UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

# SELECTED HYDROGEOLOGIC DATA FROM SOUTHERN SWEET GRASS COUNTY, SOUTH-CENTRAL MONTANA

by R. D. Feltis and Wayne A. Wood

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U.S. GEOLOGICAL SURVEY

Open-File Report 82-265

Prepared in cooperation with

SWEET GRASS COUNTY and

MONTANA BUREAU OF MINES AND GEOLOGY



Helena, Montana
February 1982

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JAMES G. WATT, Secretary

GEOLOGICAL SURVEY

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## METRIC CONVERSION TABLE

The following factors can be used to convert inch-pound units in this report to the International System (SI) of metric units:

| Multiply inch-pound unit | By | To obtain SI unit |
|---|---|---|
| acre | 4047 | square meter |
| foot (ft) | 0.3048 | meter |
| gallon per minute (gal/min) | 0.06309 | liter per second |
| inch (in.) | 25.40 | millimeter |
| micromho per centimeter at 25° Celsius (micromhos) | 100 | microsiemens per meter at 25° Celsius |
| mile | 1.609 | kilometer |

Temperature in degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) by the following equation:

$$°F = 1.8\ °C + 32$$

National Geodetic Vertical Datum of 1929 (NGVD of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "mean sea level." NGVD of 1929 is referred to as sea level in this report.

# SELECTED HYDROGEOLOGIC DATA FROM SOUTHERN SWEET GRASS COUNTY, SOUTH-CENTRAL MONTANA

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## ABSTRACT

Selected hydrogeologic data from Sweet Grass County south of the Yellowstone River have been compiled to show baseline ground-water conditions. Included are records from a 1981 onsite inventory of 94 water wells and 30 springs. Chemical analyses of water indicate the major cation, major anion, and trace element concentrations for 40 wells and 14 springs.

## INTRODUCTION

The planned development of mines for the extraction of chromium, platinum, and associated minerals in the Stillwater Complex of the Beartooth Mountains could affect the water resources in parts of Sweet Grass County. Mining could affect water quality in the mine area and vicinity, and could increase population and water use in areas impacted by mining. Consequently, the U.S. Geological Survey, in cooperation with Sweet Grass County and the Montana Bureau of Mines and Geology, conducted an inventory of wells and springs during 1981 to help determine baseline conditions of the ground-water resources in the area. The purpose of this report is to present the hydrogeologic data from Sweet Grass County south of the Yellowstone River.

The approximate boundary of the study area ranges from lat 45°10' to 45°51' N. and from long 109°34' to 110°14' W. The location of the area is shown in figure 1. The location of the inventoried wells and springs is shown on plate 1.

Appreciation is expressed to landowners who have permitted access to their lands and assisted in determining the location of wells and springs.

## WELL AND SPRING NUMBERING SYSTEM

In this report, locations are numbered according to geographic position within the rectangular grid system used by the U.S. Bureau of Land Management (fig. 2). The location number consists of as many as 12 characters. The first two characters specify the township and its position north (N) or south (S) of the Montana Base Line. The next three characters specify the range and its position east (E) of the Montana Principal Meridian. The next two characters are the section number. The next four characters designate the quarter section (160-acre tract), quarter-quarter section (40-acre tract), quarter-quarter-quarter section (10-acre tract), and quarter-quarter-quarter-quarter section (2 1/2-acre tract), respectively, in which the well or spring is located. The subdivisions of the section are designated A, B, C, and D in a counterclockwise direction, beginning in the northeast quadrant.

