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	65-04-08	--	--	--	--
A	67-09-21	--	--	--	--
A	74-08-19	20	110	100	160
A	74-08-21	--	--	--	--

TABLE 6.--CHEMICAL ANALYSES OF WATER FROM THE JACKSON (JARDINE, BIG HOLE) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
452135113231100	A	JACKSON RANGER STATION	77-07-13	USGS	--	150	7.6
	A	JACKSON RANGER STATION	77-07-13	USGS	--	150	7.6
452204113241100	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	64-08-06	MSBH	--	--	--
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	67-09-21	FR	--	--	8.6
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	72-07-26	MBMG	--	1020	9.0
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	74-08-16	M	>264	972	6.8
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	74-08-21	RFS	950	--	--
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	76-07-23	USGS	--	1130	7.1
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	77-07-12	USGS	265	1092	6.8
	B	JACKSON (JARDINE) HOT SPRINGS 05S15W	77-07-12	USGS	265	1092	6.8
452215113243200	C	JACKSON SCHOOL HOUSE	77-07-13	USGS	--	304	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	77-07-13	14.5	--	1	0	.3	.1	36	97	15	--	.7	73
A	77-07-13	14.5	--	--	--	--	--	--	--	--	--	--	--
B	64-08-06	57.0	--	46	0	14	2.0	--	--	--	240	--	610
B	67-09-21	58.0	--	31	0	6.7	3.5	240	92	19	--	11	570
B	72-07-26	58.0	--	22	0	3.4	3.2	230	94	22	--	10	490
B	74-08-16	58.0	.6	40	0	10	3.7	240	91	16	--	10	610
B	74-08-21	59.0	--	41	0	11	3.2	250	91	17	--	11	630
B	76-07-23	60.0	--	45	0	12	3.5	230	89	15	--	12	617
B	77-07-12	58.3	--	42	0	11	3.4	240	90	16	--	11	610
B	77-07-12	58.3	--	--	--	--	--	--	--	--	--	--	--
C	77-07-13	15.5	--	120	--	37	7.2	21	27	.8	--	2.9	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)
A	77-07-13	0	--	60	2.6	13	2.1	.4	23	112	--	--	--
A	77-07-13	--	--	--	--	--	--	--	25	--	--	--	--
B	64-08-06	0	--	500	--	43	10	1.9	--	--	--	.00	.00
B	67-09-21	21	--	502	2.5	46	6.0	--	44	660	--	--	--
B	72-07-26	54	0	580	1.0	49	6.7	2.8	57	906	--	.02	.10
B	74-08-16	<1	--	500	155	45	7.7	2.0	52	672	.91	--	--
B	74-08-21	--	--	517	--	50	11	1.3	49	698	.95	--	--
B	76-07-23	0	--	506	78	51	8.8	1.9	47	672	.91	--	--
B	77-07-12	--	--	500	155	46	8.1	1.9	47	670	.91	--	--
B	77-07-12	--	--	--	--	--	--	--	51	--	--	--	--
C	77-07-13	--	--	--	--	--	6.7	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	77-07-13	--	--	--
A	77-07-13	--	--	--
B	64-08-06	--	--	--
B	67-09-21	--	--	--
B	72-07-26	--	--	--
B	74-08-16	--	<.10	--
B	74-08-21	--	--	--
B	76-07-23	.00	--	.00
B	77-07-12	--	--	--
B	77-07-12	--	--	--
C	77-07-13	--	--	--

TABLE 6.--CHEMICAL ANALYSES OF WATER FROM THE JACKSON (JARDINE, BIG HOLE) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)
A	77-07-13	--	30	--	40	--	--	--	40	--	0
B	64-08-06	--	--	--	--	--	--	--	140	--	--
B	67-09-21	--	960	--	350	--	--	--	--	--	--
B	72-07-26	--	--	--	370	--	--	350	--	--	40
B	74-08-16	<1	830	<10	320	<50	<10	--	<20	<100	40
B	74-08-21	--	650	--	350	--	--	--	--	--	--
B	76-07-23	--	770	--	370	--	--	--	130	--	--
B	77-07-12	--	--	--	360	--	--	--	--	--	--
C	77-07-13	--	--	--	20	--	--	--	--	--	--

STATION LFTTER	DATE OF SAMPLE	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	77-07-13	--	--	10	--	--	--
B	64-08-06	--	--	--	--	--	--
B	67-09-21	--	--	--	--	--	--
B	72-07-26	--	--	--	--	--	--
B	74-08-16	<.1	<20	--	120	<100	30
B	74-08-21	--	--	--	--	--	--
B	76-07-23	--	--	560	--	--	--
B	77-07-12	--	--	560	--	--	--
C	77-07-13	--	--	--	--	--	--

TABLE 7.--CHEMICAL ANALYSES OF WATER FROM THE NEW BILTMORE (ZIEGLER) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)
452741112282400	A	NEW BILTMORE COLD SPRING	76-12-16	USGS	6.0	1	734
452743112282800	B	NEW BILTMORE HOT SPRINGS	64-08-06	MSBH	--	100	--
	B	NEW BILTMORE HOT SPRINGS	67-09-21	FR	--	--	--
	B	NEW BILTMORE HOT SPRINGS	72-07-10	MBMG	--	105	2140
	B	NEW BILTMORE HOT SPRINGS	74-08-17	M	--	74	2160
	B	NEW BILTMORE HOT SPRINGS	74-08-21	RFS	--	31	--
	B	NEW BILTMORE HOT SPRINGS	76-12-16	USGS	32	73	2240

STATION LETTER	DATE OF SAMPLE	PH (UNITS)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)
A	76-12-16	7.1	6.7	--	320	56	90	24	38	20	.9	--	4.5
B	64-08-06	--	52.0	--	1000	1000	310	70	--	--	--	190	--
B	67-09-21	7.9	--	--	990	870	280	71	160	25	2.2	--	27
B	72-07-10	7.3	--	--	900	860	250	72	170	28	2.4	--	26
B	74-08-17	6.8	53.0	1.1	1000	840	290	73	160	25	2.2	--	24
B	74-08-21	--	54.0	--	980	770	280	69	110	19	1.5	--	27
B	76-12-16	6.8	53.9	--	1100	860	300	72	160	24	2.2	--	26

STATION LETTER	DATE OF SAMPLE	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)
A	76-12-16	326	--	--	267	41	140	10	1.1	--	--	--	--
B	64-08-06	230	0	--	189	--	1200	50	4.5	--	--	--	.00
B	67-09-21	150	0	--	123	3.0	1100	50	--	42	1810	--	--
B	72-07-10	49	0	0	40	3.9	1100	45	4.6	55	1810	--	.00
B	74-08-17	230	<1	--	189	58	1100	46	3.3	46	1860	--	--
B	74-08-21	258	--	--	212	--	1180	52	1.8	45	1890	--	--
B	76-12-16	229	0	--	188	58	1200	45	3.6	44	1970	2.68	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	76-12-16	--	--	--
B	64-08-06	.00	--	--
B	67-09-21	--	--	--
B	72-07-10	.00	--	--
B	74-08-17	--	--	.20
B	74-08-21	--	--	--
B	76-12-16	--	.00	--

TABLE 7.--CHEMICAL ANALYSES OF WATER FROM THE NEW BILTMORE (ZIEGLER) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
B	64-08-06	--	--	--	--	--	--	200	--	--	--
B	67-09-21	--	1040	--	210	--	--	--	--	--	--
B	72-07-10	--	--	--	210	--	--	0	--	0	--
B	74-08-17	2	920	<10	180	<50	<10	100	<100	30	<.1
B	74-08-21	--	880	--	210	--	--	--	--	--	--
B	76-12-16	--	870	--	210	--	--	0	--	30	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
B	64-08-06	--	--	--	--	--
B	67-09-21	--	--	--	--	--
B	72-07-10	--	--	--	--	--
B	74-08-17	20	--	80	<100	80
B	74-08-21	--	--	--	--	--
B	76-12-16	--	4000	--	--	--

TABLE 8.--CHEMICAL ANALYSES OF WATER FROM THE ELKHORN (POLARIS) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
452728113063100	A ELKHORN (POLARIS) HOT SPRINGS 04S12W29ACC	64-08-06	MSBH	--	--	--
	A ELKHORN (POLARIS) HOT SPRINGS 04S12W29ACC	67-09-21	FR	--	--	8.0
	A ELKHORN (POLARIS) HOT SPRINGS 04S12W29ACC	72-07-27	MBMG	450	219	8.4
	A ELKHORN (POLARIS) HOT SPRINGS 04S12W29ACC	74-08-20	M	105	209	8.9
	A ELKHORN (POLARIS) HOT SPRINGS 04S12W29ACC	74-08-23	RFS	32	--	--
	A ELKHORN (POLARIS) HOT SPRINGS 04S12W29ACC	76-07-22	USGS	28	241	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	64-08-06	46.0	--	15	0	4.0	1.0	--	--	--	42	--	49
A	67-09-21	--	--	5	0	2.0	.0	43	91	8.3	--	3.5	86
A	72-07-27	--	--	10	0	1.8	1.5	46	90	6.8	--	.7	77
A	74-08-20	46.5	.9	--	--	1.9	<.1	48		--	--	.7	77
A	74-08-23	49.0	--	5	0	2.0	.0	49	94	9.5	--	1.0	99
A	76-07-22	47.6	--	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	64-08-06	21	--	75	--	25	3.0	2.9	--	--	.00	.00	--
A	67-09-21	2	--	74	1.4	26	.8	--	47	167	--	--	--
A	72-07-27	3	0	74	.5	29	1.8	2.6	57	221	.16	.70	--
A	74-08-20	4	--	70	.2	27	1.7	2.6	55	--	--	--	<.10
A	74-08-23	--	--	61	--	32	--	1.6	54	--	--	--	--
A	76-07-22	--	--	--	--	30	2.3	2.8	52	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)
A	64-08-06	--	--	--	--	--	--	--	200	--	--
A	67-09-21	--	220	--	60	--	--	--	--	--	--
A	72-07-27	--	--	--	50	--	--	0	--	--	0
A	74-08-20	17	40	<10	50	<50	<10	--	<20	<100	<20
A	74-08-23	--	<100	--	50	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	64-08-06	--	--	--	--	--
A	67-09-21	--	--	--	--	--
A	72-07-27	--	--	--	--	--
A	74-08-20	<.1	<20	<10	<100	<20
A	74-08-23	--	--	--	--	--

TABLE 9.--CHEMICAL ANALYSES OF WATER FROM THE PULLER HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
451017112090700	A	PULLER WARM SPRING	73-07-21	K		--	7.0
	A	PULLER WARM SPRING	76-05-14	USGS	1.5	1680	7.3
451018112090701	B	PULLER HOT SPRINGS	76-05-14	USGS	50	1680	7.7
451032112082701	C	MALONEY COLD SPRING	76-05-14	USGS	50	605	7.6

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)
A	73-07-21	43.0	220	--	58	19	250	69	7.3	20	--	--	--
A	76-05-14	41.0	240	0	64	20	330	72	9.2	24	537	0	440
B	76-05-14	44.4	220	0	56	19	330	74	9.7	24	511	0	419
C	76-05-14	13.0	340	94	83	33	23	12	.5	8.1	305	0	250

STATION LETTER	DATE OF SAMPLE	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	73-07-21	--	--	91	--	20	--	--	--	--
A	76-05-14	43	370	91	2.1	32	1200	1.63	.06	.00
B	76-05-14	16	350	91	2.2	33	1160	1.58	.00	.00
C	76-05-14	12	130	12	.7	40	482	.66	.11	.02

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	76-05-14	--	--	690	--	200	--	60	--	--	--
B	76-05-14	34	0	690	0	190	0	40	4	30	.0
C	76-05-14	--	--	70	--	30	--	80	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
A	76-05-14	--	--	--	1100	--	--
B	76-05-14	3	3	0	1000	.0	20
C	76-05-14	--	--	--	810	--	--

TABLE 10.--CHEMICAL ANALYSES OF WATER FROM THE SILVER STAR (BARKELLS) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)
454015112181501	A	SILVER STAR COLD SPRING 1	76-05-14	USGS	--	1.0	574
454106112171100	B	SILVER STAR COLD WELL 02S06W01CDD	76-12-15	USGS	45	--	931
454107112174200	C	SILVER STAR HOT SPRINGS AT GRATE	76-12-15	USGS	--	38	917
	C	SILVER STAR HOT SPRINGS AT GRATE	77-06-21	USGS	--	38	918
454107112174201	D	SILVER STAR HOT SPRINGS	64-08-05	MSBH	--	--	--
	D	SILVER STAR HOT SPRINGS	67-09-21	FR	--	--	--
	D	SILVER STAR HOT SPRINGS	72-07-10	MBMG	--	150	847
	D	SILVER STAR HOT SPRINGS	74-08-18	M	--	>40	808
	D	SILVER STAR HOT SPRINGS	74-08-21	RFS	--	4.6	--
454109112165900	E	JEFFERSON RIVER AT SILVER STAR	76-09-09	USGS	--	--	471
454213112200200	F	SILVER STAR COLD SPRING 2	76-09-09	USGS	--	--	365
454243112210200	G	SILVER STAR COLD SPRING 3	76-09-09	USGS	--	<1.0	266

STATION LETTER	DATE OF SAMPLE	PH (UNITS)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)
A	76-05-14	8.3	10.0	--	290	96	82	20	31	19	.8	--	3.2
B	76-12-15	--	--	--	170	0	48	11	140	63	4.7	--	10
C	76-12-15	7.6	72.2	--	26	0	9.5	.3	170	92	15	--	6.7
C	77-06-21	--	72.7	--	--	--	--	--	--	--	--	--	--
D	64-08-05	--	69.0	--	31	0	8.0	3.0	--	--	--	170	--
D	67-09-21	8.3	67.0	--	25	0	9.7	.3	170	91	15	--	8.8
D	72-07-10	8.4	--	--	32	0	9.1	2.2	170	90	13	--	6.4
D	74-08-18	8.2	71.5	1.0	24	0	9.3	.3	170	92	15	--	6.4
D	74-08-21	--	71.0	--	26	0	9.6	.5	170	91	14	--	6.9
E	76-09-09	8.8	14.5	--	210	34	52	19	20	17	.6	--	9.4
F	76-09-09	8.3	12.0	--	150	16	40	13	13	15	.5	--	7.0
G	76-09-09	7.6	10.6	--	130	25	33	11	11	15	.4	--	4.8

STATION LETTER	DATE OF SAMPLE	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)
A	76-05-14	234	0	--	192	1.9	64	19	.8	25	361	.49	--
B	76-12-15	269	--	--	221	--	220	22	7.0	--	--	--	--
C	76-12-15	176	0	--	144	7.1	190	29	8.9	110	612	.83	--
C	77-06-21	--	--	--	--	--	--	32	--	110	--	--	--
D	64-08-05	180	0	--	148	--	200	34	8.0	--	--	--	.00
D	67-09-21	210	0	--	173	1.7	200	31	--	100	624	--	--
D	72-07-10	140	0	0	120	.9	230	22	9.2	120	712	--	.09
D	74-08-18	170	2	--	143	1.8	190	31	8.7	110	612	--	--
D	74-08-21	190	--	--	156	--	190	--	5.4	110	--	--	--
E	76-09-09	196	8	--	174	.5	68	11	.4	19	305	.41	--
F	76-09-09	168	0	--	138	1.3	48	8.2	.5	21	235	.32	--
G	76-09-09	126	0	--	103	5.1	50	6.6	.2	24	203	.28	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO. PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-05-14	--	.01	--	.00	--	--
B	76-12-15	--	--	--	--	--	--
C	76-12-15	--	.01	--	--	--	--
C	77-06-21	--	--	--	--	--	--
D	64-08-05	.00	--	--	--	--	--
D	67-09-21	--	--	--	--	--	--
D	72-07-10	.40	--	--	--	--	--
D	74-08-18	--	--	<.10	--	--	--
D	74-08-21	--	--	--	--	--	--
E	76-09-09	--	.13	--	--	.03	.09
F	76-09-09	--	.13	--	--	.06	.18
G	76-09-09	--	.04	--	--	.04	.12

TABLE 10.--CHEMICAL ANALYSES OF WATER FROM THE SILVER STAR (BARKELLS) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	76-05-14	--	60	--	0	--	--	20	--	--	--
C	76-12-15	--	260	--	380	--	--	--	--	40	--
D	64-08-05	--	--	--	--	--	--	100	--	--	--
D	67-09-21	--	320	--	360	--	--	--	--	--	--
D	72-07-10	--	--	--	380	--	--	0	--	20	--
D	74-08-18	7	250	<10	340	<50	<10	<20	<100	20	.1
D	74-08-21	--	450	--	320	--	--	--	--	--	--
E	76-09-09	--	50	--	10	--	--	130	--	20	--
F	76-09-09	--	30	--	0	--	--	120	--	10	--
G	76-09-09	--	20	--	0	--	--	200	--	0	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-05-14	--	360	--	--	--
C	76-12-15	--	510	--	--	--
D	64-08-05	--	--	--	--	--
D	67-09-21	--	--	--	--	--
D	72-07-10	--	--	--	--	--
D	74-08-18	<20	--	<10	<100	50
D	74-08-21	--	--	--	--	--
E	76-09-09	--	430	--	--	--
F	76-09-09	--	210	--	--	--
G	76-09-09	--	170	--	--	--

TABLE 11.--CHEMICAL ANALYSES OF WATER FROM THE RENOVA HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
454728112073500	A	JEFFERSON R AT RENOVA HOT SPRINGS	76-08-13	USGS	--	440	8.7
454730112073500	B	RENOVA HOT SPRINGS 01N04W32D8C	76-08-13	USGS	40	1100	7.5
	B	RENOVA HOT SPRINGS 01N04W32D8C	77-06-21	USGS	40	995	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)
A	76-08-13	21.0	220	43	59	18	19	15	.6	4.4	208	5	179
B	76-08-13	50.0	180	0	51	13	150	62	4.9	13	310	0	254
B	77-06-21	48.9	--	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO. PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-08-13	.7	71	9.9	.4	17	307	.42	.01	--	.01	.03
B	76-08-13	14	200	34	3.0	37	655	.89	.01	.03	--	--
B	77-06-21	--	--	34	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	76-08-13	--	--	40	--	20	--	100	--	20	--
B	76-08-13	19	0	480	0	130	0	80	6	30	.0

STATION LETTER	DATE OF SAMPLE	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
A	76-08-13	--	--	--	440	--	--
B	76-08-13	0	4	0	850	.3	0

TABLE 12.--CHEMICAL ANALYSES OF WATER FROM THE PIPESTONE HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
455344112135200	A	PIPESTONE HOT SPRINGS DOWNSTREAM FROM POOL	77-06-21	USGS	250	592	8.1
455347112143400	B	PIPESTONE HOT SPRINGS AT PIPE	64-08-06	MSBH	--	--	--
	B	PIPESTONE HOT SPRINGS AT PIPE	67-09-29	FR	--	--	8.2
	B	PIPESTONE HOT SPRINGS AT PIPE	74-08-18	M	79	455	8.7
	B	PIPESTONE HOT SPRINGS AT PIPE	74-08-23	RFS	18	--	--
	B	PIPESTONE HOT SPRINGS AT PIPE	77-06-21	USGS	13	523	9.1
	B	PIPESTONE HOT SPRINGS AT PIPE	77-06-21	USGS	13	523	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	77-06-21	38.8	--	8	--	3.1	.1	100	95	15	--	2.1	--
B	64-08-06	57.0	--	10	0	4.0	.0	--	--	--	99	--	70
B	67-09-29	61.0	--	8	0	3.0	.1	100	94	15	--	4.1	102
B	74-08-18	57.0	2.3	--	--	2.6	<.1	98	--	--	--	1.9	100
B	74-08-23	61.0	--	6	0	2.6	.0	100	96	17	--	2.0	134
B	77-06-21	60.0	--	8	--	3.2	.0	98	95	15	--	1.9	--
B	77-06-21	60.0	--	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	77-06-21	0	--	--	95	22	5.5	70	--	--	--	.01	--
B	64-08-06	18	87	--	93	24	5.4	--	--	.00	.00	--	--
B	67-09-29	0	84	1.0	94	23	--	59	334	--	--	--	--
B	74-08-18	4	89	.3	94	20	5.3	66	--	--	--	--	<.10
B	74-08-23	0	110	--	99	27	3.1	66	366	--	--	--	--
B	77-06-21	--	--	--	97	22	5.6	61	--	--	--	.01	--
B	77-06-21	--	--	--	--	--	--	67	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)
A	77-06-21	--	290	90	70	4	90
B	64-08-06	--	--	--	100	--	--
B	67-09-29	--	350	100	--	--	--
B	74-08-18	15	280	90	<20	<20	--
B	74-08-23	--	500	90	--	--	--
B	77-06-21	--	290	90	60	0	100

TABLE 13.--CHEMICAL ANALYSES OF WATER FROM THE BOULDER (DIAMOND S) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME
461054112061000	A	BOULDER COLD SPRING 05N04W16DCA
461153112053700	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
	B	BOULDER HOT SPRINGS 05N04W10CAB
461153112053701	C	BOULDER SPRING 1
461153112053702	D	BOULDER SPRING 2
461153112053703	E	BOULDER SPRING 3
461153112053704	F	BOULDER TUNNEL

STATION LETTER	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
A	76-03-26	USGS	2.0	311	7.9
B	64-11-24	MSBH	250	--	--
B	67-09-21	FR	--	--	8.4
B	73-07-28	K	>1000	--	8.3
B	74-08-21	RFS	--	--	--
B	74-08-22	M	590	523	--
B	76-03-26	USGS	--	579	8.8
B	76-04-27	USGS	--	622	--
C	73-07-28	K	2.0	--	7.0
D	73-07-28	K	5.0	--	7.0
E	74-08-22	M	--	525	8.5
F	73-07-28	K	2.0	--	7.0

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	76-03-26	12.0	--	140	0	40	9.0	16	20	.6	--	3.0	180
B	64-11-24	38.0	--	10	0	4.0	.0	--	--	--	132	--	150
B	67-09-21	67.0	--	8	0	3.3	.0	120	94	18	--	5.5	170
B	73-07-28	75.0	--	18	--	6.0	.7	100	91	10	--	2.5	--
B	74-08-21	76.0	--	6	0	2.3	.0	124	96	22	--	3.8	200
B	74-08-22	76.0	--	--	--	2.2	<.1	120	--	--	--	3.8	161
B	76-03-26	76.0	--	8	0	2.8	.1	120	95	19	--	4.0	171
B	76-04-27	74.4	--	6	0	2.3	.0	120	96	22	--	3.8	169
C	73-07-28	59.0	--	--	--	10	--	82	--	--	--	3.1	--
D	73-07-28	64.0	--	--	--	10	--	74	--	--	--	3.2	--
E	74-08-22	62.0	<.5	--	--	2.7	<.1	120	--	--	--	3.8	164
F	73-07-28	42.0	--	--	--	10	--	84	--	--	--	3.3	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)
A	76-03-26	0	148	3.6	19	7.1	.4	25	210	.29	--	--	.32
B	64-11-24	15	148	--	78	22	15	--	--	--	.00	.00	--
B	67-09-21	3	144	1.1	79	17	--	95	407	--	--	--	--
B	73-07-28	--	--	--	--	18	--	64	--	--	--	--	--
B	74-08-21	--	164	--	77	24	6.9	100	437	--	--	--	--
B	74-08-22	4	139	--	74	19	11	110	--	--	--	--	--
B	76-03-26	0	140	.4	80	17	12	95	416	.57	--	--	.00
B	76-04-27	--	139	--	74	18	12	96	410	.56	--	--	.00
C	73-07-28	--	--	--	--	22	--	100	--	--	--	--	--
D	73-07-28	--	--	--	--	17	--	97	--	--	--	--	--
E	74-08-22	3	140	.9	74	19	11	106	--	--	--	--	--
F	73-07-28	--	--	--	--	22	--	97	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	76-03-26	--	.04
B	64-11-24	--	--
B	67-09-21	--	--
B	73-07-28	--	--
B	74-08-21	--	--
B	74-08-22	<.10	--
B	76-03-26	--	.03
B	76-04-27	--	.01
C	73-07-28	--	--
D	73-07-28	--	--
E	74-08-22	<.10	--
F	73-07-28	--	--

TABLE 13.--CHEMICAL ANALYSES OF WATER FROM THE BOULDER (DIAMOND S) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)
A	76-03-26	--	2	0	20	0	20	--	0	0	1
B	64-11-24	--	--	--	--	--	--	--	--	0	--
B	67-09-21	--	--	--	630	--	210	--	--	--	--
B	74-08-21	--	--	--	550	--	260	--	--	--	--
B	74-08-22	14	--	--	560	<10	240	<50	<10	20	<100
B	76-03-26	--	18	0	570	0	260	--	0	10	1
B	76-04-27	--	--	--	570	--	250	--	--	20	--
E	74-08-22	20	--	--	540	<10	220	<50	<10	<20	<100

STATION LETTER	DATE OF SAMPLE	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-03-26	0	.0	11	6	1	270	4.5	0	--	--
B	64-11-24	--	--	--	--	--	--	--	--	--	--
B	67-09-21	--	--	--	--	--	--	--	--	--	--
B	74-08-21	--	--	--	--	--	--	--	--	--	--
B	74-08-22	<20	.1	--	<20	--	--	--	<10	<100	60
B	76-03-26	0	.0	44	7	0	140	.7	0	--	--
B	76-04-27	--	--	--	--	--	160	--	--	--	--
E	74-08-22	<20	.1	--	<20	--	--	--	10	<100	60

STATION LETTER	DATE OF SAMPLE	TOTAL FILTRABLE RESIDUE (MG/L)	DISSOLVED GROSS ALPHA AS U-NAT. (UG/L)	DISSOLVED GROSS BETA AS CS-137 (PC/L)	DISSOLVED GROSS BETA AS SR90 /Y90 (PC/L)
B	76-04-27	430	<6.5	5.5	4.5

TABLE 14.--CHEMICAL ANALYSES OF WATER FROM THE POTOSI (CLARK) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	NAME
453519111535301	A	POTOSI DRAIN SOUTH
	A	POTOSI DRAIN SOUTH
453520111535200	B	POTOSI HOT SPRINGS VENT 37
453521111535502	C	POTOSI HOT SPRINGS VENT X
	C	POTOSI HOT SPRINGS VENT X
	C	POTOSI HOT SPRINGS VENT X
	C	POTOSI HOT SPRINGS VENT X
	C	POTOSI HOT SPRINGS VENT X
	C	POTOSI HOT SPRINGS VENT X
453521111535600	D	POTOSI HOT SPRINGS VENT 17
	D	POTOSI HOT SPRINGS VENT 17
453521111535801	E	POTOSI COLD SPRING VENT 18
453522111535601	F	POTOSI WARM SPRING VENT 15
	F	POTOSI WARM SPRING VENT 15
453524111535400	G	POTOSI DRAIN NORTH
	G	POTOSI DRAIN NORTH

STATION LETTER	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
A	76-05-12	USGS	86	240	8.1
A	77-01-15	USGS	--	--	--
B	77-01-15	USGS	--	--	--
C	64-11-24	MSBH	--	--	--
C	67-09-21	FR	--	--	8.0
C	74-08-21	M	>52	471	8.6
C	74-08-27	M	55	--	--
C	76-05-12	USGS	10	500	8.5
C	77-01-15	USGS	--	482	--
C	67-09-21	FR	--	--	7.6
D	76-05-12	USGS	8.0	507	8.4
E	76-05-12	USGS	5.0	78	7.0
F	76-05-12	USGS	1.0	184	7.0
F	77-01-15	USGS	--	--	--
G	76-05-12	USGS	73	420	8.3
G	77-01-15	USGS	--	--	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	76-05-12	23.0	--	22	0	7.6	.6	39	78	3.6	--	1.2	54
A	77-01-15	17.0	--	29	--	11	.3	42	85	6.7	--	1.6	--
B	77-01-15	52.0	--	30	--	12	.1	39	86	7.0	--	1.7	--
C	64-11-24	38.0	--	36	0	12	1.0	--	--	--	93	--	79
C	67-09-21	51.0	--	28	0	11	.0	88	86	7.3	--	3.6	67
C	74-08-21	49.5	<.5	--	--	10	<.1	91	--	--	--	1.6	63
C	74-08-27	--	--	27	0	11	.0	94	87	7.8	--	1.9	64
C	76-05-12	50.0	--	26	0	10	.0	86	87	7.5	--	1.7	66
C	77-01-15	51.0	--	26	--	11	.1	88	86	7.3	--	1.7	--
D	67-09-21	--	--	33	0	13	.2	87	84	6.6	--	2.8	69
D	76-05-12	49.0	--	26	0	10	.0	79	86	6.9	--	1.8	62
E	76-05-12	12.0	--	23	0	8.3	1.8	5.6	34	.5	--	.8	30
F	76-05-12	24.0	--	15	0	5.9	.1	36	83	4.0	--	1.1	49
F	77-01-15	39.0	--	29	--	11	.4	88	86	7.1	--	1.7	--
G	76-05-12	25.0	--	25	0	9.8	.1	67	84	5.8	--	1.6	65
G	77-01-15	13.0	--	26	--	10	.2	88	87	7.5	--	1.7	--

TABLE 14.--CHEMICAL ANALYSES OF WATER FROM THE POTOSI (CLARK) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)
A	76-05-12	0	44	.6	53	2.7	3.7	31	166	.23	--	--	.01
A	77-01-15	--	--	--	--	--	--	--	--	--	--	--	--
B	77-01-15	--	--	--	--	--	--	--	--	--	--	--	--
C	64-11-24	0	65	--	140	8.0	5.8	--	--	--	.00	.00	--
C	67-09-21	2	58	1.1	140	.0	--	41	319	--	--	--	--
C	74-08-21	2	55	.3	140	5.9	6.2	46	--	--	--	--	--
C	74-08-27	2	72	--	160	4.4	3.6	47	365	--	--	--	--
C	76-05-12	0	58	.3	130	5.6	6.6	44	318	.43	--	--	.07
C	77-01-15	--	--	--	140	6.0	--	45	--	--	--	--	--
D	67-09-21	2	60	2.9	140	2.5	--	--	--	--	--	--	--
D	76-05-12	0	51	.4	120	5.6	5.9	43	296	.40	--	--	.00
E	76-05-12	0	25	4.8	9.3	1.1	.4	21	60	.08	--	--	.00
F	76-05-12	0	40	7.8	46	2.4	2.4	30	149	.20	--	--	.00
F	77-01-15	--	--	--	--	--	--	--	--	--	--	--	--
G	76-05-12	0	53	.5	98	4.5	5.0	39	258	.35	--	--	.00
G	77-01-15	--	--	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	76-05-12	--	.01
A	77-01-15	--	--
B	77-01-15	--	--
C	64-11-24	--	--
C	67-09-21	--	--
C	74-08-21	<.10	--
C	74-08-27	--	--
C	76-05-12	--	.01
C	77-01-15	--	--
D	67-09-21	--	--
D	76-05-12	--	.01
E	76-05-12	--	.01
F	76-05-12	--	.01
F	77-01-15	--	--
G	76-05-12	--	.00
G	77-01-15	--	--

TABLE 14.--CHEMICAL ANALYSES OF WATER FROM THE POTOSI (CLARK) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	76-05-12	--	30	--	20	--	--	130	--	--	--
C	64-11-24	--	--	--	--	--	--	0	--	--	--
C	67-09-21	--	250	--	80	--	--	--	--	--	--
C	74-08-21	6	<20	<10	50	<50	<10	<20	100	<20	<.1
C	74-08-27	--	<100	--	60	--	--	--	--	--	--
C	76-05-12	--	20	--	60	--	--	10	--	--	--
C	77-01-15	--	--	--	60	--	--	--	--	--	--
D	67-09-21	--	300	--	60	--	--	--	--	--	--
D	76-05-12	--	20	--	60	--	--	40	--	--	--
E	76-05-12	--	20	--	0	--	--	120	--	--	--
F	76-05-12	--	20	--	30	--	--	200	--	--	--
F	77-01-15	--	--	--	60	--	--	--	--	--	--
G	76-05-12	--	30	--	50	--	--	60	--	--	--
G	77-01-15	--	--	--	70	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-05-12	--	300	--	--	--
C	64-11-24	--	--	--	--	--
C	67-09-21	--	--	--	--	--
C	74-08-21	20	--	10	<100	<20
C	74-08-27	--	--	--	--	--
C	76-05-12	--	510	--	--	--
C	77-01-15	--	--	--	--	--
D	67-09-21	--	--	--	--	--
D	76-05-12	--	490	--	--	--
E	76-05-12	--	120	--	--	--
F	76-05-12	--	290	--	--	--
F	77-01-15	--	--	--	--	--
G	76-05-12	--	460	--	--	--
G	77-01-15	--	--	--	--	--

TABLE 15.--CHEMICAL ANALYSES OF WATER FROM THE WOLF CREEK HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
445831111384300	A	MADISON R UPSTREAM FROM WOLF CR 10S01E07DBC	76-08-13	USGS	--	218	--
445833111390201	B	WOLF CREEK WARM SPRING 2	76-05-13	USGS	10	1200	7.8
445857111365200	C	WOLF CREEK COLD SPRING 10S01E09BBC	76-08-13	USGS	<1.0	283	--
445902111364700	D	WOLF CREEK HOT SPRINGS 10S01E09BBB	76-08-13	USGS	50	679	--
445902111364701	E	WOLF CREEK HOT SPRINGS	76-05-13	USGS	53	659	8.6
445908111364601	F	WOLF CREEK WARM SPRING 1	76-05-13	USGS	35	333	8.3
445932111352000	G	WOLF CREEK NEAR MORAINE 10S01E03BDC	76-08-13	USGS	--	97	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)
A	76-08-13	18.5	52	0	15	3.6	20	44	1.2	3.0	85	--	70
B	76-05-13	25.5	24	0	6.5	1.8	270	95	24	6.5	491	0	403
C	76-08-13	10.0	130	0	38	8.1	8.1	12	.3	1.4	168	--	138
D	76-08-13	67.0	--	--	--	--	--	--	--	--	--	--	--
E	76-05-13	68.0	15	0	4.7	.8	120	94	13	1.9	157	9	144
F	76-05-13	23.0	62	0	19	3.5	49	63	2.7	1.6	145	0	119
G	76-08-13	10.0	35	1	11	1.9	1.5	8	.1	.5	42	--	34

STATION LETTER	DATE OF SAMPLE	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO. PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-08-13	--	13	13	1.9	28	140	.19	.01	--	.02	.06
B	76-05-13	12	80	49	21	38	715	.97	.02	.00	--	--
C	76-08-13	--	7.1	.9	.3	16	163	.22	.04	--	.01	.03
D	76-08-13	--	50	22	18	--	--	--	--	--	--	--
E	76-05-13	.7	53	23	18	55	363	.49	.01	.00	--	--
F	76-05-13	1.2	22	8.5	6.5	24	206	.28	.00	.02	--	--
G	76-08-13	--	5.8	.3	.1	6.4	49	.07	.06	--	.00	.00

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	76-08-13	--	--	140	--	120	--	190	--	20	--
B	76-05-13	--	--	190	--	120	--	10	--	--	--
C	76-08-13	--	--	20	--	0	--	230	--	0	--
E	76-05-13	7	0	40	0	80	0	0	3	0	.0
F	76-05-13	--	--	40	--	40	--	140	--	--	--
G	76-08-13	--	--	0	--	0	--	100	--	0	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
A	76-08-13	--	--	--	70	--	--
B	76-05-13	--	--	--	130	--	--
C	76-08-13	--	--	--	130	--	--
E	76-05-13	30	2	0	70	.0	0
F	76-05-13	--	--	--	150	--	--
G	76-08-13	--	--	--	60	--	--

TABLE 16.--CHEMICAL ANALYSES OF WATER FROM THE ENNIS (THEXTON) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)
452159111435700	A	THEXTON COLD SPRING 05S01W28DCD	76-04-01	USGS	--	.20	458
452201111434600	B	NELSON-R.LEE WELL	77-09-07	USGS	45	6.0	410
452202111445100	C	ENNIS (THEXTON) HOT SPRINGS 05S01W28DCA	69-02-06	MSBH	--	15	--
	C	ENNIS (THEXTON) HOT SPRINGS 05S01W28DCA	76-04-01	USGS	--	<20	1510
	C	ENNIS (THEXTON) HOT SPRINGS 05S01W28DCA	76-04-01	USGS	--	<20	1510
452207111433700	D	THEXTON HOT WELL 05S01W28DBD	76-04-01	USGS	--	.20	1540
	D	THEXTON HOT WELL 05S01W28DBD	76-04-01	USGS	--	.20	--
452226111432700	E	PRAY COLD SPRING	77-11-05	USGS	--	20	440

STATION LETTER	DATE OF SAMPLE	PH (UNITS)	TEMPERATURE (DEG C)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	76-04-01	7.7	7.8	210	0	50	20	25	20	.8	--	5.4	255
B	77-09-07	--	16.0	180	11	47	14	22	21	.7	--	5.1	200
C	69-02-06	--	--	210	5	32	20	--	--	--	55	--	250
C	76-04-01	7.7	83.2	17	0	5.8	.6	340	95	36	--	17	442
C	76-04-01	--	--	--	--	5.6	--	--	--	--	--	--	--
D	76-04-01	8.7	72.2	18	0	5.8	.9	330	95	34	--	17	437
D	76-04-01	--	--	--	--	--	--	--	--	--	--	--	--
E	77-11-05	7.6	15.0	200	0	50	17	26	22	.8	--	6.3	240