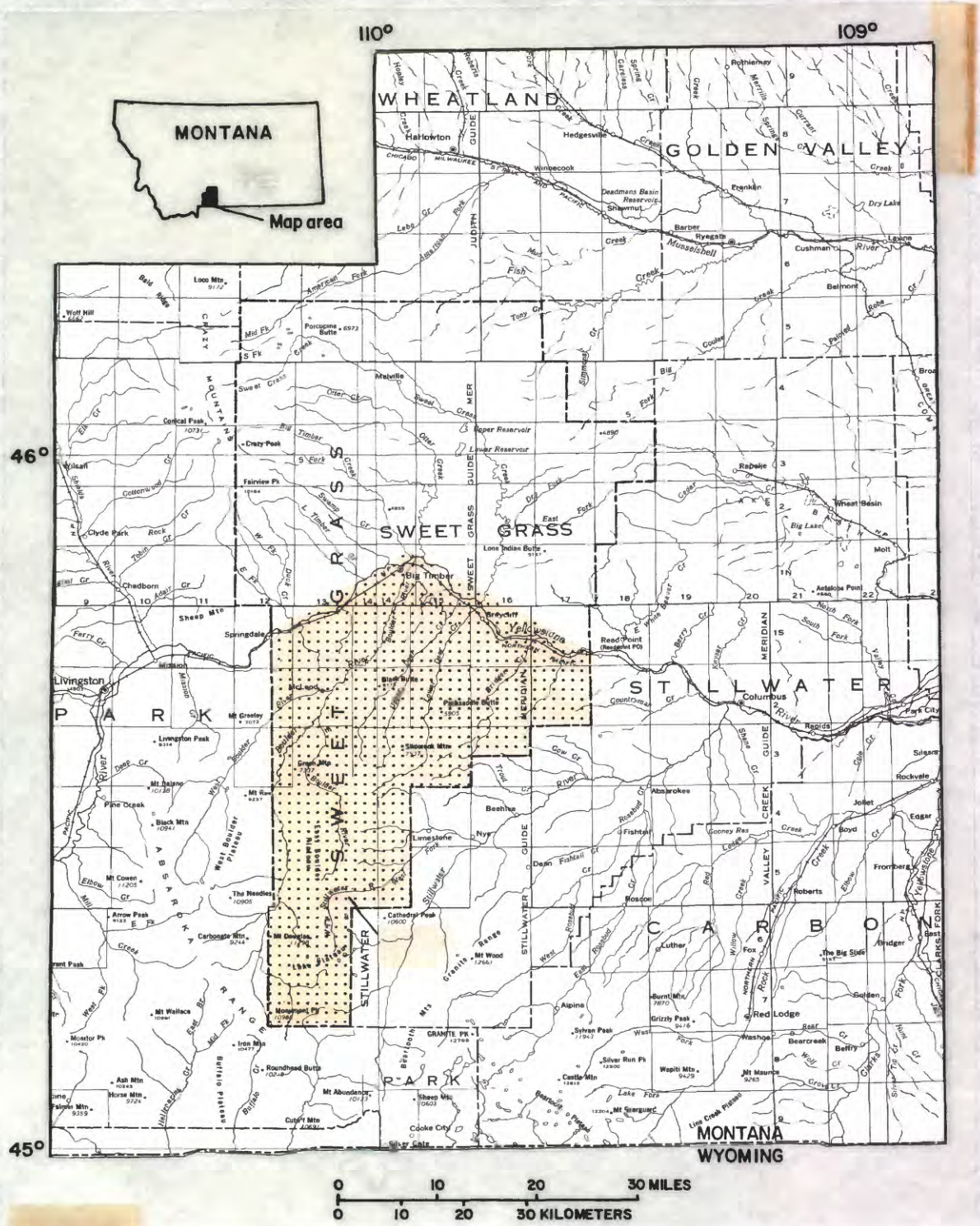


Figure 1.--Location of study area.