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)
A	76-04-01	0	209	8.1	34	19	.8	31	314	.43	--	--	.53
B	77-09-07	--	160	--	33	21	.4	41	284	.39	--	--	--
C	69-02-06	0	205	--	30	72	.3	--	--	--	.00	.00	--
C	76-04-01	0	363	14	220	120	11	96	1030	1.40	--	--	.01
C	76-04-01	--	--	--	--	--	--	91	--	--	--	--	--
D	76-04-01	--	358	--	250	110	11	98	1040	1.41	--	--	.00
D	76-04-01	--	--	--	--	--	--	95	--	--	--	--	--
E	77-11-05	0	200	9.6	32	18	1.2	41	311	.42	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED PHOSPHORUS (P) (MG/L)
A	76-04-01	.02
B	77-09-07	--
C	69-02-06	--
C	76-04-01	.02
C	76-04-01	--
D	76-04-01	.03
D	76-04-01	--
E	77-11-05	--

TABLE 16.--CHEMICAL ANALYSES OF WATER FROM THE ENNIS (THEXTON) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	76-04-01	6	0	110	0	40	1	0	1	0	.0
B	77-09-07	--	--	50	--	30	--	1400	--	30	--
C	69-02-06	--	--	--	--	--	--	700	--	--	--
C	76-04-01	25	10	610	0	260	1	20	0	10	.0
C	76-04-01	--	--	--	--	--	--	--	--	--	--
D	76-04-01	--	--	610	--	--	--	1700	--	--	--
E	77-11-05	--	--	160	--	80	--	310	--	0	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
A	76-04-01	2	7	1	270	3.4	0
B	77-09-07	--	--	--	410	--	--
C	69-02-06	--	--	--	--	--	--
C	76-04-01	12	7	0	180	1.2	0
C	76-04-01	--	--	--	160	--	--
D	76-04-01	--	--	--	--	--	--
E	77-11-05	--	--	--	260	--	--

TABLE 17.--CHEMICAL ANALYSES OF WATER FROM THE NORRIS (HAPGOOD, BEARTRAP) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)
453403111411100	A	ROWE COLD SPRING	76-03-31	USGS	--	2.0	470
453413111412100	B	HOT SPRINGS CREEK AT NORRIS	76-07-09	USGS	--	--	294
453419111410500	C	NORRIS WARM WELL 2 033S01W14DAA2	76-08-14	USGS	45	10	730
453421111410800	D	NORRIS (BEARTRAP) WELL	76-03-31	USGS	--	--	602
	D	NORRIS (BEARTRAP) WELL	76-03-31	USGS	--	--	602
453430111410000	E	NORRIS (BEARTRAP) HOT SPRINGS	64-11-24	MSBH	--	--	--
	E	NORRIS (BEARTRAP) HOT SPRINGS	67-09-29	FR	--	--	--
	E	NORRIS (BEARTRAP) HOT SPRINGS	74-08-21	M	--	105	903
	E	NORRIS (BEARTRAP) HOT SPRINGS	74-08-27	RFS	--	30	--
	E	NORRIS (BEARTRAP) HOT SPRINGS	76-03-29	USGS	--	112	970
	E	NORRIS (BEARTRAP) HOT SPRINGS	76-03-29	USGS	--	112	970

STATION LETTER	DATE OF SAMPLE	PH (UNITS)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)
A	76-03-31	7.9	12.0	--	140	0	36	12	60	47	2.2	--	8.0
B	76-07-09	--	17.5	--	110	27	32	8.1	15	22	.6	--	2.9
C	76-08-14	--	21.0	--	78	0	22	5.4	--	--	--	--	8.4
D	76-03-31	--	14.0	--	88	0	23	7.2	120	73	5.6	--	8.6
D	76-03-31	--	14.0	--	--	--	22	--	--	--	--	--	--
E	64-11-24	--	--	--	128	0	35	10	--	--	--	180	--
E	67-09-29	8.5	41.0	--	33	0	8.1	3.0	200	90	15	--	11
E	74-08-21	7.6	52.5	<1.0	56	0	17	3.2	180	85	11	--	10
E	74-08-27	--	45.0	--	58	0	19	2.6	210	86	12	--	11
E	76-03-29	7.8	50.0	--	61	0	19	3.2	190	85	11	--	11
E	76-03-29	--	--	--	--	--	18	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)
A	76-03-31	239	0	196	4.8	70	11	2.4	56	354	.48	--	--
B	76-07-09	105	--	86	--	16	6.5	--	--	--	--	--	--
C	76-08-14	310	--	254	--	110	16	5.4	56	--	--	--	--
D	76-03-31	294	--	241	--	89	13	4.9	46	458	.62	--	--
D	76-03-31	--	--	--	--	--	--	--	44	--	--	--	--
E	64-11-24	390	0	320	--	130	25	8.5	--	--	--	.00	.00
E	67-09-29	330	9	286	1.8	150	18	--	79	642	--	--	--
E	74-08-21	380	1	313	15	130	23	7.4	88	647	--	--	--
E	74-08-27	400	--	328	--	150	27	4.4	87	708	--	--	--
E	76-03-29	383	0	314	6.7	130	22	8.1	78	651	.89	--	--
E	76-03-29	--	--	--	--	--	--	--	73	--	--	--	--

TABLE 17.--CHEMICAL ANALYSES OF WATER FROM THE NORRIS (HAPGOOD, BEARTRAP) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO. PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-03-31	.12	--	.01	--	--
B	76-07-09	--	--	--	--	--
C	76-08-14	.01	--	--	.05	.15
D	76-03-31	.01	--	.01	--	--
D	76-03-31	--	--	--	--	--
E	64-11-24	--	--	--	--	--
E	67-09-29	--	--	--	--	--
E	74-08-21	--	<.10	--	--	--
E	74-08-27	--	--	--	--	--
E	76-03-29	.00	--	.02	--	--
E	76-03-29	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)
A	76-03-31	--	1	0	50	0	40	--	0	20	2
B	76-07-09	--	--	--	--	--	10	--	--	--	--
C	76-08-14	--	--	--	80	--	80	--	--	120	--
D	76-03-31	--	--	--	60	--	--	--	--	360	--
D	76-03-31	--	--	--	--	--	--	--	--	--	--
E	64-11-24	--	--	--	--	--	--	--	--	0	--
E	67-09-29	--	--	--	370	--	110	--	--	--	--
E	74-08-21	<1	--	--	100	<10	90	<50	<10	20	<100
E	74-08-27	--	--	--	200	--	100	--	--	--	--
E	76-03-29	--	2	10	120	0	100	--	0	120	0
E	76-03-29	--	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-03-31	0	.0	11	2	0	500	.7	0	--	--
B	76-07-09	--	--	--	--	--	--	--	--	--	--
C	76-08-14	10	--	--	--	--	410	--	--	--	--
D	76-03-31	--	--	--	--	--	590	--	--	--	--
D	76-03-31	--	--	--	--	--	520	--	--	--	--
E	64-11-24	--	--	--	--	--	--	--	--	--	--
E	67-09-29	--	--	--	--	--	--	--	--	--	--
E	74-08-21	20	<.1	--	<20	--	--	--	40	<100	80
E	74-08-27	--	--	--	--	--	--	--	--	--	--
E	76-03-29	20	.0	5	6	0	320	.7	0	--	--
E	76-03-29	--	--	--	--	--	310	--	--	--	--

TABLE 18.--CHEMICAL ANALYSES OF WATER FROM THE BOZEMAN (FERRIS, MATTHEWS) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
453937111111000	A	BOZEMAN HOT SPRINGS WELL	76-02-04	USGS	2.0	682	8.0
	A	BOZEMAN HOT SPRINGS WELL	76-02-04	USGS	2.0	682	8.0
453938111111000	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	51-09-22	H	120	679	8.7
	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	64-11-14	MSRH	60	--	--
	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	74-08-21	RFS	50	--	--
	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	74-08-25	M	.00	624	8.6
	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	76-02-04	USGS	75	703	9.5
	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	76-02-04	USGS	75	703	9.5
	B	BOZEMAN (FERRIS) HOT SPRINGS 02S04E14DAD	76-07-09	USGS	--	819	--
454220111145700	C	WEST GALLATIN RIVER AT SHEDS BRIDGE	76-07-09	USGS	--	194	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	SODIUM PLUS POTASSIUM DISS AS NA (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	76-02-04	48.3	--	14	0	4.4	.6	120	95	14	--	1.2	66
A	76-02-04	48.3	--	--	--	5.9	--	--	--	--	--	--	--
B	51-09-22	60.0	--	10	0	3.5	.4	140	95	19	--	3.3	110
B	64-11-14	--	--	30	0	12	.0	--	--	--	150	--	91
B	74-08-21	51.0	--	29	0	8.5	1.8	135	90	11	--	3.2	160
B	74-08-25	50.0	.6	35	0	9.5	2.7	120	87	8.8	--	2.8	130
B	76-02-04	54.6	--	28	0	7.0	2.4	130	90	11	--	3.1	83
B	76-02-04	54.6	--	--	--	8.6	--	--	--	--	--	--	--
B	76-07-09	54.4	--	--	--	--	--	--	--	--	--	--	--
C	76-07-09	15.0	--	86	12	24	6.4	2.8	6	.1	--	1.3	90

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE DISSOLVED (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	SOLIDS RESIDUE ON EVAP AT 180C DISSOLVED (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	TOTAL NITRATE (NO3) (MG/L)
A	76-02-04	0	54	.9	110	50	11	31	--	361	.49	--	--
A	76-02-04	--	--	--	--	--	--	--	--	--	--	--	--
B	51-09-22	8	104	.4	120	51	10	60	464	451	--	--	.20
B	64-11-14	21	110	--	120	54	13	--	--	--	--	.00	--
B	74-08-21	--	131	--	120	52	7.5	64	--	471	--	--	--
B	74-08-25	3	112	.5	110	46	9.2	66	--	434	--	--	--
B	76-02-04	15	93	.1	120	48	12	57	--	436	.59	--	--
B	76-02-04	--	93	--	--	--	--	57	--	--	--	--	--
B	76-07-09	--	--	--	130	50	10	63	--	--	--	--	--
C	76-07-09	--	74	--	17	.8	--	--	--	--	--	--	--

TABLE 18.--CHEMICAL ANALYSES OF WATER FROM THE BOZEMAN (FERRIS, MATTHEWS) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRATE (NO3) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	76-02-04	--	.00	--	.06
A	76-02-04	--	--	--	--
B	51-09-22	--	--	--	--
B	64-11-14	.00	--	--	--
B	74-08-21	--	--	--	--
B	74-08-25	--	--	<.10	--
B	76-02-04	--	.02	--	.02
B	76-02-04	--	--	--	--
B	76-07-09	--	--	--	--
C	76-07-09	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)
A	76-02-04	9	10	240	0	30	--	0	0	1	10
A	76-02-04	--	--	--	--	--	--	--	--	--	--
B	51-09-22	--	--	210	--	--	--	--	20	--	--
B	64-11-14	--	--	--	--	--	--	--	0	--	--
B	74-08-21	--	--	150	--	40	--	--	--	--	--
B	74-08-25	--	--	200	<10	40	<50	<10	<20	<100	<20
B	76-02-04	4	0	220	0	40	--	1	0	2	30
B	76-02-04	--	--	--	--	--	--	--	--	--	--
C	76-07-09	--	--	--	--	0	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-02-04	.0	12	0	0	40	.2	540	--	--
A	76-02-04	--	--	--	--	20	--	--	--	--
B	51-09-22	--	--	--	--	--	--	--	--	--
B	64-11-14	--	--	--	--	--	--	--	--	--
B	74-08-21	--	--	--	--	--	--	--	--	--
B	74-08-25	--	--	<20	--	--	--	<10	<100	30
B	76-02-04	.0	11	0	0	160	.3	0	--	--
B	76-02-04	--	--	--	--	160	--	--	--	--
C	76-07-09	--	--	--	--	--	--	--	--	--

TABLE 19.--CHEMICAL ANALYSES OF WATER FROM THE ALHAMBRA HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	DEPTH TO BOTTOM OF SAMPLE INTERVAL (FT)	INSTANTANEOUS DISCHARGE (CFS)
462451111531800	A	MINE TRIB TO MID FK WARM SP CR 08N02W29CCC	76-08-20	USGS	--	--	.29
462511111564100	B	SOUTH FORK WARM SPRINGS CREEK 08N03W26BAD	76-08-20	USGS	--	--	3.7
462514111563700	C	NORTH FORK WARM SPRINGS CREEK 08N03W26BAA	76-08-20	USGS	--	--	1.2
462554111571500	D	BILL DECKER WELL 08N03W22ACA	76-08-20	USGS	86	86	--
462647111585800	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	59-01-12	MSBH	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	64-08-05	MSBH	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	67-09-29	FR	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	73-07-29	K	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	76-04-08	USGS	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	76-04-08	USGS	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	76-04-28	USGS	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	76-08-17	USGS	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	76-12-02	USGS	--	--	--
	E	ALHAMBRA HOT SPRINGS (SOUTH) 08N03W16ACD	77-08-12	USGS	--	--	--
462648111584100	F	HILLBROOK COLD WELL 08N03W16ADD	76-08-03	USGS	99	--	--
462650111584100	G	WARM SPRINGS CREEK AT WALLS 08N03W16ADB	76-08-20	USGS	--	--	4.7
462651111584801	H	WARM SPRINGS CREEK UPSTREAM FROM ALHAMBRA	76-04-30	USGS	--	--	10
462652111583600	I	LEO POPE WELL 08N03W16ABB	76-06-30	USGS	167	--	--
462652111591400	J	HILLBROOK FLOWING WELL 08N03W16BDA	76-07-13	USGS	312	--	--
	J	HILLBROOK FLOWING WELL 08N03W16BDA	76-12-02	USGS	312	--	--
	J	HILLBROOK FLOWING WELL 08N03W16BDA	77-08-12	USGS	--	--	--
462653111585001	K	WALLS COLD WELL	76-04-29	USGS	67	--	--
462653111585101	L	WALLS HOT SPRING 08N03W16ACA	76-04-29	USGS	--	--	--
462659111585000	M	ALHAMBRA HOT SPRINGS (NORTH) 08N03W16AAC2	67-09-29	FR	--	--	--
	M	ALHAMBRA HOT SPRINGS (NORTH) 08N03W16AAC2	73-07-29	K	--	--	--
	M	ALHAMBRA HOT SPRINGS (NORTH) 08N03W16AAC2	74-08-23	M	--	--	--
	M	ALHAMBRA HOT SPRINGS (NORTH) 08N03W16AAC2	74-08-29	RFS	--	--	--
	M	ALHAMBRA HOT SPRINGS (NORTH) 08N03W16AAC2	76-06-29	USGS	--	--	--
462701111585000	N	ALHAMBRA HOT WELL (NORTH) 08N03W16AAC	76-04-29	USGS	101	--	--
	N	ALHAMBRA HOT WELL (NORTH) 08N03W16AAC	76-04-29	USGS	101	--	--
	N	ALHAMBRA HOT WELL (NORTH) 08N03W16AAC	76-04-29	USGS	--	--	--
	N	ALHAMBRA HOT WELL (NORTH) 08N03W16AAC	76-06-29	USGS	101	--	--
	N	ALHAMBRA HOT WELL (NORTH) 08N03W16AAC	76-12-02	USGS	100	--	--
462701111585002	O	JOE ASPHOLM WELL	76-06-29	USGS	--	--	--
462704111590300	P	WARM SPRINGS CREEK NEAR MOUTH	76-08-20	USGS	--	--	5.2
462705111590800	Q	PRICKLY PEAR CR UPSTREAM FROM WARM SPRINGS	76-07-13	USGS	--	--	--

STATION LETTER	DATE OF SAMPLE	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO
A	76-08-20	--	397	7.3	10.0	--	190	120	52	14	6.7	7	.2
B	76-08-20	--	108	7.6	12.0	--	43	5	13	2.6	4.1	17	.3
C	76-08-20	--	270	7.8	13.5	--	120	54	34	8.7	6.4	10	.3
D	76-08-20	2.5	384	7.8	10.0	--	150	0	39	13	29	29	1.0
E	59-01-12	--	--	--	--	--	140	0	25	18	--	--	--
E	64-08-05	--	--	--	51.0	--	97	0	30	5.0	--	--	--
E	67-09-29	--	--	8.6	54.0	--	36	0	6.8	4.5	330	93	24
E	73-07-29	500	--	7.5	54.0	--	--	--	26	--	270	12	--
E	76-04-08	50	1580	6.7	55.0	--	91	0	27	5.2	310	86	14
E	76-04-08	50	1580	--	--	--	--	--	26	--	--	--	--
E	76-04-28	50	1570	--	55.5	--	--	--	--	--	--	--	--
E	76-08-17	50	1540	--	55.0	--	--	--	--	--	--	--	--
E	76-12-02	50	1510	6.8	54.4	--	85	0	27	4.3	300	86	14
E	77-08-12	50	1460	--	54.4	--	--	--	--	--	--	--	--
F	76-08-03	30	1000	7.5	17.7	--	120	0	36	7.5	170	74	6.7
G	76-08-20	--	192	8.2	16.0	--	84	20	24	5.9	6.4	14	.3
H	76-04-30	--	209	--	1.0	--	79	22	22	5.8	5.6	13	.3
I	76-06-30	20	410	6.7	16.0	--	160	0	44	12	50	39	1.7
J	76-07-13	15	1650	6.9	30.0	--	110	0	32	5.6	340	85	15
J	76-12-02	30	1620	6.8	30.0	--	97	0	30	5.3	340	86	15
J	77-08-12	--	1580	--	28.9	--	--	--	--	--	--	--	--
K	76-04-29	29	358	7.4	8.9	--	130	0	32	11	25	29	1.0
L	76-04-29	29	1170	--	55.6	--	61	0	18	3.5	210	86	12
M	67-09-29	--	--	8.5	53.0	--	24	0	9.0	.3	200	92	16
M	73-07-29	--	--	7.0	50.0	--	66	--	21	3.3	150	81	8.0
M	74-08-23	11	929	7.2	56.5	<.5	59	0	18	3.5	220	87	12
M	74-08-29	4.1	--	--	59.0	--	61	0	19	3.2	220	87	12
M	76-06-29	8.0	827	7.2	59.4	--	--	--	--	--	--	--	--
N	76-04-29	46	1040	6.8	52.2	--	--	--	--	--	--	--	--
N	76-04-29	46	1040	6.8	52.0	--	60	0	17	3.9	190	85	11
N	76-04-29	--	--	--	--	--	--	--	--	--	--	--	--
N	76-06-29	40	1080	6.8	54.0	--	--	--	--	--	--	--	--
N	76-12-02	--	1060	7.0	52.2	--	59	0	18	3.3	190	85	11
O	76-06-29	--	1000	7.0	--	--	--	--	--	--	--	--	--
P	76-08-20	--	264	8.0	18.5	--	78	0	22	5.6	25	40	1.2
Q	76-07-13	--	210	8.1	16.0	--	80	38	24	4.7	6.2	14	.3

TABLE 19.--CHEMICAL ANALYSES OF WATER FROM THE ALHAMBRA HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)
A	76-08-20	--	2.2	83	0	--	68	6.7	130	.5	.3	21	272
B	76-08-20	--	1.2	47	0	--	39	1.9	15	.9	.1	19	79
C	76-08-20	--	2.6	82	0	--	67	1.9	67	1.2	.7	21	183
D	76-08-20	--	3.2	217	0	--	178	5.5	40	3.2	1.3	14	251
E	59-01-12	248	--	610	0	--	500	--	150	16	1.5	--	--
E	64-08-05	314	--	710	0	--	582	--	150	23	7.8	--	--
E	67-09-29	--	17	620	21	--	543	2.7	160	22	--	--	--
E	73-07-29	--	15	--	--	--	--	--	--	20	--	54	--
E	76-04-08	--	17	712	0	--	584	227	150	20	9.0	61	953
E	76-04-08	--	--	--	--	--	--	--	--	--	--	58	--
E	76-04-28	--	--	--	--	--	--	--	--	--	--	--	--
E	76-08-17	--	16	--	--	--	--	--	--	--	--	--	--
E	76-12-02	--	16	698	--	--	572	177	160	20	9.4	--	1000
E	77-08-12	--	--	--	--	--	--	--	--	20	--	--	--
F	76-08-03	--	9.1	454	0	--	372	23	120	8.0	6.3	48	632
G	76-08-20	--	2.1	78	0	--	64	.8	30	1.1	.2	21	130
H	76-04-30	--	2.0	70	--	--	57	--	34	1.3	.7	19	126
I	76-06-30	--	8.6	231	0	--	189	73	52	6.5	2.2	29	334
J	76-07-13	--	20	787	0	--	646	141	170	25	8.7	67	1060
J	76-12-02	--	20	781	--	--	641	198	190	24	8.9	--	--
J	77-08-12	--	--	--	--	--	--	--	--	24	--	--	--
K	76-04-29	--	4.3	177	0	--	145	10	39	1.5	.9	24	227
L	76-04-29	--	10	489	--	--	401	--	88	11	6.9	60	651
M	67-09-29	--	11	420	9	--	359	2.2	88	49	--	64	637
M	73-07-29	--	10	--	--	--	--	--	--	13	--	37	--
M	74-08-23	--	9.5	480	<1	--	394	48	89	10	8.4	66	662
M	74-08-29	--	10	510	--	--	418	--	93	--	4.8	65	--
M	76-06-29	--	10	--	--	--	--	--	100	11	--	67	--
N	76-04-29	--	--	--	--	--	--	--	--	--	--	--	--
N	76-04-29	--	9.9	463	0	--	380	117	88	8.7	7.4	58	613
N	76-04-29	--	--	--	--	--	--	--	--	--	--	58	--
N	76-06-29	--	9.5	--	--	--	--	--	90	9.9	--	61	--
N	76-12-02	--	9.6	461	--	--	378	74	86	10	8.1	--	--
O	76-06-29	--	--	--	--	--	--	--	90	9.7	--	62	--
P	76-08-20	--	2.9	117	0	--	96	1.9	43	2.4	1.0	24	185
Q	76-07-13	--	1.8	51	0	--	42	.6	54	1.5	.1	17	135

STATION LETTER	DATE OF SAMPLE	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED SOLIDS (TONS PER DAY)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO. PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-08-20	.37	.21	--	--	.07	--	--	.01	.03
B	76-08-20	.11	.80	--	--	.01	--	--	.01	.03
C	76-08-20	.25	.62	--	--	.06	--	--	.01	.03
D	76-08-20	.34	--	--	--	.01	--	--	.00	.00
E	59-01-12	--	--	--	<.10	--	--	--	--	--
E	64-08-05	--	--	.00	.00	--	--	--	--	--
E	67-09-29	--	--	--	--	--	--	--	--	--
E	73-07-29	--	--	--	--	--	--	--	--	--
E	76-04-08	1.30	--	--	--	.00	--	.02	--	--
E	76-04-08	--	--	--	--	--	--	--	--	--
E	76-04-28	--	--	--	--	--	--	--	--	--
E	76-08-17	--	--	--	--	--	--	--	--	--
E	76-12-02	--	--	--	--	--	--	--	--	--
E	77-08-12	--	--	--	--	--	--	--	--	--
F	76-08-03	.86	--	--	--	.21	--	.00	--	--
G	76-08-20	.18	1.68	--	--	.06	--	--	.03	.09
H	76-04-30	.17	3.40	--	--	.15	--	.01	--	--
I	76-06-30	.45	--	--	--	3.2	--	.00	--	--
J	76-07-13	1.44	--	--	--	.01	--	.01	--	--
J	76-12-02	--	--	--	--	--	--	--	--	--
J	77-08-12	--	--	--	--	--	--	--	--	--
K	76-04-29	.31	--	--	--	.36	--	.01	--	--
L	76-04-29	.89	--	--	--	.00	--	.00	--	--
M	67-09-29	--	--	--	--	--	--	--	--	--
M	73-07-29	--	--	--	--	--	--	--	--	--
M	74-08-23	--	--	--	--	--	<.10	--	--	--
M	74-08-29	--	--	--	--	--	--	--	--	--
M	76-06-29	--	--	--	--	--	--	--	--	--
N	76-04-29	--	--	--	--	--	--	--	--	--
N	76-04-29	.83	--	--	--	.02	--	.02	--	--
N	76-04-29	--	--	--	--	--	--	--	--	--
N	76-06-29	--	--	--	--	--	--	--	--	--
N	76-12-02	--	--	--	--	--	--	--	--	--
O	76-06-29	--	--	--	--	--	--	--	--	--
P	76-08-20	.25	2.61	--	--	.03	--	--	.02	.06
Q	76-07-13	.18	--	--	--	.01	--	.00	--	--

TABLE 19.--CHEMICAL ANALYSES OF WATER FROM THE ALHAMBRA HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DISSOLVED IRON (FE) (UG/L)
A	76-08-20	--	--	--	6	--	20	--	--	--	1800
B	76-08-20	--	--	--	10	--	0	--	--	--	190
C	76-08-20	--	--	--	9	--	10	--	--	--	310
D	76-08-20	--	--	--	20	--	40	--	--	--	30
E	59-01-12	--	--	--	--	--	--	--	--	--	200
E	64-08-05	--	--	--	--	--	--	--	--	--	800
E	67-09-29	--	--	--	460	--	700	--	--	--	--
E	76-04-08	--	36	10	410	0	710	--	0	--	120
E	76-04-08	--	--	--	--	--	--	--	--	--	--
F	76-08-03	--	--	--	180	--	300	--	--	--	410
G	76-08-20	--	--	--	6	--	10	--	--	--	380
H	76-04-30	--	--	--	20	--	10	--	--	--	70
I	76-06-30	--	--	--	50	--	80	--	--	--	60
J	76-07-13	--	20	0	480	0	830	--	0	--	630
K	76-04-29	--	--	--	80	--	40	--	--	--	10
L	76-04-29	--	--	--	240	--	370	--	--	--	150
M	67-09-29	--	--	--	250	--	330	--	--	--	--
M	74-08-23	1	--	--	240	<10	320	<50	<10	--	<20
M	74-08-29	--	--	--	200	--	380	--	--	--	--
N	76-04-29	--	25	0	410	0	360	--	1	--	120
P	76-08-20	--	--	--	40	--	50	--	--	--	440
Q	76-07-13	--	--	--	20	--	5	--	--	--	510

STATION LETTER	DATE OF SAMPLE	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-08-20	--	1600	--	--	--	--	280	--	--	--	--
B	76-08-20	--	10	--	--	--	--	120	--	--	--	--
C	76-08-20	--	120	--	--	--	--	200	--	--	--	--
D	76-08-20	--	180	--	--	--	--	900	--	--	--	--
E	59-01-12	--	--	--	--	--	--	--	--	--	--	--
E	64-08-05	--	--	--	--	--	--	--	--	--	--	--
E	67-09-29	--	--	--	--	--	--	--	--	--	--	--
E	76-04-08	2	20	.0	15	10	0	1900	.7	0	--	--
E	76-04-08	--	--	--	--	--	--	1600	--	--	--	--
F	76-08-03	--	--	--	--	--	--	1000	--	--	--	--
G	76-08-20	--	70	--	--	--	--	170	--	--	--	--
H	76-04-30	--	--	--	--	--	--	160	--	--	--	--
I	76-06-30	--	--	--	--	--	--	1100	--	--	--	--
J	76-07-13	2	30	.2	15	0	0	2200	.6	20	--	--
K	76-04-29	--	--	--	--	--	--	430	--	--	--	--
L	76-04-29	--	--	--	--	--	--	1300	--	--	--	--
M	67-09-29	--	--	--	--	--	--	--	--	--	--	--
M	74-08-23	<100	<20	<.1	--	<20	--	--	--	60	<100	50
M	74-08-29	--	--	--	--	--	--	--	--	--	--	--
N	76-04-29	2	20	.0	23	2	0	1000	1.0	0	--	--
P	76-08-20	--	70	--	--	--	--	290	--	--	--	--
Q	76-07-13	--	--	--	--	--	--	240	--	--	--	--

TABLE 19.--CHEMICAL ANALYSES OF WATER FROM THE ALHAMBRA HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	TOTAL RESIDUE (MG/L)	TOTAL FILTRABLE RESIDUE (MG/L)	TOTAL NONFILTRABLE RESIDUE (MG/L)	DISSOLVED GROSS ALPHA AS U-NAT. (UG/L)	SUSPENDED GROSS ALPHA AS U-NAT. (UG/L)	DISSOLVED GROSS BETA AS CS-137 (PC/L)	SUSPENDED GROSS BETA AS CS-137 (PC/L)	DISSOLVED GROSS BETA AS SR90 /Y90 (PC/L)	SUSPENDED GROSS BETA AS SR90 /Y90 (PC/L)	DISSOLVED RA-226 (RADON METHOD) (PC/L)	DISSOLVED RADON-222 (PC/L)
E	76-04-28	1000	--	--	930	--	220	--	170	--	--	10000
E	76-08-17	--	1300	1	310	<.4	270	<.4	230	<.4	61	--
E	76-12-02	--	1000	--	890	--	210	--	170	--	73	17000
F	76-08-03	--	340	--	26	<.4	19	<.4	16	<.4	3.5	--
J	76-07-13	--	1200	--	260	--	81	--	65	--	27	--
J	76-12-02	--	1200	--	560	--	130	--	110	--	37	37000
M	76-06-29	--	740	--	290	--	81	--	66	--	40	3000
N	76-04-29	--	720	--	410	--	110	--	83	--	28	--
N	76-06-29	--	660	--	240	--	69	--	57	--	27	11000
N	76-12-02	--	680	--	360	--	90	--	73	--	28	24000

STATION LETTER	DATE OF SAMPLE	DISSOLVED URANIUM (U) (UG/L)	DISSOLVED URANIUM (DIRECT FLUOROMETRIC) (PC/L)
E	76-04-28	--	--
E	76-08-17	.40	--
E	76-12-02	<.40	<.4
F	76-08-03	7.2	--
J	76-07-13	.50	--
J	76-12-02	.80	.8
M	76-06-29	--	.9
N	76-04-29	--	--
N	76-06-29	--	.9
N	76-12-02	.80	.8

TABLE 20.--CHEMICAL ANALYSES OF WATER FROM THE BROADWATER (HELENA) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	INSTANTANEOUS DISCHARGE (CFS)	FLOW RATE (GPM)
463433112074000	A	GRIFFITH COLD SPRING T10N04W32DAD	76-04-07	USGS	--	--	1.8
463456112084501	B	SMALLWOOD-PETERSON COLD SP T10NR04W32BCD	76-04-07	USGS	--	--	121
463538112065500	C	TENMILE CR UPSTREAM FROM NEW BR, BROADWATER	76-11-16	USGS	--	7.1	--
463544112063300	D	BROADWATER HOT SPRINGS AT OUTLET	76-01-30	USGS	--	--	207
	D	BROADWATER HOT SPRINGS AT OUTLET	76-01-30	USGS	--	--	207
	D	BROADWATER HOT SPRINGS AT OUTLET	76-04-27	USGS	--	--	207
463544112063800	E	BROADWATER HOT SPRINGS AT BREAK	76-11-24	USGS	--	--	126
463544112064200	F	BROADWATER HOT SPRINGS AT MANHOLE	64-09-17	MSBH	--	--	75
	F	BROADWATER HOT SPRINGS AT MANHOLE	67-09-21	MBMG	--	--	--
	F	BROADWATER HOT SPRINGS AT MANHOLE	73-09-21	K	--	--	30
	F	BROADWATER HOT SPRINGS AT MANHOLE	74-08-21	RFS	--	--	15
	F	BROADWATER HOT SPRINGS AT MANHOLE	74-08-24	M	--	--	>13
	F	BROADWATER HOT SPRINGS AT MANHOLE	76-01-30	USGS	--	--	--
	F	BROADWATER HOT SPRINGS AT MANHOLE	76-01-30	USGS	--	--	--
463544112064201	G	BROADWATER NORTHWEST COLD PIT	76-09-08	USGS	12	--	--
463544112064202	H	BROADWATER HOT PIT 2	76-09-08	USGS	12	--	--
463544112064203	I	BROADWATER WELL 3	76-10-06	USGS	--	--	60
	I	BROADWATER WELL 3	77-06-07	USGS	--	--	36
463545112061500	J	GLOEGE WELL	76-01-29	USGS	275	--	13
	J	GLOEGE WELL	76-01-29	USGS	275	--	13
463547112063700	K	TENMILE CR DOWNSTREAM FROM DOTSON	76-11-16	USGS	--	7.5	--
463557112060700	L	STATE NURSERY WELL 1	77-06-30	USGS	--	--	--
463600112062000	M	GANNON WELL 1	76-10-08	USGS	--	--	1.0
463610112054600	N	STATE NURSERY WELL 4	77-06-30	USGS	--	--	--
	N	STATE NURSERY WELL 4	77-06-30	USGS	--	--	--
463747112081200	O	NOVAK SPRING	77-06-30	USGS	--	--	--
	O	NOVAK SPRING	77-06-30	USGS	--	--	--
464221112110700	P	BERG SPRING	77-06-29	USGS	--	--	--
	P	BERG SPRING	77-06-29	USGS	--	--	--
464423112110300	Q	ANDERSON SPRING (SITZER GULCH)	77-06-30	USGS	--	--	--
	Q	ANDERSON SPRING (SITZER GULCH)	77-06-30	USGS	--	--	--

STATION LETTER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)
A	76-04-07	486	7.4	9.5	--	240	18	78	12	9.0	7	.3	--
B	76-04-07	484	7.2	7.0	--	240	20	67	18	13	10	.4	--
C	76-11-16	323	8.1	6.0	--	130	26	37	9.7	11	15	.4	--
D	76-01-30	906	8.3	62.2	--	32	0	11	.9	170	90	13	--
D	76-01-30	906	8.3	66.2	--	--	--	12	--	--	--	--	--
D	76-04-27	940	--	59.0	--	34	0	12	1.0	170	90	13	--
E	76-11-24	929	8.2	60.0	--	31	0	11	.9	170	91	13	--
F	64-09-17	--	--	59.0	--	41	0	12	2.0	--	--	--	180
F	67-09-21	--	8.4	65.0	--	26	0	9.6	.4	170	91	15	--
F	73-09-21	--	7.0	63.0	--	33	--	12	.7	150	89	11	--
F	74-08-21	--	--	65.0	--	33	0	12	.8	190	91	14	--
F	74-08-24	796	8.5	62.0	<.5	31	0	11	.9	160	90	12	--
F	76-01-30	872	8.2	66.4	--	29	0	10	.8	170	91	14	--
F	76-01-30	872	8.2	66.4	--	--	--	11	--	--	--	--	--
G	76-09-08	1065	8.0	21.0	--	56	0	20	1.4	190	86	11	--
H	76-09-08	863	7.8	67.0	--	27	0	9.4	.8	180	92	15	--
I	76-10-06	860	7.4	67.8	--	24	0	9.1	.3	170	92	15	--
I	77-06-07	874	--	65.5	--	36	--	13	.8	180	90	13	--
J	76-01-29	728	7.4	19.4	--	260	24	78	16	38	24	1.0	--
J	76-01-29	728	7.4	19.4	--	--	--	79	--	--	--	--	--
K	76-11-16	333	8.0	8.0	--	140	25	39	9.4	18	22	.7	--
L	77-06-30	465	6.7	11.0	--	150	0	45	9.6	50	41	1.8	--
M	76-10-08	395	7.7	11.7	--	160	27	47	9.3	24	25	.8	--
N	77-06-30	373	6.8	10.0	--	150	31	42	10	22	24	.8	--
N	77-06-30	373	6.8	10.0	--	--	--	--	--	--	--	--	--
O	77-06-30	336	7.4	11.0	--	180	39	50	13	8.2	9	.3	--
O	77-06-30	336	7.4	11.0	--	--	--	--	--	--	--	--	--
P	77-06-29	418	7.4	10.0	--	260	42	63	36	7.4	6	.2	--
P	77-06-29	418	7.4	10.0	--	--	--	--	--	--	--	--	--
Q	77-06-30	616	7.3	9.0	--	340	93	73	38	18	10	.4	--
Q	77-06-30	616	7.3	9.0	--	--	--	--	--	--	--	--	--