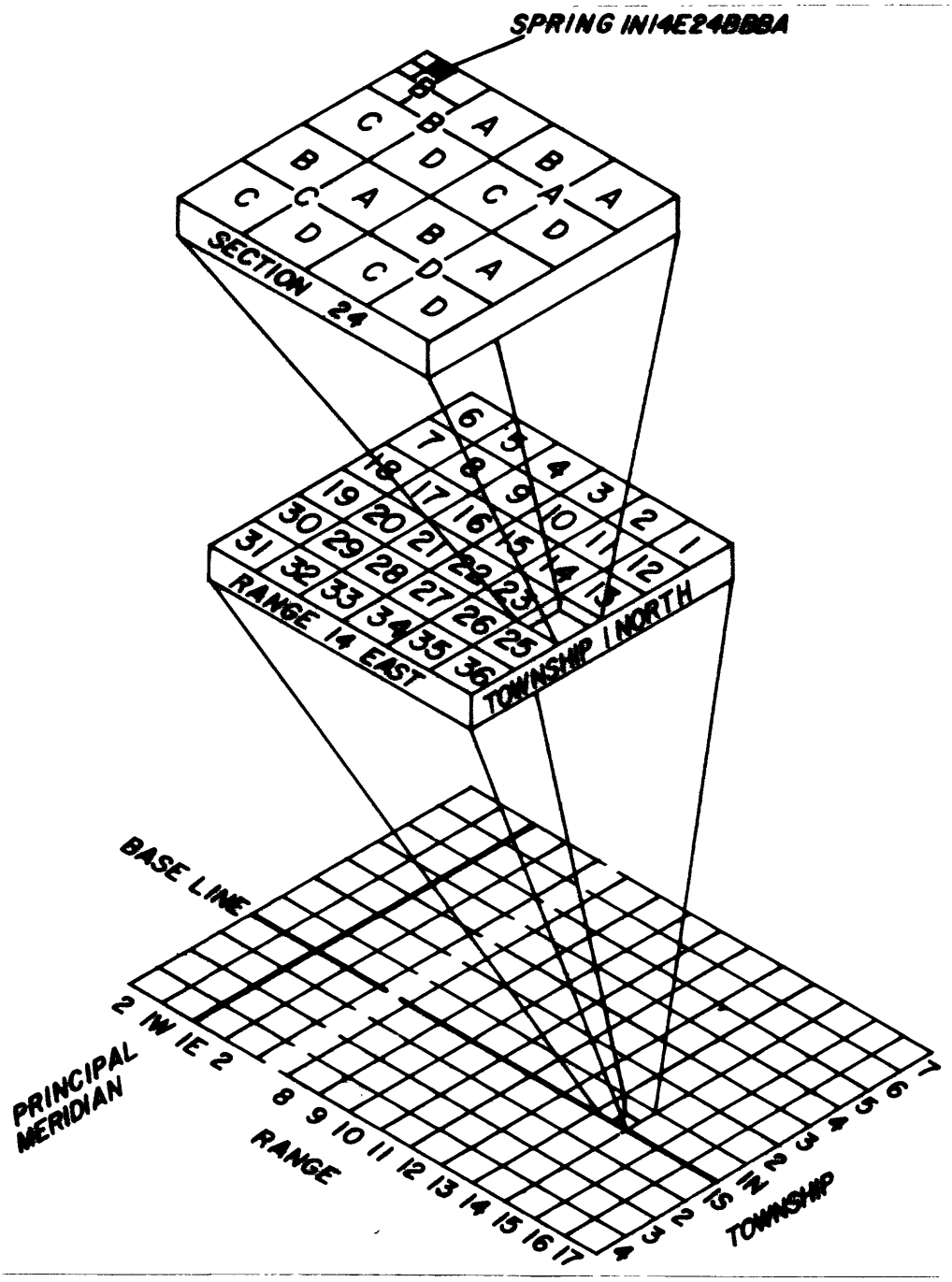


Figure 2.--System of numbering wells and springs.

When more than one well or spring is described within a 2 1/2-acre tract, consecutive digits are added to the number. For example, as shown on figure 2, spring 1N14E24BBBA is the first spring inventoried in the NE1/4 NW1/4 NW1/4 NW1/4 sec.24, T.1 N., R.14 E.

## DATA PRESENTATION

This report includes data from an onsite inventory of 94 water wells and 30 springs. The well and spring data are given in table 1. The major cation and anion concentrations for water from 40 wells and 14 springs are given in table 2. The concentrations of 17 trace constituents in water from the same wells and springs, as determined by an argon coupled emission spectrometer, are listed in table 3. The minimum limits of detection for the various ions by this method are shown in the following list:

| Ion | Minimum detection limit (micrograms per liter) |
|---|---|
| Aluminum (Al) | 30 |
| Boron (B) | 20 |
| Cadmium (Cd) | 2 |
| Chromium (Cr) | 2 |
| Copper (Cu) | 2 |
| Iron (Fe) | 2 |
| Lead (Pb) | 40 |
| Lithium (Li) | 2 |
| Manganese (Mn) | 1 |
| Molybdenum (Mo) | 20 |
| Nickel (Ni) | 10 |
| Silver (Ag) | 2 |
| Strontium (Sr) | 1 |
| Titanium (Ti) | 1 |
| Vanadium (V) | 1 |
| Zinc (Zn) | 4 |
| Zirconium (Zr) | 3 |

Therefore, if a constituent shows a value such as <1, the actual ion concentration in that sample is less than the detection limit of 1 microgram per liter.

## DATA

Table 1.--*Records of selected water wells and springs*

[Abbreviations: °C, degrees Celsius; ft, feet;
in., inches; mo-d-yr, month day and year]

Location: numbering system described in text.

Water source: W, well; S, spring.

Depth of well: in feet below land surface.

Depth cased: in feet below land surface.

Depth to first opening: in feet below land surface.

Geologic source: Pz, Paleozoic rocks undifferentiated; Mm, Madison Group; Kli, "Livingston igneous series" of Livingston Group; Kl, Livingston Group; Ke, Eagle Sandstone; Khc, Hell Creek Formation; Qt, terrace deposits; Qg, glacial deposits; Qal, alluvium.

Altitude of land surface: in feet above sea level.

Water level: in feet below land surface. Method of water-level determination: R, reported; +, unable to measure the pressure head of a flowing well.

Discharge: R, reported; E, estimated.

Temperature: degrees Celsius.

Remarks: C, chemical analyses in tables 2 and 3.

Table 1.--*Records of selected water wells and springs*--Continued

| Location | Owner or name | Water source | Year drilled | Depth of well (ft) | Casing diameter (in.) | Depth cased (ft) | Depth to first opening (ft) | Geologic source | Altitude of land surface (ft) | Water level (ft) | Date water level measured (mo-d-yr) | Discharge (gallons per minute) | Date discharge measured (mo-d-yr) | Temperature (°C) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1N13E25DDBA | K. Laubach | W | -- | 19 | -- | -- | -- | Qal | 4,090 | 7.5 | 04-08-81 | -- | 04-08-81 | 8.5 | |
| 1N13E36CBAC | J. Kinross-Wright | W | 1910 | 7 | 24 | 7 | -- | Qal | 4,090 | -- | -- | -- | 07-22-81 | 12.0 | |
| 1N14E12CACB | M. Peterson | W | -- | 60 | 6 | -- | -- | Khc | 4,015 | 12.4 | 03-31-81 | 9.2 | 03-31-81 | 10.0 | C |
| 1N14E12CCAD | G. Brakke | W | 1975 | 80 | 4 | 80 | 40 | Khc,Qt | 4,035 | 23.1 | 03-17-81 | 8.0 | 03-17-81 | 10.0 | C |
| 1N14E13BBCD | J. Schiltz | W | -- | 60 | -- | -- | -- | Khc | 4,070 | 25.3 | 04-01-81 | -- | 04-01-81 | 10.5 | |
| 1N14E13BDCA | D. Finn | W | 1976 | 110 | 4 | 110 | 90 | Khc | 4,065 | 31.7 | 05-24-81 | 3.5 | 05-24-81 | 11.5 | |
| 1N14E13DAAC | C. Buttrell | W | 1976 | 120 | -- | -- | -- | Khc | 4,105 | 45.9 | 05-25-81 | -- | 05-25-81 | 11.0 | |
| 1N14E13DABD | L. Godfrey | W | 1978 | 50 | -- | -- | -- | Khc,Qt | 4,070 | 2.3 | 05-24-81 | 6.0 | 05-24-81 | 9.0 | |
| 1N14E15BDBB | Sweet Grass Co. | W | -- | -- | -- | -- | -- | -- | 4,030 | 5.4 | 03-09-81 | -- | -- | -- | |
| 1N14E15BDCB | Sweet Grass Co. | W | 1976 | 45 | 6 | 44 | 44 | Qal | 4,030 | 4.4 | 03-09-81 | 33R | 05-05-81 | -- | |
| 1N14E21AADC | L. Fredricks | W | -- | 161 | -- | -- | -- | Khc | 4,095 | -- | -- | -- | 07-21-81 | 14.0 | |
| 1N14E21DCDC | J. Ronneberg | W | -- | 60 | -- | -- | -- | Khc | 4,170 | -- | -- | -- | 07-22-81 | 15.0 | |
| 1N14E23ACDD | J. Alexander | S | -- | -- | -- | -- | -- | Qt | 4,110 | -- | -- | -- | 05-29-81 | 8.5 | |
| 1N14E23BDAB | T. Strobel | W | 1975 | 50 | 6 | 49 | 49 | Qt | 4,130 | 21.5R | 05-21-75 | 20R | 03-18-81 | 11.0 | C |
| 1N14E23BDAD | T. Strobel | W | 1981 | -- | -- | -- | -- | Qt | 4,125 | 35.0 | 03-18-81 | -- | -- | -- | |
| 1N14E23DBAC | S. Thompson | W | 1978 | 50 | 4 | 50 | 30 | Khc | 4,120 | 6.7R | 04-27-78 | 20R | 05-29-81 | 9.5 | |