TABLE 20.--CHEMICAL ANALYSES OF WATER FROM THE BROADWATER (HELENA) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED SOLIDS (TONS PER DAY)
A	76-04-07	10	276	0	226	16	54	5.0	.2	14	300	.41	--
B	76-04-07	3.7	270	0	221	27	47	3.5	.4	22	308	.42	--
C	76-11-16	2.9	130	0	107	1.5	39	2.9	.3	20	189	.26	3.64
D	76-01-30	6.1	178	0	146	1.4	170	41	11	82	582	.79	--
D	76-01-30	--	--	--	158	--	--	--	--	82	--	--	--
D	76-04-27	5.7	192	--	157	--	170	33	7.9	84	580	.79	--
E	76-11-24	5.8	188	--	154	1.9	190	34	--	--	--	--	--
F	64-09-17	--	190	0	156	--	180	39	9.6	--	--	--	--
F	67-09-21	8.7	190	4	162	1.3	160	40	--	92	600	--	--
F	73-09-21	4.7	--	--	--	--	--	35	--	60	--	--	--
F	74-08-21	6.0	300	--	246	--	190	22	6.2	97	673	--	--
F	74-08-24	5.8	210	5	172	1.1	170	33	9.4	98	597	--	--
F	76-01-30	6.3	152	0	125	1.5	180	34	9.6	93	581	.79	--
F	76-01-30	--	--	--	158	--	--	--	--	--	--	--	--
G	76-09-08	9.1	212	0	174	3.4	220	39	9.7	100	701	.95	--
H	76-09-08	6.3	188	0	154	4.8	180	34	9.3	98	619	.84	--
I	76-10-06	5.9	193	0	158	11	180	34	11	93	598	.81	--
I	77-06-07	6.2	--	--	--	--	--	--	--	--	--	--	--
J	76-01-29	3.4	289	0	237	16	84	12	.7	28	403	.55	--
J	76-01-29	--	--	--	233	--	--	--	--	--	--	--	--
K	76-11-16	3.2	136	0	112	2.2	46	4.7	.6	23	212	.29	4.30
L	77-06-30	4.1	190	0	160	61	72	13	1.9	34	328	--	--
M	76-10-08	2.7	162	0	133	5.2	38	5.9	.9	22	231	.31	--
N	77-06-30	3.1	140	--	115	36	57	7.6	.7	22	233	.32	--
N	77-06-30	--	--	--	--	--	--	--	--	21	--	--	--
O	77-06-30	2.6	170	--	139	11	44	6.1	.4	25	233	.32	--
O	77-06-30	--	--	--	--	--	--	--	--	27	--	--	--
P	77-06-29	1.4	200	--	164	13	32	5.7	.2	8.8	233	.32	--
P	77-06-29	--	--	--	--	--	--	--	--	9.0	--	--	--
Q	77-06-30	2.7	300	--	246	24	120	8.2	.4	13	421	.57	--
	77-06-30	--	--	--	--	--	--	--	--	13	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED ORTHO PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-04-07	--	--	--	.37	--	.02	--	--
B	76-04-07	--	--	--	.01	--	.02	--	--
C	76-11-16	--	--	--	.25	--	--	--	--
D	76-01-30	--	--	.00	--	--	.03	--	--
D	76-01-30	--	--	--	--	--	--	--	--
D	76-04-27	--	--	--	.00	--	.01	--	--
E	76-11-24	--	--	--	--	--	--	--	--
F	64-09-17	.00	.00	--	--	--	--	--	--
F	67-09-21	--	--	--	--	--	--	--	--
F	73-09-21	--	--	--	--	--	--	--	--
F	74-08-21	--	--	--	--	--	--	--	--
F	74-08-24	--	--	--	--	<.10	--	--	--
F	76-01-30	--	--	.00	--	--	.03	--	--
F	76-01-30	--	--	--	--	--	--	--	--
G	76-09-08	--	--	--	1.1	--	--	.12	.37
H	76-09-08	--	--	--	1.6	--	--	.10	.31
I	76-10-06	--	--	--	.00	--	--	--	--
I	77-06-07	--	--	--	--	--	--	--	--
J	76-01-29	--	--	.17	--	--	.03	--	--
J	76-01-29	--	--	--	--	--	--	--	--
K	76-11-16	--	--	--	.21	--	--	--	--
L	77-06-30	--	--	--	.03	--	--	--	--
M	76-10-08	--	--	--	.00	--	--	--	--
N	77-06-30	--	--	--	--	--	--	--	--
O	77-06-30	--	--	--	--	--	--	--	--
O	77-06-30	--	--	--	--	--	--	--	--
P	77-06-29	--	--	--	--	--	--	--	--
P	77-06-29	--	--	--	--	--	--	--	--
Q	77-06-30	--	--	--	--	--	--	--	--
Q	77-06-30	--	--	--	--	--	--	--	--

TABLE 20.--CHEMICAL ANALYSES OF WATER FROM THE BROADWATER (HELENA) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)
A	76-04-07	6	0	20	0	10	--	0	0	1	10
B	76-04-07	6	0	30	0	30	--	1	10	2	0
C	76-11-16	--	--	20	--	20	--	--	210	--	10
D	76-01-30	22	0	780	0	570	--	9	60	3	30
D	76-01-30	--	--	--	--	--	--	--	--	--	--
D	76-04-27	--	--	750	--	530	--	--	30	--	--
E	64-09-17	--	--	--	--	--	--	--	0	--	--
E	67-09-21	--	--	880	--	550	--	--	--	--	--
E	74-08-21	--	--	820	--	550	--	--	--	--	--
E	74-08-24	--	--	800	<10	480	<50	<10	70	<100	50
E	76-01-30	20	10	800	1	570	--	6	130	4	50
E	76-01-30	--	--	--	--	--	--	--	--	--	--
G	76-09-08	--	--	780	--	600	--	--	120	--	10
H	76-09-08	--	--	780	--	590	--	--	10	--	40
I	76-10-06	--	--	810	--	600	--	--	110	--	20
I	77-06-07	--	--	--	--	600	--	--	--	--	--
J	76-01-29	15	0	70	0	80	--	5	20	3	30
J	76-01-29	--	--	--	--	--	--	--	--	--	--
K	76-11-16	--	--	60	--	50	--	--	190	--	30
L	77-06-30	--	--	160	--	140	--	--	40	--	8
M	76-10-08	--	--	50	--	40	--	--	170	--	50

STATION LETTER	DATE OF SAMPLE	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-04-07	.0	0	6	1	150	1.6	10	--	--
B	76-04-07	.0	2	7	0	190	2.6	0	--	--
C	76-11-16	--	--	--	--	260	--	--	--	--
D	76-01-30	.0	26	2	0	290	.2	10	--	--
D	76-01-30	--	--	--	--	270	--	--	--	--
D	76-04-27	--	--	--	--	330	--	--	--	--
E	64-09-17	--	--	--	--	--	--	--	--	--
E	67-09-21	--	--	--	--	--	--	--	--	--
E	74-08-21	--	--	--	--	--	--	--	--	--
E	74-08-24	--	--	<20	--	--	--	20	100	60
E	76-01-30	.2	23	0	0	290	.4	10	--	--
E	76-01-30	--	--	--	--	260	--	--	--	--
G	76-09-08	--	--	--	--	550	--	--	--	--
H	76-09-08	--	--	--	--	140	--	--	--	--
I	76-10-06	--	--	--	--	310	--	--	--	--
I	77-06-07	--	--	--	--	--	--	--	--	--
J	76-01-29	.0	43	2	2	560	4.1	30	--	--
J	76-01-29	--	--	--	--	550	--	--	--	--
K	76-11-16	--	--	--	--	260	--	--	--	--
L	77-06-30	--	--	--	--	370	--	--	--	--
M	76-10-08	--	--	--	--	780	--	--	--	--

STATION LETTER	DATE OF SAMPLE	TOTAL FILTRABLE RESIDUE (MG/L)	DISSOLVED GROSS ALPHA AS U-NAT. (UG/L)	DISSOLVED GROSS BETA AS CS-137 (PC/L)	DISSOLVED GROSS BETA AS SR90 /Y90 (PC/L)
D	76-04-27	650	7.7	8.3	6.7

TABLE 21.--CHEMICAL ANALYSES OF WATER FROM THE MARYSVILLE TEST WELL AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	INSTANTANEOUS DISCHARGE (CFS)	FLOW RATE (GPM)
464245112210600	A	DAGO GULCH SPRING 11N06W16AAB	76-07-01	USGS	--	--	<2.0
464329112204100	B	BALD BUTTE SPRINGS 11N06W10BBC	76-07-01	USGS	--	--	18
464346112210700	C	DOG CREEK SPRING 1 11N06W04DDC	76-07-02	USGS	--	--	8.0
464409112213100	D	SPRING FRIDAY GULCH 11N06W04BDD	76-07-02	USGS	--	--	1.0
464456112221700	E	NO NAME SPRING 12N06W32DAB	76-07-02	USGS	--	--	20
464514112223300	F	MARYSVILLE DEEP WELL	75-08-29	USGS	5750	--	--
	F	MARYSVILLE DEEP WELL	75-08-29	USGS	5255	--	--
	F	MARYSVILLE DEEP WELL	75-08-29	USGS	4508	--	--
464515112205300	G	EMPIRE MINE DRAIN 12N06W32AAD	76-07-02	USGS	--	--	--
464715112245600	H	LOST HORSE CREEK NEAR MOUTH STA 5	76-10-22	USGS	--	--	--
464721112264600	I	S FK LITTLE PRICKLY PEAR CR NR MOUTH STA 2A	76-10-22	USGS	--	--	--
464736112223900	J	LITTLE PRICKLY PEAR CR BL LOST HORSE STA 10	76-10-22	USGS	--	13	--
464744112262800	K	N FK L PRICKLY PEAR AT MCQUITHY GULCH STA 1	76-10-22	USGS	--	3.8	--
464816112220700	L	L PRICKLY PEAR CR UPSTR MARSH CR STA 11	76-10-22	USGS	--	13	--
464818112202500	M	PIEGAN CREEK NEAR MOUTH STA 13	76-10-22	USGS	--	--	--
464818112220700	N	MARSH CREEK AT MOUTH STA 12	76-10-22	USGS	--	--	--
464841112201400	O	LITTLE PRICKLY PEAR CR AT EAST GRADY STA 14	76-10-22	USGS	--	17	--
472056112170600	P	TRINITY HILL COLD SPRING	77-06-29	USGS	--	--	--
	P	TRINITY HILL COLD SPRING	77-06-29	USGS	--	--	--

STATION LETTER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	76-07-01	356	7.3	7.0	170	35	55	7.6	1.9	2	.1	2.6	163
B	76-07-01	229	7.3	6.0	120	10	42	3.9	1.5	3	.1	2.3	136
C	76-07-02	318	7.6	9.8	160	10	54	7.0	2.8	4	.1	2.6	188
D	76-07-02	515	7.6	8.0	200	61	71	6.5	2.4	2	.1	2.9	175
E	76-07-02	368	7.6	9.0	190	17	64	8.4	2.8	3	.1	2.3	216
F	75-08-29	950	7.9	96.5	21	0	7.7	.5	210	93	51	10	260
F	75-08-29	1000	7.6	42.0	18	0	5.9	.7	200	93	21	11	242
F	75-08-29	960	7.8	39.0	22	0	7.8	.6	200	92	19	12	238
G	76-07-02	287	8.1	7.2	150	13	52	5.2	1.9	3	.1	1.3	169
H	76-10-22	221	8.0	6.0	110	15	26	11	1.7	3	.1	1.0	116
I	76-10-22	197	8.1	8.7	99	8	20	12	1.2	3	.1	.6	111
J	76-10-22	256	8.1	6.2	130	15	28	15	1.3	2	.1	.7	143
K	76-10-22	299	8.2	6.8	160	15	30	20	1.0	1	.0	.5	173
L	76-10-22	269	8.2	6.2	140	15	31	15	1.5	2	.1	.8	152
M	76-10-22	252	8.1	5.3	230	45	[illegible]	15	3.8	3	.1	2.1	221
N	76-10-22	322	8.2	4.5	170	16	45	16	2.5	3	.1	1.4	192
O	76-10-22	182	8.1	5.5	150	5	34	16	1.8	3	.1	.9	178
P	77-06-29	426	7.3	8.0	240	31	65	20	6.4	5	.2	4.3	260
P	77-06-29	426	7.3	8.0	--	--	--	--	--	--	--	--	--

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED SOLIDS (TONS PER DAY)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)
A	76-07-01	0	134	15	24	.6	1.3	22	196	.27	--	--	--
B	76-07-01	0	112	9.7	7.0	.5	1.0	18	144	.20	--	--	--
C	76-07-02	0	154	6.7	11	1.2	.2	14	188	.26	--	--	--
D	76-07-02	0	144	7.0	24	1.4	.1	13	208	.28	--	--	--
E	76-07-02	0	177	7.7	21	1.2	.3	16	223	.30	--	--	--
F	75-08-29	0	200	5.2	180	51	20	69	806	--	--	.23	1.0
F	75-08-29	--	198	9.7	150	43	18	72	625	.85	--	--	--
F	75-08-29	--	195	6.0	160	47	19	63	655	.89	--	--	--
G	76-07-02	0	139	2.1	16	1.4	.2	16	179	.24	--	--	--
H	76-10-22	--	95	1.7	10	.8	.2	--	--	--	--	--	--
I	76-10-22	--	91	1.3	6.2	.4	.1	--	--	--	--	--	--
J	76-10-22	0	117	1.6	9.7	.7	.2	7.5	134	.18	4.96	--	--
K	76-10-22	0	142	1.7	7.9	3.1	.2	6.2	155	.21	1.60	--	--
L	76-10-22	0	125	1.5	8.5	.8	.2	7.6	141	.19	5.00	--	--
M	76-10-22	--	181	2.5	28	1.5	.2	--	--	--	--	--	--
N	76-10-22	--	157	1.9	9.2	.9	.1	--	--	--	--	--	--
O	76-10-22	0	146	2.3	12	.8	.2	8.7	163	.22	7.56	--	--
P	77-06-29	--	213	21	26	5.2	.1	9.6	265	.36	--	--	--
P	77-06-29	--	--	--	--	--	--	10	--	--	--	--	--

TABLE 21.--CHEMICAL ANALYSES OF WATER FROM THE MARYSVILLE TEST WELL AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	76-07-01	.15	.00
B	76-07-01	.13	.00
C	76-07-02	.45	.00
D	76-07-02	.15	.00
E	76-07-02	.03	.00
F	75-08-29	--	--
F	75-08-29	.29	--
F	75-08-29	.08	--
G	76-07-02	.34	.01
H	76-10-22	--	--
I	76-10-22	--	--
J	76-10-22	.03	--
K	76-10-22	.15	--
L	76-10-22	.13	--
M	76-10-22	--	--
N	76-10-22	--	--
O	76-10-22	.06	--
P	77-06-29	--	--
P	77-06-29	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED BORON (B) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)
A	76-07-01	9	10	--	--	20	--	--	90
B	76-07-01	6	5	--	--	0	--	--	90
C	76-07-02	6	5	--	--	30	--	--	130
D	76-07-02	6	10	--	--	0	--	--	150
E	76-07-02	10	5	--	--	160	--	--	160
F	75-08-29	100	2000	10	20	--	90	<.3	70
F	75-08-29	790	2700	--	--	20	50	--	220
F	75-08-29	820	6500	--	--	250	30	--	230
G	76-07-02	4	5	--	--	0	--	--	100
H	76-10-22	--	--	--	--	130	--	--	--
I	76-10-22	--	--	--	--	70	--	--	--
J	76-10-22	2	10	--	--	100	10	--	100
K	76-10-22	2	0	--	--	80	10	--	100
L	76-10-22	2	0	--	--	130	20	--	100
M	76-10-22	--	--	--	--	490	--	--	--
N	76-10-22	--	--	--	--	170	--	--	--
O	76-10-22	5	10	--	--	150	20	--	110

TABLE 22.--CHEMICAL ANALYSES OF WATER FROM THE WHITE SULPHUR (BREWERS) SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
463221110534500	A	WHITE SULPHUR SPRINGS 09N07E18BBB	61-09-01	MSBH	500	--	--
	A	WHITE SULPHUR SPRINGS 09N07E18BBB	74-08-24	M	>400	2220	6.5
	A	WHITE SULPHUR SPRINGS 09N07E18BBB	76-05-11	USGS	>160	2380	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
A	61-09-01	--	--	240	0	42	33	--	--	--	450	--	730
A	74-08-24	46.0	.7	160	0	44	12	480	85	17	--	20	830
A	76-05-11	45.5	--	--	--	--	--	--	--	--	--	--	721

STATION LETTER	DATE OF SAMPLE	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)
A	61-09-01	24	0	639	--	320	170	1.6	--	--	.45	2.0	--
A	74-08-24	<1	--	681	420	310	180	7.4	51	1530	--	--	2.1
A	76-05-11	--	--	591	--	320	180	6.5	49	--	--	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)
A	61-09-01	--	--	--	--	--	--	100	--	--	--
A	74-08-24	6	9100	<10	1300	<50	<10	110	<100	150	<20

STATION LETTER	DATE OF SAMPLE	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	61-09-01	--	--	--
A	74-08-24	20	100	90

TABLE 23.--CHEMICAL ANALYSES OF WATER FROM THE LA DUKE (CORWIN) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
450535110462500	A	LA DUKE (CORWIN) HOT SPRINGS 08S08E32CD	72-07-26	MBMG	500	2400	7.6
	A	LA DUKE (CORWIN) HOT SPRINGS 08S08E32CD	75-07-02	USGS	132	2460	6.5
	A	LA DUKE (CORWIN) HOT SPRINGS 08S08E32CD	76-05-27	USGS	220	2600	--

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
A	72-07-26	66.0	--	990	907	270	80	230	33	3.1	24	94	0
A	75-07-02	65.0	<1.0	1000	790	320	58	230	31	3.1	23	300	<1
A	76-05-27	67.5	--	1100	850	330	61	240	32	3.2	25	281	--

STATION LETTER	DATE OF SAMPLE	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)
A	72-07-26	0	77	3.8	1300	42	3.6	52	2070	--	.00	.00	--
A	75-07-02	--	246	152	1200	45	3.6	49	2080	--	--	--	--
A	76-05-27	--	230	--	1400	42	3.5	45	2290	3.11	--	--	.03

STATION LETTER	DATE OF SAMPLE	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	72-07-26	--	--
A	75-07-02	.22	--
A	76-05-27	--	.00

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	TOTAL IRON (FE) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	72-07-26	--	--	280	260	--	20	--	--	--
A	75-07-02	<1	460	240	--	160	20	--	<100	70
A	76-05-27	--	480	270	--	300	--	3900	--	--