| 1N14E24AAAA | M. Overland | W | 1953 | 67 | -- | -- | -- | Khc | 4,120 | -- | -- | -- | -- | -- | |
| 1N14E24BBBA | J. Morrison | S | -- | -- | -- | -- | -- | Qt | 4,090 | -- | -- | -- | 05-29-81 | 7.5 | |
| 1N14E24BBCD | G. McCann | W | 1978 | 90 | 5 | 90 | 70 | Khc | 4,110 | 18.3 | 05-24-81 | 8.6 | 05-24-81 | 10.0 | |
| 1N14E26DAAC | R. Pearce | W | 1966 | 125 | 4 | 125 | -- | Khc | 4,210 | 37.0 | 05-26-81 | 11.0 | 05-29-81 | 11.0 | |
| 1N14E27DDCB | W. Cramer | W | 1978 | 40 | -- | -- | -- | Qt | 4,200 | 13.9 | 06-02-81 | 7.0 | 06-02-81 | 10.0 | |
| 1N14E28BABD | D. Wilson | W | 1920 | 110 | -- | -- | -- | Khc | 4,160 | 70R | -- | -- | -- | -- | |
| 1N14E30CBBD | K. Laubach | W | 1978 | 30 | 6 | 30 | -- | Qal | 4,088 | 11.4 | 04-08-81 | 6.0 | 04-08-81 | 9.5 | C |
| 1N14E31ADBA | O. McCleerey | S | -- | -- | -- | -- | -- | Khc | 4,300 | -- | -- | 2.0 | 07-22-81 | 11.0 | |
| 1N14E32ABCC | G. Duncan | S | -- | -- | -- | -- | -- | Qt | 4,460 | -- | -- | -- | 07-21-81 | 12.0 | |
| 1N14E34ABDD | K. Tyler | W | 1980 | 49 | -- | -- | -- | Qt | 4,210 | 15.9 | 06-01-81 | 10 | 06-01-81 | 10.5 | |
| 1N14E34ADAB | D. Tyler | W | 1979 | 30 | -- | -- | -- | Qal | 4,190 | 2.7 | 06-01-81 | -- | 06-01-81 | 7.0 | |
| 1N14E34ADDC | D. Wilson | W | -- | -- | -- | -- | -- | Qt | 4,210 | 5.7 | 05-25-81 | -- | 05-25-81 | 9.0 | |
| 1N14E34BDBA | D. Tyler | S | -- | -- | -- | -- | -- | Khc | 4,260 | -- | -- | 4.8 | 06-01-81 | 10.5 | |
| 1N15E21ADAC | K. Boe | W | 1960 | 34 | 6 | 34 | -- | Qal | 3,962 | 17.9 | 07-23-81 | 4.4 | 07-23-81 | 11.5 | |
| 1N15E21BADA | G. Hill | W | 1978 | 40 | 6 | 40 | 40 | Qal | 3,972 | 20.9 | 03-18-81 | 9.2 | 03-18-81 | 12.0 | C |
| 1N15E21DBBC | L. Morris | W | 1981 | 60 | -- | -- | -- | Qal | 3,960 | 18.0 | 07-23-81 | 12 | 07-23-81 | 13.5 | |
| 1N15E29DCAD | E. Roberts | W | 1951 | 50 | -- | -- | -- | Khc | 4,050 | 15 R | 1951 | -- | 03-31-81 | 9.5 | C |
| 1N15E33ABBC1 | R. Whidden | W | 1935 | 60 | 4 | -- | -- | Khc | 4,000 | 21.6 | 03-31-81 | 11 | 03-31-81 | 10.5 | C |
| 1N15E33ABBC2 | R. Whidden | W | 1947 | 90 | 6 | -- | -- | Khc | 4,000 | 18.7 | 03-31-81 | -- | -- | -- | |
| 1S12E23ACBD | G. Johnson | W | 1978 | 250 | 4 | 150 | 130 | Kl | 4,445 | -- | -- | 6.3 | 03-10-81 | 11.5 | C |
| 1S13E08DCDA | R. Engle | S | -- | -- | -- | -- | -- | Khc | 4,195 | -- | -- | -- | 07-21-81 | 12.5 | |
| 1S13E08DDBA | R. Engle | W | 1959 | 60 | -- | -- | -- | Khc | 4,175 | 20R | 1959 | -- | 07-21-81 | 11.0 | |
| 1S13E09ABBB | T. Terland | W | 1960 | 32 | -- | -- | -- | Qal | 4,145 | -- | -- | -- | 07-21-81 | 12.0 | |
| 1S13E09BBCD | R. Mahlum | W | 1955 | 22 | 6 | 8 | 8 | Qal | 4,150 | 11.4 | 03-31-81 | 5.7 | 03-31-81 | 9.0 | C |
| 1S13E12AADD | T. Hammersmark | S | -- | -- | -- | -- | -- | Khc | 4,320 | -- | -- | -- | -- | 7.5 | C |