TABLE 24.--CHEMICAL ANALYSES OF WATER FROM THE CHICO (EMIGRANT) HOT SPRINGS AREA

STATION NUMBER	STATION LETTER AND NAME		DATE OF SAMPLE	SAMPLED BY	SAMPLING DEPTH (FT)	INSTANTANEOUS DISCHARGE (CFS)	FLOW RATE (GPM)
451509110393700	A	LC-3 CHICO FLOWING WELL 07S09E06DDA	76-07-08	USGS	400	--	4.5
451517110393700	B	EAST FORK EMIGRANT CR 07S09E06 DAA	76-07-08	USGS	--	20	--
451524110393700	C	CHICO WELL 11 EMIGRANT GULCH 07S09E06ADD	76-07-23	USGS	2400	--	20
451609110462800	D	SIXMILE CREEK	76-10-28	USGS	--	14	--
	D	SIXMILE CREEK	77-04-05	USGS	--	8.8	--
451859110415800	E	EMIGRANT CR AT OLD CHICO	76-10-28	USGS	--	12	--
	E	EMIGRANT CR AT OLD CHICO	77-04-05	USGS	--	8.9	--
451951110451000	F	EMIGRANT CR NEAR MOUTH	77-04-05	USGS	--	2.2	--
451955110410800	G	CHICO COLD SPRING 06S08E12ACB	76-07-09	USGS	--	--	287
452013110412100	H	CHICO HOT SPRINGS WEST VENT 06S09E01CDC	76-10-28	USGS	--	--	209
452013110412700	I	CHICO HOT SPRINGS 06S09E01CDC	64-11-24	MSBH	--	--	--
	I	CHICO HOT SPRINGS 06S09E01CDC	74-08-25	M	--	--	132
	I	CHICO HOT SPRINGS 06S09E01CDC	76-05-27	USGS	--	--	--
	I	CHICO HOT SPRINGS 06S09E01CDC	76-07-09	USGS	--	--	112
	I	CHICO HOT SPRINGS 06S09E01CDC	77-04-05	USGS	--	--	130
452103110363000	J	MILL CREEK UPSTREAM FROM DIVERSION STA 4	76-10-28	USGS	--	40	--
	J	MILL CREEK UPSTREAM FROM DIVERSION STA 4	77-04-05	USGS	--	36	--
452141110431700	K	YELLOWSTONE FISH HATCHERY	76-10-28	USGS	--	--	460
452205110432900	L	YELLOWSTONE RIVER AT EMIGRANT	76-10-28	USGS	--	1690	--
	L	YELLOWSTONE RIVER AT EMIGRANT	77-04-05	USGS	--	1090	--
452431110415100	M	EIGHTMILE CREEK NEAR CHICORY	76-10-28	USGS	--	17	--
	M	EIGHTMILE CREEK NEAR CHICORY	77-04-05	USGS	--	14	--
452449110384900	N	MILL CREEK NEAR MOUTH	77-04-05	USGS	--	8.6	--
452510110382800	O	YELLOWSTONE RIVER NEAR PRAY	76-10-28	USGS	--	1600	--
	O	YELLOWSTONE RIVER NEAR PRAY	77-04-05	USGS	--	1060	--

STATION LETTER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	AIR TEMPERATURE (DEG C)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO
A	76-07-08	297	7.2	--	9.2	--	130	67	36	8.6	9.5	14	.4
B	76-07-08	73	7.8	--	8.0	--	21	10	6.4	1.1	1.8	16	.2
C	76-07-23	556	--	--	10.0	--	270	98	77	18	21	15	.6
D	76-10-28	345	8.1	--	4.0	--	96	0	20	11	3.8	8	.2
D	77-04-05	227	8.1	--	8.5	--	110	6	22	14	4.4	8	.2
E	76-10-28	227	7.5	--	3.5	--	67	6	19	4.7	3.0	9	.2
E	77-04-05	169	7.8	--	7.5	--	76	14	21	5.6	3.3	9	.2
F	77-04-05	166	7.6	--	10.5	--	75	13	21	5.4	3.6	9	.2
G	76-07-09	200	8.1	--	9.5	--	78	0	25	3.6	6.4	15	.3
H	76-10-28	518	7.3	--	42.5	--	130	0	37	8.0	31	34	1.2
I	64-11-24	--	--	--	48.5	--	117	0	43	2.0	--	--	--
I	74-08-25	379	7.4	--	42.0	.6	120	0	35	8.8	35	37	1.4
I	76-05-27	507	--	--	45.0	--	--	--	--	--	--	--	--
I	76-07-09	490	7.8	--	46.0	--	--	--	--	--	--	--	--
I	77-04-05	438	7.3	--	43.5	--	130	0	36	8.4	34	36	1.3
J	76-10-28	191	8.1	1.5	17.5	--	81	0	21	6.9	4.0	10	.2
J	77-04-05	210	8.2	--	4.0	--	99	1	25	8.9	5.3	10	.2
K	76-10-28	420	7.6	--	9.0	--	120	13	34	9.1	8.4	13	.3
L	76-10-28	260	8.9	9.0	7.0	--	72	0	19	5.8	19	35	1.0
L	77-04-05	302	8.7	17.0	11.0	--	85	0	22	7.2	26	38	1.2
M	76-10-28	71	7.8	--	5.6	--	24	0	6.7	1.8	2.6	17	.2
M	77-04-05	68	7.4	--	11.5	--	23	0	5.9	2.0	2.4	16	.2
N	77-04-05	213	8.5	--	7.8	--	100	1	26	8.7	5.1	10	.2
O	76-10-28	242	8.7	6.0	6.0	--	71	3	18	6.2	19	35	1.0
O	77-04-05	308	8.6	12.5	9.0	--	84	2	22	7.1	25	37	1.2

TABLE 24.--CHEMICAL ANALYSES OF WATER FROM THE CHICO (EMIGRANT) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)
A	76-07-08	--	2.0	72	0	59	7.3	88	1.2	.5	33	218	.30
B	76-07-08	--	.5	13	0	11	.3	14	.5	.1	12	43	.06
C	76-07-23	--	1.1	208	--	171	--	120	.8	.8	30	375	.51
D	76-10-28	--	1.6	124	0	102	1.6	12	.8	.1	10	121	.16
D	77-04-05	--	2.1	130	0	107	1.5	15	1.2	.1	10	134	.18
E	76-10-28	--	.7	75	0	62	3.4	16	.4	.2	11	93	.13
E	77-04-05	--	.9	75	0	62	1.7	19	.6	.1	10	98	.13
F	77-04-05	--	.8	75	0	62	2.7	20	.5	.1	10	99	.13
G	76-07-09	--	.6	105	0	86	1.2	5.0	1.5	.4	15	110	.15
H	76-10-28	--	6.6	172	0	141	14	42	12	.9	31	255	.35
I	64-11-24	41	--	170	0	139	--	41	13	.8	--	--	--
I	74-08-25	--	6.8	170	<1	139	11	41	10	.9	34	255	--
I	76-05-27	--	--	172	--	141	--	53	11	.9	33	--	--
I	76-07-09	--	--	--	--	--	--	53	11	.8	31	--	--
I	77-04-05	--	6.9	170	0	140	14	47	10	1.0	34	263	.36
J	76-10-28	--	1.3	107	0	88	1.4	8.2	1.4	.2	14	110	.15
J	77-04-05	--	1.5	120	0	98	1.2	12	2.0	.2	14	129	.18
K	76-10-28	--	2.6	134	0	110	5.4	33	2.2	.2	18	175	.24
L	76-10-28	--	4.2	93	0	76	.2	27	13	.8	23	158	.21
L	77-04-05	--	5.8	96	3	85	.3	43	15	1.1	29	201	.27
M	76-10-28	--	2.6	43	0	35	1.1	1.1	2.9	.1	29	68	.09
M	77-04-05	--	2.8	32	0	26	2.0	4.2	.8	.1	36	70	.10
N	77-04-05	--	1.4	120	1	100	.6	10	1.1	.1	13	126	.17
O	76-10-28	--	4.3	82	0	67	.3	31	10	.7	22	152	.21
O	77-04-05	--	5.6	100	0	82	.4	42	15	1.1	28	196	.27

STATION LETTER	DATE OF SAMPLE	DISSOLVED SOLIDS (TONS PER DAY)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO. PHOSPHORUS (P) (MG/L)	DISSOLVED ORTHO PHOSPHATE (PO4) (MG/L)
A	76-07-08	--	--	--	--	.01	--	.00	--	--
B	76-07-08	2.32	--	--	--	.07	--	.00	--	--
C	76-07-23	--	--	--	--	.01	--	--	.03	.09
D	76-10-28	4.70	--	--	--	.09	--	.00	--	--
D	77-04-05	3.18	--	--	--	.09	--	--	--	--
E	76-10-28	3.09	--	--	--	.08	--	.00	--	--
E	77-04-05	2.35	--	--	--	.08	--	--	--	--
F	77-04-05	.59	--	--	--	.08	--	.00	--	--
G	76-07-09	--	--	--	--	.11	--	.01	--	--
H	76-10-28	--	--	--	--	.26	--	--	--	--
I	64-11-24	--	.00	.00	--	--	--	--	--	--
I	74-08-25	--	--	--	--	--	<.10	--	--	--
I	76-05-27	--	--	--	--	--	--	--	--	--
I	76-07-09	--	--	--	--	--	--	--	--	--
I	77-04-05	--	--	--	--	.21	--	.00	--	--
J	76-10-28	11.9	--	--	--	.01	--	.03	--	--
J	77-04-05	12.8	--	--	--	.05	--	--	--	--
K	76-10-28	--	--	--	--	.34	--	--	--	--
L	76-10-28	721	--	--	--	--	--	.00	--	--
L	77-04-05	592	--	--	--	--	--	.00	--	--
M	76-10-28	3.19	--	--	--	.03	--	.14	--	--
M	77-04-05	2.72	--	--	--	.01	--	--	--	--
N	77-04-05	2.95	--	--	--	.04	--	.00	--	--
O	76-10-28	657	--	--	.03	--	--	.01	--	--
O	77-04-05	561	--	--	.24	--	--	.00	--	--

TABLE 24.--CHEMICAL ANALYSES OF WATER FROM THE CHICO (EMIGRANT) HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COBALT (CO) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)
A	76-07-08	--	--	--	6	--	10	--	--	3100	--
B	76-07-08	--	--	--	6	--	0	--	--	210	--
C	76-07-23	--	--	--	4	--	50	--	--	1200	--
D	76-10-28	--	0	0	5	0	0	--	0	60	2
D	77-04-05	--	--	--	2	--	10	--	--	160	--
E	76-10-28	--	0	0	7	1	0	--	2	140	18
E	77-04-05	--	--	--	2	--	0	--	--	40	--
F	77-04-05	--	0	0	2	0	0	--	1	40	2
G	76-07-09	--	--	--	8	--	0	--	--	30	--
H	76-10-28	--	--	--	50	--	30	--	--	90	--
I	64-11-24	--	--	--	--	--	--	--	--	0	--
I	74-08-25	--	--	--	60	<10	30	<50	<10	<20	<100
I	77-04-05	--	17	0	60	0	30	--	0	50	0
J	76-10-28	--	0	0	7	0	0	--	0	70	1
J	77-04-05	--	--	--	7	--	10	--	--	130	--
K	76-10-28	--	--	--	9	--	0	--	--	90	--
L	76-10-28	90	25	0	340	0	100	--	2	30	1
L	77-04-05	90	12	0	540	2	140	--	3	60	4
M	76-10-28	--	0	0	7	2	0	--	0	100	18
M	77-04-05	--	--	--	4	--	0	--	--	190	--
N	77-04-05	--	0	0	7	1	0	--	1	40	15
O	76-10-28	50	10	0	330	0	90	--	1	40	2
O	77-04-05	80	12	0	510	1	140	--	4	60	5

STATION LETTER	DATE OF SAMPLE	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-07-08	--	--	--	--	--	330	--	--	--	--
B	76-07-08	--	--	--	--	--	70	--	--	--	--
C	76-07-23	70	--	--	--	--	2000	--	--	--	--
D	76-10-28	0	.0	2	6	0	360	.9	0	--	--
D	77-04-05	10	--	--	--	--	350	--	--	--	--
E	76-10-28	0	.0	3	6	0	190	.9	10	--	--
E	77-04-05	10	--	--	--	--	190	--	--	--	--
F	77-04-05	10	.0	2	4	0	180	.0	0	--	--
G	76-07-09	--	--	--	--	--	210	--	--	--	--
H	76-10-28	0	--	--	--	--	380	--	--	--	--
I	64-11-24	--	--	--	--	--	--	--	--	--	--
I	74-08-25	<20	--	--	<20	--	--	--	10	<100	<20
I	77-04-05	10	.0	0	6	0	360	3.7	0	--	--
J	76-10-28	10	.0	1	7	0	170	1.0	0	--	--
J	77-04-05	0	--	--	--	--	200	--	--	--	--
K	76-10-28	0	--	--	--	--	240	--	--	--	--
L	76-10-28	0	.0	2	2	0	150	1.0	0	--	--
L	77-04-05	10	.0	2	4	0	170	.9	0	--	--
M	76-10-28	0	.0	0	6	0	60	3.7	0	--	--
M	77-04-05	0	--	--	--	--	40	--	--	--	--
N	77-04-05	10	.0	0	6	0	180	.7	10	--	--
O	76-10-28	0	.0	1	0	0	150	.0	10	--	--
O	77-04-05	10	.0	2	1	0	160	.8	10	--	--

TABLE 25.--CHEMICAL ANALYSES OF WATER FROM THE HUNTERS HOT SPRINGS AREA

STATION NUMBER	STATION LETTER	STATION LETTER AND NAME	DATE OF SAMPLE	SAMPLED BY	INSTANTANEOUS DISCHARGE (CFS)	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)
454435110131500	A	YELLOWSTONE RIVER AT SPRINGDALE	76-10-29	USGS	2360	--	287
	A	YELLOWSTONE RIVER AT SPRINGDALE	77-04-06	USGS	1540	--	324
454439110131900	B	HUNTERS CREEK NEAR MOUTH	76-10-29	USGS	2.2	--	518
	B	HUNTERS CREEK NEAR MOUTH	77-04-06	USGS	1.7	--	463
454526110152600	C	HUNTERS HOT SPRINGS	61-08-15	MSBH	--	--	--
	C	HUNTERS HOT SPRINGS	72-07-25	MBMG	--	1500	337
	C	HUNTERS HOT SPRINGS	73-07-29	K	--	1500	--
	C	HUNTERS HOT SPRINGS COMPOSITE	74-08-21	RFS	--	420	--
	C	HUNTERS HOT SPRINGS COMPOSITE	75-07-02	M	--	>1320	354
	C	HUNTERS HOT SPRINGS COMPOSITE	76-10-29	USGS	--	710	441
	C	HUNTERS HOT SPRINGS COMPOSITE	77-04-06	USGS	--	776	430
454535110150500	D	HUNTERS COLD SPRING	74-08-21	RFS	--	--	--
	D	HUNTERS COLD SPRING	77-04-06	USGS	--	.50	706

STATION LETTER	DATE OF SAMPLE	PH (UNITS)	AIR TEMPERATURE (DEG C)	TEMPERATURE (DEG C)	HYDROGEN SULFIDE (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)
A	76-10-29	8.2	5.5	5.5	--	99	5	26	8.1	18	28	.8	--
A	77-04-06	8.5	--	9.5	--	120	1	31	9.2	21	27	.9	--
B	76-10-29	8.4	17.5	1.5	--	87	0	25	5.8	78	66	3.7	--
B	77-04-06	8.4	--	16.0	--	68	0	19	4.9	80	72	4.2	--
C	61-08-15	--	--	--	--	10	0	2.0	1.0	--	--	--	83
C	72-07-25	8.5	--	--	--	12	0	1.2	2.2	90	94	11	--
C	73-07-29	7.6	--	60.0	--	--	--	3.6	--	80	--	--	--
C	74-08-21	--	--	57.0	--	2	0	.6	.0	88	99	30	--
C	75-07-02	9.1	--	60.0	5.3	--	--	<1.0	<.1	85	--	--	--
C	76-10-29	8.9	--	53.9	--	3	0	1.0	.2	86	98	21	--
C	77-04-06	8.6	--	56.5	--	3	0	1.0	.0	85	98	23	--
D	74-08-21	--	--	--	--	190	0	53	15	45	33	1.4	--
D	77-04-06	7.6	--	8.0	--	230	0	61	18	47	31	1.4	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)
A	76-10-29	3.9	114	0	--	94	1.2	35	8.0	.6	18	174	.24
A	77-04-06	4.6	140	0	--	110	.7	43	11	.8	20	210	.29
B	76-10-29	.9	226	0	--	185	1.4	39	18	4.0	45	329	.45
B	77-04-06	1.1	180	6	--	160	1.1	36	16	4.9	50	308	.42
C	61-08-15	--	98	36	0	140	--	21	18	1.7	--	--	--
C	72-07-25	.5	150	10	0	140	.9	20	15	6.0	68	287	--
C	73-07-29	.6	--	--	--	--	--	--	14	--	50	--	--
C	74-08-21	1.0	200	--	--	164	--	19	24	4.6	62	298	--
C	75-07-02	.6	170	15	--	164	.3	11	18	5.6	65	--	--
C	76-10-29	.6	125	22	--	139	.3	16	17	5.8	59	273	.37
C	77-04-06	1.4	150	4	--	130	.6	19	14	5.8	63	268	--
D	74-08-21	.4	300	--	--	246	--	55	23	.3	9.8	349	--
D	77-04-06	.3	280	0	--	230	10	84	13	.3	10	375	--

TABLE 25.--CHEMICAL ANALYSES OF WATER FROM THE HUNTERS HOT SPRINGS AREA--CONTINUED

STATION LETTER	DATE OF SAMPLE	DISSOLVED SOLIDS (TONS PER DAY)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED AMMONIA NITROGEN (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	76-10-29	1110	--	--	.00	--	--	.00
A	77-04-06	873	--	--	.12	--	--	.00
B	76-10-29	1.95	--	--	--	.26	--	.01
B	77-04-06	1.42	--	--	--	.14	--	.00
C	61-08-15	--	.02	.10	--	--	--	--
C	72-07-25	--	.00	.00	--	--	--	--
C	73-07-29	--	--	--	--	--	--	--
C	74-08-21	--	--	--	--	--	--	--
C	75-07-02	--	--	--	--	--	.16	--
C	76-10-29	--	--	--	--	.01	--	.00
C	77-04-06	--	--	--	--	.04	--	--
D	74-08-21	--	--	--	--	--	--	--
D	77-04-06	--	--	--	--	.44	--	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED ALUMINUM (AL) (UG/L)	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	TOTAL IRON (FE) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)
A	76-10-29	30	18	0	250	0	70	0	--	20	1
A	77-04-06	40	18	0	350	1	100	3	--	30	2
B	76-10-29	--	0	0	530	4	30	1	--	100	37
B	77-04-06	--	0	0	590	1	30	1	--	60	7
C	61-08-15	--	--	--	--	--	--	--	--	<100	--
C	72-07-25	--	--	--	--	--	40	--	0	--	--
C	74-08-21	--	--	--	700	--	40	--	--	--	--
C	75-07-02	40	--	--	670	--	30	--	--	<20	--
C	76-10-29	--	0	0	720	5	40	21	--	70	49
C	77-04-06	--	--	--	720	--	40	--	--	40	--
D	74-08-21	--	--	--	<100	--	<20	--	--	--	--
D	77-04-06	--	--	--	50	--	20	--	--	130	--

STATION LETTER	DATE OF SAMPLE	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)	DISSOLVED CESIUM (CS) (UG/L)	DISSOLVED RUBIDIUM (RB) (UG/L)
A	76-10-29	0	.0	0	2	0	210	.4	10	--	--
A	77-04-06	20	.0	2	1	0	230	1.0	10	--	--
B	76-10-29	10	.0	8	7	0	310	1.2	0	--	--
B	77-04-06	0	.0	6	6	0	220	.6	0	--	--
C	61-08-15	--	--	--	--	--	--	--	--	--	--
C	72-07-25	0	--	--	--	--	--	--	--	--	--
C	74-08-21	--	--	--	--	--	--	--	--	--	--
C	75-07-02	<20	--	--	--	--	--	--	--	<100	<20
C	76-10-29	10	.0	8	7	0	60	.7	10	--	--
C	77-04-06	0	--	--	--	--	10	--	--	--	--
D	74-08-21	--	--	--	--	--	--	--	--	--	--
D	77-04-06	0	--	--	--	--	1600	--	--	--	--

TABLE 26.--CHEMICAL ANALYSES OF WATER FROM THE RINGLING FLOWING WELL AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)
462022110471100	A	RINGLING FLOWING WELL	61-08-14	MSBH	--	--	--
	A	RINGLING FLOWING WELL	76-05-26	USGS	800	1630	6.8

STATION LETTER	DATE OF SAMPLE	TEMPERATURE (DEG C)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
A	61-08-14	--	1300	1200	350	93	--	--	--	.0	--	160	0
A	76-05-26	48.0	1000	890	300	66	8.8	2	.1	--	6.5	164	0

STATION LETTER	DATE OF SAMPLE	HYDROXIDE (OH) (MG/L)	ALKALINITY AS CACO3 (MG/L)	CARBON DIOXIDE (CO2) (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)
A	61-08-14	0	131	--	990	11	1.8	--	--	--	.23	1.0	--
A	76-05-26	--	135	42	860	2.1	2.7	25	1360	1.85	--	--	.02

STATION LETTER	DATE OF SAMPLE	DISSOLVED PHOSPHORUS (P) (MG/L)
A	61-08-14	--
A	76-05-26	.00

STATION LETTER	DATE OF SAMPLE	DISSOLVED ARSENIC (AS) (UG/L)	DISSOLVED BERYLLIUM (BE) (UG/L)	DISSOLVED BORON (B) (UG/L)	DISSOLVED CADMIUM (CD) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED COPPER (CU) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED LEAD (PB) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED MERCURY (HG) (UG/L)
A	61-08-14	--	--	--	--	--	--	<100	--	--	--
A	76-05-26	1	0	80	0	60	0	100	4	0	.0

STATION LETTER	DATE OF SAMPLE	DISSOLVED MOLYBDENUM (MO) (UG/L)	DISSOLVED NICKEL (NI) (UG/L)	DISSOLVED SELENIUM (SE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)	DISSOLVED VANADIUM (V) (UG/L)	DISSOLVED ZINC (ZN) (UG/L)
A	61-08-14	--	--	--	--	--	--
A	76-05-26	1	4	3	4300	2.1	20

TABLE 27.--CHEMICAL ANALYSES OF WATER FROM THE LUCAS FLOWING WELL AREA

STATION NUMBER	STATION LETTER	AND NAME	DATE OF SAMPLE	SAMPLED BY	FLOW RATE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS)	TEMPERATURE (DEG C)
462130110404100	A	LUCAS FLOWING WELL	61-09-13	MSBH	--	--	--
	A	LUCAS FLOWING WELL	76-05-26	USGS	99	3300	42.2

STATION LETTER	DATE OF SAMPLE	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	PERCENT SODIUM	SODIUM ADSORPTION RATIO	DISSOLVED SODIUM PLUS POTASSIUM (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)	ALKALINITY AS CACO3 (MG/L)
A	61-09-13	2500	2400	704	176	--	--	--	.0	--	116	0	95
A	76-05-26	2200	2100	660	140	32	3	.3	--	13	115	--	94

STATION LETTER	DATE OF SAMPLE	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	DISSOLVED SOLIDS (TONS PER AC-FT)	DISSOLVED NITRATE (N) (MG/L)	DISSOLVED NITRATE (NO3) (MG/L)	DISSOLVED NITRITE PLUS NITRATE (N) (MG/L)	DISSOLVED PHOSPHORUS (P) (MG/L)
A	61-09-13	2200	16	1.5	--	--	--	.05	.20	--	--
A	76-05-26	2200	6.0	2.8	25	3150	4.28	--	--	.00	.00

STATION LETTER	DATE OF SAMPLE	DISSOLVED BORON (B) (UG/L)	DISSOLVED LITHIUM (LI) (UG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED STRONTIUM (SR) (UG/L)
A	61-09-13	--	--	2000	--
A	76-05-26	180	100	1600	12000

Table 28.--Composition of gases escaping from thermal springs and wells
[Composition is in percent by volume.]

Thermal-spring area (fig.1)	Latitude	Longitude	Name	Date of sample[1]	Oxygen (O_2) plus argon (Ar)	Argon (Ar)	Nitrogen (N_2)	Methane (CH_4)	Carbon dioxide (CO_2)	Ethane (C_2H_6)	Reported total
4	46 02 37	112 48 38	Gregson Hot Springs	8/19/74	2.9	-	96	0.6	0.6	-	-
6	45 22 04	113 24 11	Jackson Hot Springs	8/16/74	2.9	-	82	<.1	16	-	-
7	45 27 28	113 06 31	Elkhorn Hot Springs	8/20/74	2.4	-	98	<.1	.1	-	-
9	45 10 17	112 09 07	Puller warm spring	5/14/76	5.6	-	91.8	.1	2.6	-	100.1
	45 10 18	112 09 07	Puller Hot Springs	5/14/76	7.7	-	89.5	.1	2.5	-	100.0
					7.9	-	89.6	.1	2.5	-	100.1
10	45 41 07	112 17 42	Silver Star Hot Springs	8/18/74	2.7	-	96	<.1	1.2	-	-
11	45 47 30	112 07 35	Renova Hot Springs	8/13/76	3.1[2]	1.3	93.4	1.7	.5	-	100.0
					2.9[2]	1.3	93.2	.5	1.7	-	99.6
15	44 59 02	111 36 47	Wolf Creek Hot Springs	5/13/76	5.1	-	93.8	.4	.3	-	99.6
					6.4	-	93.2	.4	.2	-	100.2
					6.4	-	93.1	.4	.2	-	100.1
17	45 34 30	111 41 00	Norris Hot Springs	8/21/74	2.9	-	95	.2	2.8	-	-
19	46 26 47	111 58 58	Alhambra Hot Springs (south)	4/29/76	5.7	-	86.2	.0	8.1	-	100.0
					6.0	-	85.2	.0	9.6	-	100.8
	46 26 53	111 58 51	Walls hot spring	8/29/76	2.3	-	89.2	<.1	8.9	-	100.5

Table 28.--Composition of gases escaping from thermal springs and wells--continued
[Composition is in percent by volume.]

Thermal-spring area (fig.1)	Latitude	Longitude	Name	Date of sample[1]	Oxygen (O_2) plus Argon (Ar)	Argon (Ar)	Nitrogen (N_2)	Methane (CH_4)	Carbon dioxide (CO_2)	Ethane (C_2H_6)	Reported total
19	46 27 01	111 58 50	Alhambra hot well (north)	4/29/76	4.2	-	89.9	.0	6.5	-	100.6
					4.4	-	92.6	.0	3.2	-	100.2
				6/29/76	4.1	-	87.9	<.1	9.2	-	100.3
				12/02/76	1.9	-	89.4	<.1	7.7	<.1	99.2
20	46 35 44	112 06 42	Broadwater Hot Springs at manhole	8/16/76	1.1[2]	1.4	96.4	<.1	1.9	-	100.9
	46 35 44	112 06 42	Broadwater well 3	12/16/76	1.8	-	94.7	.1	.9	<.1	97.6
25	45 45 26	110 15 26	Hunters Hot Springs	7/02/75	1.3	-	36	64	<.1	-	-
					1.1	-	38	62	<.1	-	-

[1]Analyses of samples collected prior to 1976 are from Mariner, Presser, and Evans (1976).
[2]Oxygen alone.

Table 29.--Isotopic composition of selected thermal and cool waters
[Hydrogen and oxygen isotope ratios are reported relative to Standard Mean Ocean Water (SMOW).]

Thermal-spring area (fig. 1)	Location		Name	Date of sample[1]	Isotopic composition, in parts per thousand	
	Latitude	Longitude			δD	$\delta^{18}O$
1	45 50 57	114 02 06	Medicine Hot Springs	8/16/74	-165.0	-19.62
	--	--	Unnamed Creek near Medicine Hot Springs	8/16/74	-141.8	-18.56
2	46 05 49	114 00 15	Sleeping Child Hot Springs	8/15/74	-150.4	-19.46
				8/15/74	-149.9	-19.30
	--	--	Unnamed Creek near Sleeping Child Hot Springs	8/15/74	-138.4	-18.05
3	46 45 08	114 31 58	Lolo Hot Springs	8/17/74	-139.8	-16.08
	--	--	Unnamed Creek near Lolo Hot Springs	8/17/74	-130.9	-17.54
4	46 02 37	112 48 38	Gregson Hot Springs	8/19/74	-149.1	-18.60
5	46 10 40	112 47 40	Warm Springs	8/19/74	-152.3	-19.97
6	45 22 04	113 24 11	Jackson Hot Springs	8/16/74	-153.5	-20.44
				7/23/76	-153.6	-19.45
	--	--	Unnamed Creek near Jackson Hot Springs	8/16/74	-142.5	-18.32
7	45 27 28	113 06 31	Elkhorn Hot Springs	8/20/74	-155.1	-20.25
	--	--	S. Fk. Hot Spring Creek near Elkhorn Hot Springs	8/20/74	-144.2	-19.03
8	45 27 43	122 28 28	New Biltmore Hot Springs	8/17/74	-149.0	-19.30
	--	--	Big Hole River near New Biltmore Hot Springs	8/17/74	-140.9	-18.17

Table 29.--Isotopic composition of selected thermal and cool waters--continued

Table 29.--Isotopic composition of selected thermal and cool waters--continued
[Hydrogen and oxygen isotope ratios are reported relative to Standard Mean Ocean Water (SMOW).]

Thermal-spring area (fig. 1)	Location		Name	Date of sample[1]	Isotopic composition, in parts per thousand	
	Latitude	Longitude			δD	$\delta^{18}O$
10	45 40 15	112 18 15	Silver Star cold spring 1	5/14/76	-142.2	-17.90
	45 42 13	112 20 02	Silver Star cold spring 2	9/09/76	-150.0	-19.15
	45 42 43	112 21 02	Silver Star cold spring 3	9/09/76	-147.5	-18.90
	45 41 07	112 17 42	Silver Star Hot Springs	8/18/74	-145.4	-18.48
12	45 53 47	112 14 34	Pipestone Hot Springs at pipe	8/18/74	-144.3	-18.28
13	46 10 54	112 06 10	Boulder cold spring	3/26/76	-144.6	-18.10
	46 11 53	112 05 37	Boulder Hot Springs	8/22/74	-146.0	-18.91
				8/22/74	-146.5	-19.03
				3/31/76	-148.0	-18.60
14	45 35 21	111 53 55	Potosi Hot Springs, vent X	8/21/74	-149.0	-19.81
				5/12/76	-150.0	-19.60
	45 35 21	111 53 56	Potosi Hot Springs, vent-17	5/12/76	-148.0	-19.50
	45 35 21	111 53 58	Potosi Hot Springs, vent-18	5/12/76	-145.0	-18.75
	45 35 22	111 53 56	Potosi Hot Springs, vent-15	5/12/76	-144.5	-18.65
15	44 59 02	111 36 47	Wolf Creek Hot Springs	5/13/76	-153.1	-20.35
	44 59 08	111 36 46	Wolf Creek warm spring 1	5/13/76	-140.7	-18.95
17	45 34 30	111 41 00	Norris Hot Springs	8/21/74	-148.4	-19.11
				3/29/76	-149.2	-18.75
	--	--	Unnamed Spring near Norris Hot Springs	8/21/74	-150.4	-19.42

Table 29.--Isotopic composition of selected thermal and cool waters--continued
[Hydrogen and oxygen isotope ratios are reported relative to Standard Mean Ocean Water (SMOW).]

Thermal-spring area (fig. 1)	Location		Name	Date of sample[1]	Isotopic composition, in parts per thousand	
	Latitude	Longitude			δD	$\delta^{18}O$
19	46 26 47	111 58 58	Alhambra Hot Springs (south)	4/08/76	-149.0	-18.35
	46 26 51	111 58 48	Warm Springs Creek upstream from Alhambra	4/30/76	-142.3	-18.55
	46 27 01	111 58 50	Alhambra hot well (north)	4/29/76	-147.3	-19.95
	46 26 47	111 58 58	Alhambra north spring	8/23/74	-146.5	-19.23
20	46 35 44	112 06 33	Broadwater Hot Springs at outlet	8/24/74	-147.6	-18.56
				3/25/76	-148.9	-18.20
	46 35 44	112 06 42	Broadwater hot pit 2	9/08/76	-149.0	-18.35
	46 35 44	112 06 42	Broadwater well 3	10/06/76	-149.8	-18.75
22	46 32 21	110 53 45	White Sulphur Springs	8/17/74	-148.6	-18.91
23	45 05 35	110 46 25	La Duke Hot Springs	7/02/75	-145.8	-19.74
24	45 15 09	110 39 37	Chico Hot Springs	8/25/74	-150.2	-17.70
25	45 45 26	110 15 26	Hunters Hot Springs	7/02/75	-138.9	-18.52

[1]Analyses of samples collected prior to 1976 are from Mariner, Presser, and Evans (1976).

Table 30.--Gross alpha and gross beta activity of selected thermal waters

[Analyses by Montana Department of Health and Environmental Sciences. Analyses are in picocuries per liter.]

Thermal-spring area (fig.1)	Location		Name	Date of sample	Gross alpha	Gross beta
	Latitude	Longitude				
1	45 50 47	114 02 06	Medicine Hot Springs	7/23/76	3	10
2	46 05 49	114 00 15	Sleeping Child Hot Springs	7/23/76	1	9
4	46 02 37	112 48 38	Gregson Hot Springs	9/10/76	2	2
5	46 10 40	112 47 40	Warm Springs (State Hospital)	9/10/76	27	40
					32	37
6	45 22 04	113 24 11	Jackson Hot Springs	7/23/76	16	28
7	45 27 28	113 06 31	Elkhorn Hot Springs	7/22/76	8	0
8	45 27 43	112 28 28	New Biltmore Hot Springs	12/16/76	49	43
10	45 41 07	112 17 42	Silver Star Hot Springs at Grate	7/15/76	1	4
11	45 47 30	112 07 35	Renova Hot Springs	8/13/76	8	10
12	45 53 47	112 14 34	Pipestone Hot Springs at pipe	8/13/76	2	2
				12/16/76	3	8
13	46 11 53	112 05 37	Boulder Hot Springs	7/15/76	0	0
14	45 35 21	111 53 55	Potosi Hot Springs, vent-X	1/15/77	2	8
15	44 59 02	111 36 47	Wolf Creek Hot Springs	8/13/76	2	2
16	45 22 02	111 44 51	Ennis Hot Springs	1/15/77	4	13
17	45 34 30	111 41 00	Norris Hot Springs	7/09/76	0	10
18	45 39 38	111 11 10	Bozeman Hot Springs	7/09/76	1	4
					0	3

Table 30.--Gross alpha and gross beta activity of selected thermal waters--continued

[Analyses by Montana Department of Health and Environmental Sciences. Analyses are in picocuries per liter.]

Thermal-spring area (fig.1)	Location		Name	Date of sample	Gross alpha	Gross beta
	Latitude	Longitude				
19	46 26 47	111 58 58	Alhambra Hot Springs (south)	6/15/76	153	131
				6/29/76	214	100
				12/02/76	293	150
	46 26 52	111 59 14	Hillbrook flowing well	7/10/76	77	59
				7/23/76	113	60
				10/19/76	121	53
				12/02/76	113	77
	46 26 53	111 58 51	Walls hot spring	6/29/76	97	48
				10/19/76	70	54
	46 26 59	111 58 50	Alhambra Hot Springs (north)	6/15/76	68	58
				6/29/76	94	48
				10/19/76	81	43
	46 27 01	111 58 50	Alhambra north hot well	6/29/76	112	56
				12/02/76	110	70
20	46 35 44	112 06 33	Broadwater Hot Springs at outlet	7/15/76	0	5
	46 35 44	112 06 42	Broadwater well 3	10/06/76	12	13
				12/06/76	4	8
	46 36 00	112 06 20	Gannon well 1	10/08/76	2	5
23	45 05 35	110 46 25	La Duke Hot Springs	1/24/77	57	48
24	45 20 13	110 41 27	Chico Hot Springs	7/09/76	0	6
25	45 45 26	110 15 26	Hunters Hot Springs (composite)	10/29/76	8	3
26	46 20 22	110 47 11	Ringling flowing well	1/11/77	14	14

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas

[Abbreviations: ft, feet; m, meters; MP, measuring point; LSD, land-surface datum. To convert feet to meters, multiply feet by 0.3048.]