Table 1.--*Records of selected water wells and springs*--Continued

| Location | Owner or name | Water source | Year drilled | Depth of well (ft) | Casing diameter (in.) | Depth cased (ft) | Depth to first opening (ft) | Geologic source | Altitude of land surface (ft) | Water level (ft) | Date water level measured (mo-d-yr) | Discharge (gallons per minute) | Date discharge measured (mo-d-yr) | Temperature (°C) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1S13E17BBCA | R. Ruckers | W | 1900 | 32 | -- | -- | -- | Khc | 4,225 | -- | -- | -- | -- | 11.5 | |
| 1S13E18DDDB | W. Jarrett | S | -- | -- | -- | -- | -- | Khc | 4,320 | -- | -- | 6E | 07-22-81 | 10.0 | |
| 1S14E02BAAA | T. Molzahn | W | 1976 | 76 | -- | -- | -- | Khc | 4,283 | 54.1 | 03-17-81 | 8.6 | 03-17-81 | 11.5 | C |
| 1S14E03BCAB | L. Labrie | S | -- | -- | -- | -- | -- | Khc | 4,440 | -- | -- | 2.2 | 06-01-81 | 9.5 | |
| 1S14E03BDBB | L. Labrie | W | 1966 | 150 | 6 | 128 | 118 | Khc | 4,340 | 83.8 | 05-31-81 | 4.8 | 05-31-81 | 11.5 | C |
| 1S14E10ADBB | C. Fallang | W | 1974 | 91 | 4 | 91 | 70 | Khc | 4,350 | 40.5 | 05-25-81 | 9R | 05-25-81 | 11.5 | |
| 1S14E10BBCD | M. Barber | W | 1955 | 38 | -- | -- | -- | Khc | 4,380 | 28.0 | 05-31-81 | 4.0 | 05-31-81 | 11.5 | |
| 1S14E10CAAD | V. Braughton | W | 1968 | 40 | -- | -- | -- | Qal | 4,320 | 6.6 | 05-25-81 | -- | 05-25-81 | 9.5 | |
| 1S14E10CABD | K. Tyler | W | 1978 | 52 | -- | -- | -- | Qal | 4,330 | 2.7 | 06-01-81 | 6.0 | 06-01-81 | 9.5 | |
| 1S14E10CCAD | D. Tyler | W | 1974 | 26 | 6 | 20 | -- | Qal | 4,345 | 9.2 | 03-17-81 | -- | 03-17-81 | 6.5 | C |
| 1S14E11BBBD | P. Lomeland | S | -- | -- | -- | -- | -- | Khc | 4,350 | -- | -- | 8.6 | 03-17-81 | 7.0 | |
| 1S14E15BBCC | D. Tyler | W | 1975 | 42 | 6 | 42 | -- | Qal | 4,378 | 23.9 | 03-17-81 | 8.6 | 03-17-81 | 7.0 | |
| 1S14E21AABB | C. McBride | W | 1977 | 84 | 6 | 34 | 34 | Kli | 4,420 | 25.9 | 03-11-81 | 1.5R | -- | -- | |
| 1S14E21AADD | M. Breck | W | 1977 | 84 | -- | -- | -- | Kli,Qal | 4,400 | 7.0 | 05-25-81 | -- | 05-25-81 | 9.0 | |
| 1S14E21ACAD | T. Powell | W | 1975 | 56 | 6 | 52 | 52 | Kli | 4,440 | 45.1 | 03-11-81 | 11 | 03-11-81 | 12.0 | C |
| 1S14E21DCCD | C. Waylon | W | 1979 | 94 | -- | -- | -- | Kli | 4,520 | 20.9 | 05-30-81 | 8.5R | 05-30-81 | 9.5 | |
| 1S14E28AAAD | G. Wolf | W | 1975 | 50 | 6 | 42 | 42 | Qal | 4,440 | 24.2 | 03-11-81 | 12 | 03-11-81 | 10.0 | C |
| 1S14E28ABBD | P. Camerus | W | 1952 | 32 | -- | -- | -- | Kli | 4,480 | 10R | 05-03-81 | -- | 05-30-81 | 10.0 | |
| 1S14E28BABB | P. Camerus | S | -- | -- | -- | -- | -- | Kli | 4,540 | -- | -- | -- | 05-30-81 | 9.5 | |
| 1S14E32CADB | A. Warp | W | 1955 | 28 | -- | -- | -- | Qal | 4,530 | -- | -- | -- | 06-02-81 | 9.0 | |
| 1S15E01DAAC | J. Halverson | W | 1973 | 98 | 4 | 98 | 75 | Khc | 4,007 | 38.8 | 03-13-81 | 8.0 | 03-13-81 | 10.0 | C |
| 1S15E02ABBA | E. Butler | W | 1960 | 45 | -- | -- | -- | Qal | 3,965 | 4.4 | 07-23-81 | 3.8 | 07-23-81 | 13.5 | |
| 1S15E06ADCA | G. Hanson | W | 1978 | 80 | 4 | 80 | 60 | Khc | 4,285 | 49.2 | 03-10-81 | 7.5 | 03-10-81 | 10.0 | C |
| 1S15E14BBBC | C. Pile | S | -- | -- | -- | -- | -- | Khc | 4,420 | -- | -- | .7 | 03-19-81 | 10.0 | C |
| 1S15E22ABCC | C. Pile | W | 1975 | 48 | 6 | 48 | 44 | Khc | 4,274 | 25.5 | 03-12-81 | 5.2 | 03-12-81 | 9.0 | C |
| 1S15E22ACCC | C. Pile | S | -- | -- | -- | -- | -- | Qal | 4,245 | -- | -- | -- | 03-19-81 | 4.0 | C |
| 1S16E08BCBB | R. Jackson | W | 1977 | 56 | 6 | 36 | 36 | Khc | 3,944 | 23.4 | 03-10-81 | 5.0 | 03-10-81 | 10.0 | C |
| 1S16E08BDDB | T. Smith | W | 1978 | 80 | 4 | 80 | 60 | Khc | 3,927 | 6.9 | 03-12-81 | 6.3 | 03-12-81 | 9.0 | C |
| 1S16E17DCBA | C. Pile | W | -- | 109 | 6 | 109 | -- | Kli | 3,960 | 70.7 | 07-23-81 | -- | -- | -- | |
| 1S16E22CBBA | R. Forster | W | -- | 34 | 6 | 34 | 34 | Qal | 3,860 | -- | -- | -- | 03-12-81 | 9.0 | C |
| 1S16E22CBBC | R. Forster | S | -- | -- | -- | -- | -- | Kli | 3,890 | -- | -- | -- | 03-12-81 | 10.0 | C |
| 1S16E24AACC | W. Hancock | W | -- | -- | -- | -- | -- | Qal | 3,830 | 3.0 | 07-09-81 | 6.3 | 07-09-81 | 9.5 | |
| 1S16E25AAAC | R. Mosness | W | 1978 | 42 | 6 | 42 | -- | Qal | 3,890 | 6.7 | 03-11-81 | 7.5 | 03-11-81 | 9.5 | C |
| 1S16E36CBDA | T. Terland | W | -- | 45 | 6 | -- | -- | Qal | 4,018 | 12.6 | 03-31-81 | 7.4 | 03-11-81 | 9.0 | C |
| 1S17E29BDDD | I. Pollard | W | 1973 | 105 | 4 | 105 | 65 | Khc | 3,830 | 38.1 | 03-10-81 | -- | 03-10-81 | 10.5 | C |
| 1S17E33DACB | L. Green | W | 1977 | 110 | 4 | 110 | 90 | Khc | 3,870 | 51.3 | 03-10-81 | 30R | 03-07-77 | 9.0 | C |
| 1S17E35ABAB | B. Rayborn | W | 1976 | 140 | 4 | 140 | 100 | Khc | 3,810 | 54.7 | 03-11-81 | 6.3 | 03-11-81 | 9.5 | C |
| 1S17E36AACD | C. Booth | W | 1960 | 83 | -- | -- | -- | Khc | 3,790 | 30R | 04-02-81 | -- | 04-02-81 | 9.5 | |
| 2S13E01ACDB | R. Weller | W | -- | 17 | -- | -- | -- | Qal | 4,620 | 4.4 | 06-03-81 | -- | 06-03-81 | 9.5 | |
| 2S13E01BACA | R. Weller | W | 1968 | 28 | -- | -- | -- | Kli | 4,725 | 1.3 | 06-03-81 | -- | 06-03-81 | 8.5 | |
| 2S13E01BDDD | B. Richert | W | 1980 | 90 | -- | -- | -- | Kli | 4,645 | 24.4 | 06-03-81 | 12 | 06-03-81 | 10.0 | |
| 2S13E01DBBC | R. Weller | W | 1978 | 37 | 6 | 33 | 33 | Qal | 4,627 | -- | -- | -- | 03-12-81 | 10.0 | C |