Silver Star (Barkells) Hot Springs area

Bayer Ranch well 1. Lat 45°34'34" N., long 112°15'45" W. Reported well depth, unknown. Water level, 156.5 ft (47.70 m) below MP. MP is top of casing at LSD. Date of measurements, Sept. 9, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	300	91.4	9.9	550	167.6	10.5
50	15.2	7.9	350	106.7	9.9	600	182.9	11.1
100	30.5	9.0	400	121.9	10.1	650	198.1	11.4
150	45.7	9.0	440	134.1	10.2	700	213.4	12.9
200	61.0	9.6	450	137.2	10.2	750	228.6	13.3
250	76.2	9.9	500	152.4	10.4			

Bayer Ranch well 2. Lat 45°34'34" N., long 112°15'49" W. Reported well depth, unknown. Water level, 129.7 ft (39.53 m) below MP. MP is top of casing 2.0 ft (0.6 m) above LSD. Date of measurements, Dec. 15, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	1.2	150	45.7	9.5	300	91.4	10.3
50	15	4.8	200	61.0	9.7	350	106.7	10.5
100	30.5	7.3	250	76.2	10.0			

Bozeman (Ferris, Matthews) Hot Springs area

Bozeman hot spring well. Lat 45°39'37" N., long 111°11'10" W. Reported well depth, 457 ft (139 m) below LSD. Water level, 35.0 ft (10.67 m) above MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Nov. 13, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
+35	+10.7	13.7	150	45.7	55.8	325	99.1	53.3
+10	+3.0	21.5	175	53.3	54.2	350	106.7	53.7
0	0	48.7	200	61.0	53.2	375	114.3	54.1
25	7.6	58.5	225	68.6	53.0	400	121.9	54.5
50	15.2	59.3	250	76.2	52.8	425	129.5	55.4
75	22.9	59.4	275	83.8	52.9	450	137.2	55.7
100	30.5	59.4	300	91.4	53.0	455	138.7	55.8
125	38.1	59.5						

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Bozeman (Ferris, Matthews) Hot Springs area--continued

Bozeman hot spring well. Lat 45°39'37" N., long 111°11'10" W. Reported well depth, 457 ft (139 m) below LSD. Water level, flowing at MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Nov. 14, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	58.5	120	36.6	57.1	250	76.2	53.9
20	6.1	59.3	130	39.6	54.3	300	91.4	54.1
50	15.2	59.4	140	42.7	54.2	350	106.7	54.2
100	30.5	58.9	150	45.7	54.2	400	121.9	54.8
110	33.5	58.2	200	61.0	53.8	450	137.2	55.6

Alhambra Hot Springs area

Buness well. Lat 46°26'09" N., long 111°57'31" W. Reported well depth, 212 ft (64.6 m) below LSD. Water level, 19.3 ft (5.88 m) below MP. MP is top of casing 1.3 ft (0.40 m) above LSD. Date of measurements, Aug. 16, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	70	21.3	8.9	151	46.0	10.3
1	.30	22.4	82	25.0	9.0	162	49.4	10.5
10	3.0	14.3	90	27.4	9.2	182	55.5	10.8
21	6.4	7.5	101	30.1	9.4	191	58.2	10.9
30	9.1	7.6	121	36.9	9.7	202	61.6	11.0
41	12.5	8.0	130	39.6	9.9	211	64.3	11.0
50	15.2	8.4	139	42.4	10.1	212	64.6	11.0
59	18.0	8.6						

Hillbrook cold well. Lat 46°26'48" N., long 111°58'41" W. Reported well depth, 99 ft (30.2 m) below LSD. Water level, 5.9 ft (1.80 m) below MP. MP is top of casing 2.3 ft (0.70 m) above LSD. Date of measurements, Aug. 3, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
10	3.0	16.1	40	12.2	18.1	70	21.3	18.5
20	6.1	15.6	50	15.2	18.2	80	24.4	18.6
30	9.1	17.8	60	18.3	18.5			

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Alhambra Hot Springs area--continued

Hillbrook flowing well. Lat 46°26'52" N., long 111°59'14" W. Reported well depth, 325 ft (99.1 m) below LSD. Water level, 52.0 ft (15.85 m) above MP. MP is top of casing 1.5 ft (0.46 m) above LSD. Date of measurements, July 13, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
--	--	--	141	43.0	31.3	262	79.9	32.7
30	9.1	29.7	161	49.1	31.5	279	85.0	32.7
50	15.2	29.9	182	55.5	32.2	302	92.0	32.8
80	24.4	30.2	200	61.0	32.4	321	97.8	32.5
100	30.5	31.1	220	67.1	32.4	325	99.1	32.6
121	36.9	31.3	240	73.2	32.4			

Alhambra north flowing well. Lat 46°27'01" N., long 111°58'50" W. Reported well depth, 100 ft (30.5 m) below LSD. Water level, flowing at MP. MP is top of casing 5.0 ft (1.52 m) above LSD. Date of measurements, June 30, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
9	2.7	54.3	53	16.2	53.8	82	25.0	54.6
18	5.5	54.1	59	18.0	53.6	82	25.0	54.8
30	9.1	54.0	65	19.8	53.6	88	26.8	54.5
40	12.2	53.9	71	21.6	53.5	94	28.6	54.6
50	15.2	53.9	77	23.5	52.8	100	30.5	54.6

Habb well. Lat 46°27'52" N., long 111°59'49" W. Reported well depth, 255 ft (77.7 m) below LSD. Water level, 25.0 ft (7.62 m) below MP. MP is top of casing 1.2 ft (0.37 m) above LSD. Date of measurements, Aug. 16, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	90	27.3	10.8	182	55.5	12.3
2	.61	26.1	101	30.8	11.0	191	58.2	12.4
11	3.4	26.9	110	33.5	11.3	202	61.6	12.6
20	6.1	19.4	121	36.9	11.4	211	64.3	12.7
31	9.4	9.6	130	39.6	11.6	222	67.7	12.8
40	12.2	9.6	142	43.3	11.8	231	70.4	12.9
49	14.9	9.8	151	46.0	11.9	240	73.2	13.0
60	18.3	10.2	162	49.4	12.0	251	76.5	13.1
72	22.0	10.5	170	51.8	12.2	255	77.7	13.1
81	24.7	10.6						

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Alhambra Hot Springs area--continued

Ostry well. Lat 46°28'06" N., long 111°59'47" W. Reported well depth, 212 ft (64.6 m) below LSD. Water level, 16.0 ft (4.88 m) below MP. MP is top of casing 0.95 ft (0.29 m) above LSD. Date of measurements, Aug. 15, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	25.7	80	24.4	10.7	152	46.3	12.1
10	3.0	22.9	90	27.4	11.0	160	48.8	12.2
20	6.1	8.5	102	31.1	11.2	171	52.1	12.5
32	9.8	9.0	110	33.5	11.5	180	54.9	12.5
40	12.2	9.3	120	36.6	11.7	192	58.5	12.6
51	15.5	10.0	132	40.2	11.8	200	61.0	12.6
62	18.9	10.2	140	42.7	11.8	212	64.6	12.6
70	21.3	10.2						

Broadwater (Helena) Hot Springs area

Colorado Gulch (Yahvah) well. Lat 46°33'18" N., long 112°10'26" W. Reported well depth, 210 ft (64.0 m) below LSD. Water level, 41.0 ft (12.50 m) below MP. MP is top of casing 0.8 ft (0.24 m) above LSD. Date of measurements, Aug. 6, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	21.8	80	24.4	9.7	151	46.0	10.8
11	3.4	19.0	90	27.4	9.8	160	48.8	10.9
20	6.1	17.3	100	30.5	10.0	171	92.1	11.0
30	9.1	15.6	111	33.8	10.1	180	54.9	11.0
41	12.5	8.8	120	36.6	10.4	192	58.5	11.1
50	15.2	8.9	131	39.9	10.5	200	61.0	11.1
62	18.9	9.2	140	42.7	10.6	209	63.7	11.1
70	21.3	9.4						

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Dundas well. Lat 46°35'44" N., long 112°05'47" W. Reported well depth, 25 ft (77.1 m) below LSD. Water level, 42.6 ft (12.98 m) below MP. MP is top of casing 0.91 ft (0.28 m) above LSD. Date of measurements, Aug. 1, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	90	27.4	11.5	182	55.5	12.5
10	3.0	15.0	102	31.1	11.4	190	57.9	12.6
20	6.1	13.1	110	33.5	11.6	200	61.0	12.6
32	9.8	12.2	122	37.2	11.8	210	64.0	12.6
40	12.2	11.7	130	39.6	12.1	220	67.1	12.6
50	15.2	10.5	142	43.3	12.4	230	70.1	12.9
61	18.6	10.8	150	45.7	12.4	240	73.2	12.9
70	21.3	10.9	159	48.5	12.5	250	76.2	13.3
81	24.7	11.3	171	52.1	12.5	253	77.1	13.4

Broadwater well 3. Lat 46°35'44" N., long 112°06'42" W. Reported well depth, 213 ft (64.9 m) below LSD. Water level, 1.0 ft (0.30 m) above MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Oct. 6, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	64.7	70	21.3	66.7	140	42.7	67.2
10	3.0	66.7	80	24.4	66.7	149	45.4	67.2
20	6.1	66.7	90	27.4	67.2	161	49.1	67.2
30	9.1	66.7	101	30.8	67.2	169	51.5	67.2
40	12.2	66.7	110	33.5	67.2	180	54.9	67.2
49	14.9	66.7	120	36.6	67.2	190	57.9	67.2
60	18.3	66.7	131	39.9	67.2	200	61.0	67.2

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Broadwater well 3. Lat 46°35'44" N., long 112°06'42" W. Reported well depth, 213 ft (64.9 m) below LSD. Water level, flowing at MP. MP is top of casing 1.0 ft (0.30 m) above LSD.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
			Date of measurements, Oct. 6, 1976					
10	3.0	67.2	90	27.4	67.2	160	48.8	67.2
20	6.1	67.2	110	33.5	67.2	171	52.1	67.2
30	9.1	67.2	130	39.6	67.2	180	54.9	67.8
50	15.2	67.2	139	42.4	67.2	190	57.9	67.8
71	21.6	67.2	150	45.7	67.2			
			Date of measurements, June 22, 1977					
0	0	67.1	60	18.3	67.5	121	36.9	67.8
11	3.4	66.7	70	21.3	67.5	130	39.6	67.5
20	6.1	66.7	80	24.4	67.5	141	43.0	67.6
30	9.1	66.8	90	27.4	67.6	150	45.7	67.6
40	12.2	67.0	101	30.8	67.6	160	48.8	67.7
50	15.2	67.5	110	33.5	67.7	165	50.3	67.6
			Date of measurements, June 28, 1977					
0	0	63.0	60	18.3	67.7	129	39.3	67.9
10	3.0	66.8	70	21.3	67.7	140	42.7	67.8
20	6.1	67.8	81	24.7	67.7	151	46.0	67.8
31	9.4	67.9	90	27.4	67.7	162	49.4	67.9
40	12.2	67.7	101	30.8	67.8	171	52.1	67.9
51	15.5	67.7	120	36.6	68.0			

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Broadwater well 4. Lat 46°35'44" N., long 112°06'43" W. Reported well depth, 240 ft (73.2 m) below LSD. Water level, 3.1 ft (0.94 m) below MP. MP is top of casing 0.5 ft (0.15 m) above LSD. Date of measurements, Sept. 29, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	26.7	90	27.4	45.2	170	51.8	52.9
11	3.4	31.0	101	30.8	45.7	180	54.9	53.5
20	6.1	31.7	110	33.5	46.8	190	57.9	54.1
29	8.8	33.1	121	36.9	49.5	200	61.0	54.8
41	12.5	35.2	130	39.6	50.1	210	64.0	55.4
52	15.8	36.6	141	43.0	50.8	220	67.1	55.9
61	18.6	38.8	150	45.7	51.6	230	70.1	56.6
70	21.3	40.8	160	48.8	52.5	233	71.0	56.9
80	24.4	44.4						

Broadwater well 4. Lat 46°35'44" N., long 112°06'43" W. Reported well depth, 240 ft (73.2 m) below LSD. Water level, 4.05 ft (1.23 m) below MP. MP is top of casing 0.5 ft (0.15 m) above LSD. Date of measurements, June 22, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	78	23.8	38.6	171	52.1	49.3
5	1.5	19.1	90	27.4	44.7	180	54.9	50.4
10	3.0	19.2	101	30.8	45.0	191	58.2	51.5
20	6.1	21.0	110	33.5	45.4	200	61.0	52.4
31	9.4	24.6	121	36.9	45.6	210	64.0	53.2
40	12.2	28.1	130	39.6	45.8	222	67.7	53.6
51	15.5	30.6	140	42.7	46.2	230	70.1	53.9
60	18.3	33.2	150	45.7	47.2	240	73.2	54.1
71	21.6	37.8	160	48.8	48.0			

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Broadwater well 4. Lat 46°35'44" N., long 112°06'43" W. Reported well depth, 240 ft (73.2 m) below LSD. Water level, 3.63 ft (1.11 m) below MP. MP is top of casing 0.5 ft (0.15 m) above LSD. Date of measurements, June 28, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	80	24.4	44.0	161	49.1	49.4
10	3.0	20.8	90	27.4	45.8	170	51.8	50.4
20	6.1	22.7	101	30.8	46.3	181	55.2	51.6
31	9.4	26.1	110	33.5	46.6	190	57.9	52.5
42	12.8	28.8	121	36.9	46.8	202	61.6	53.6
51	15.5	32.5	130	39.6	47.0	211	64.3	53.9
60	18.3	34.9	141	43.0	47.6	220	67.1	54.1
71	21.6	39.4	150	45.7	48.2	225	68.6	54.1

Gloege well. Lat 46°35'45" N., long 112°06'15" W. Reported well depth, 275 ft (83.8 m) below LSD. Water level, 28.3 ft (8.63 m) below MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Jan. 29, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	90	27.4	12.6	230	70.1	19.8
32	9.8	10.2	110	33.5	14.0	240	73.2	20.0
40	12.9	10.2	130	39.6	15.0	242	73.8	20.3
50	15.2	10.4	150	45.7	15.8	250	76.2	20.5
60	18.3	11.2	170	51.8	16.9	260	79.2	20.9
70	21.3	11.5	190	57.9	18.0	270	82.3	21.3
80	24.4	--	210	64.0	18.8	275	83.8	21.5

Broadwater well 1. Lat 46°35'45" N., long 112°06'42" W. Reported well depth, 200 ft (61.0 m) below LSD. Water level, 6.6 ft (2.01 m) below MP. MP is top of casing 0.5 ft (0.15 m) above LSD. Date of measurements, Sept. 15, 1976.

Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)
0	0	29.1	60	18.3	57.7	110	33.5	64.4
10	3.0	46.2	70	21.3	57.9	122	37.2	65.0
20	6.1	49.1	80	24.4	58.4	132	40.2	65.0
30	9.1	52.6	90	27.4	60.8	142	43.3	65.0
40	12.2	57.6	100	30.5	62.0	146	44.5	65.3
50	15.2	57.7						

[1] Well drilled approximately 20° from vertical.

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Broadwater well 1. Lat 46°35'45" N., long 112°06'42" W. Reported well depth, 200 ft (61.0 m) below LSD. Water level, 7.02 ft (2.14 m) below MP. MP is top of casing 0.5 ft (0.15 m) above LSD. Date of measurements, June 28, 1977.

Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)
0	0	--	20	6.1	50.6	30	9.1	55.0
11	3.4	48.1						

[1]Well drilled approximately 20° from vertical.

Broadwater well 2. Lat 46°35'46" N., long 112°06'42" W. Reported well depth, 204 ft (62.2 m) below LSD. Water level, 22.3 ft (6.80 m) below MP. MP is top of casing 0.5 ft (0.15 m) above LSD. Date of measurements, Sept. 16, 1976.

Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)
0	0	--	80	24.4	47.8	152	46.3	65.0
10	3.0	26.6	91	27.4	51.7	160	48.8	65.0
20	6.1	31.9	100	30.5	54.9	169	51.5	66.7
30	9.1	33.5	109	33.2	57.6	180	54.9	66.7
40	12.2	35.6	120	36.6	61.1	190	57.9	66.7
50	15.2	38.3	132	40.2	63.0	200	61.0	67.2
62	18.9	42.0	140	42.7	65.0	204	62.2	67.2
70	21.3	45.0						

[1]Well drilled approximately 20° from vertical.

Broadwater well 2. Lat 46°35'46" N., long 112°06'42" W. Reported well depth, 204 ft (62.2 m) below LSD. Water level, 21.49 ft (6.55 m) below MP. MP is top of casing 0.57 ft (0.15 m) above LSD. Date of measurements, June 27, 1977.

Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)	Measured depth[1] below LSD (feet)	(meters)	Temperature (°C)
0	0	--	70	21.3	42.2	130	39.6	62.5
26	7.9	29.3	80	24.4	45.5	140	42.7	63.7
30	9.1	30.2	90	27.4	49.6	151	46.0	65.5
41	12.5	32.8	100	30.5	53.8	160	48.8	66.0
50	15.2	35.6	110	33.5	56.9	165	50.3	66.0
62	18.9	39.5	120	36.6	59.7			

[1]Well drilled approximately 20° from vertical.

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Thomson well. Lat 46°35'49" N., long 112°06'23" W. Reported well depth, 120 ft (36.6 m) below LSD. Water level, 17.0 ft (5.18 m) below MP. MP is top of casing 1.6 ft (0.49 m) above LSD. Date of measurements, Aug. 12, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	40	12.2	15.8	80	24.4	16.0
10	3.0	22.9	50	15.2	15.8	90	27.4	16.4
20	6.1	14.2	60	18.3	15.9	100	30.5	16.6
30	9.1	15.4	70	21.3	15.9			

Broadwater well 5. Lat 46°35'52" N., long 112°06'38" W. Reported well depth, 260 ft (76.8 m) below LSD. Water level, 77.9 ft (23.74 m) below MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Oct. 6, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	91	27.8	14.7	180	54.9	18.5
10	3.0	12.6	100	30.5	15.1	191	58.2	19.0
20	6.1	13.3	111	33.8	15.6	200	61.0	19.3
30	9.1	13.0	120	36.6	15.9	211	64.3	19.8
40	12.2	12.6	131	39.9	16.4	220	67.1	20.1
50	15.2	12.6	139	42.4	16.8	231	70.4	20.5
59	18.0	12.7	151	46.0	17.3	240	73.2	20.7
70	21.3	13.0	159	48.5	17.6	246	78.0	20.9
82	25.0	14.2	171	52.1	18.1			

Broadwater well 5. Lat 46°35'52" N., long 112°06'38" W. Reported well depth, 260 ft (76.8 m) below LSD. Water level, 91.1 ft (27.77 m) below MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, June 28, 1977.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	--	151	46.0	17.4	211	64.3	19.8
96	29.3	15.0	160	48.8	17.8	220	67.1	20.2
101	30.8	15.4	171	52.1	18.2	231	70.4	20.6
110	33.5	15.7	180	54.9	18.6	240	73.2	20.9
120	36.6	16.1	191	58.2	19.0	251	76.5	21.2
130	39.6	16.6	200	61.0	19.4	260	79.2	21.2
140	42.7	17.0						

Table 31.--Subsurface temperatures in selected water wells near hot-spring areas--continued

Broadwater (Helena) Hot Springs area--continued

Gannon well 2. Lat 46°35'54" N., long 112°06'17" W. Reported well depth, 175 ft (53.34 m) below LSD. Water level, 6.0 ft (1.83 m) below MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Oct. 27, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	16.0	70	21.3	12.0	130	39.6	13.7
10	3.0	11.7	80	24.4	12.2	140	42.7	13.9
20	6.1	11.7	90	27.4	12.6	150	45.7	14.3
30	9.1	11.4	100	30.5	12.8	160	48.8	14.5
40	12.2	11.0	111	33.8	13.2	171	52.1	14.7
50	15.2	11.2	120	36.6	13.4	174	53.0	14.7
60	18.3	11.5						

Gannon well 1. Lat 46°36'00" N., long 112°06'20" W. Reported well depth, 240 ft (73.2 m) below LSD. Water level, flowing at MP. MP is top of casing 1.0 ft (0.30 m) above LSD. Date of measurements, Oct. 8, 1976.

Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)	Measured depth below LSD (feet)	(meters)	Temperature (°C)
0	0	54.7	80	24.4	56.3	160	48.8	57.2
10	3.0	54.9	90	27.4	56.5	170	51.8	57.2
20	6.1	54.7	100	30.5	57.0	180	54.9	57.2
30	9.1	55.0	112	34.1	57.0	190	57.9	57.2
40	12.2	55.2	120	36.6	57.2	200	61.0	57.2
50	15.2	55.6	130	39.6	57.4	210	64.0	57.4
60	18.3	55.9	140	42.7	57.2	221	67.4	57.2
70	21.3	56.1	150	45.7	57.2	230	70.1	57.2