Table 1.--*Records of selected water wells and springs*--Continued

| Location | Owner or name | Water source | Year drilled | Depth of well (ft) | Casing diameter (in.) | Depth cased (ft) | Depth to first opening (ft) | Geologic source | Altitude of land surface (ft) | Water level (ft) | Date water level measured (mo-d-yr) | Discharge (gallons per minute) | Date discharge measured (mo-d-yr) | Temperature (°C) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2S13E10DCDA | G. Moor | W | -- | 80 | -- | -- | -- | Kli | 4,818 | 40R | 1978 | -- | 06-03-81 | 12.0 | |
| 2S13E11BBBC | Ellison Ranch | S | -- | -- | -- | -- | -- | Kli | 4,900 | -- | -- | 4.3 | 06-04-81 | 8.5 | |
| 2S13E11CDCC | A. Ellison | W | 1967 | 35 | -- | -- | -- | Qal | 4,717 | 15.1 | 03-31-81 | 20R | 03-31-81 | 9.5 | C |
| 2S13E15AABB | J. Ellison | W | 1980 | 56 | -- | 56 | -- | Qal | 4,795 | 40.9 | 06-03-81 | 8 | 06-03-81 | 8.0 | |
| 2S13E15BAAA | C. Martin | W | 1956 | 67 | -- | -- | -- | Kli | 4,830 | 55R | 1956 | -- | 06-03-81 | 10.0 | |
| 2S13E15BBCD | Hot Water Ranch | W | 1916 | 2,250 | -- | -- | -- | Pz | 4,815 | + | 04-02-81 | -- | 04-02-81 | 49 | C |
| 2S13E15CAAC | J. Cooper | W | 1972 | 72 | -- | -- | -- | Qal | 4,790 | 17.3 | 06-03-81 | 8 | 06-03-81 | 9 | |
| 2S13E15CABB | W. Wilson | W | 1978 | 50 | 6 | 50 | 50 | Qal | 4,880 | 28.2 | 03-18-81 | 10 | 03-18-81 | 6.5 | C |
| 2S13E20ABBA | M. Anderson | W | 1975 | 70 | 6 | 40 | 40 | Ke | 4,940 | 39 | 03-31-81 | 5.7 | 03-31-81 | 10.5 | C |
| 2S13E33CDAD | W. Ewan | W | -- | 38 | -- | -- | -- | Qal | 4,870 | -- | -- | -- | 04-08-81 | 7.5 | C |
| 2S14E05ACAB | T. Brownlee | S | -- | -- | -- | -- | -- | Kli | 4,680 | -- | -- | -- | 06-02-81 | 6.5 | |
| 2S14E05CBCB | E. Webber | S | -- | -- | -- | -- | -- | Kli | 4,650 | -- | -- | -- | 06-04-81 | 8.0 | |
| 2S14E06AABB | E. Webber | W | 1979 | 33 | -- | -- | -- | Qal | 4,570 | 5.1 | 06-04-81 | 8.2 | 06-04-81 | 9.5 | |
| 2S14E06AADA | E. Webber | W | 1968 | 63 | -- | -- | -- | Kli | 4,595 | 18.9 | 06-04-81 | 15 | 06-04-81 | 10.0 | |
| 2S15E03ABBA | C. Pile | S | -- | -- | -- | -- | -- | Kli | 4,680 | -- | -- | -- | 03-19-81 | 7.0 | C |
| 2S16E10BACD | T. Terland | W | 1976 | 60 | -- | -- | -- | Kli | 4,190 | 12.4 | 03-19-81 | 10 | 03-19-81 | 8.0 | C |
| 2S16E12DCBA | H. Bue | W | 1961 | 50 | -- | -- | -- | Khc | 4,610 | 10R | 09-07-81 | -- | 04-01-81 | 10.0 | C |
| 2S16E20ACCA | G. Mothershead | S | -- | -- | -- | -- | -- | Kli | 4,445 | -- | -- | -- | 07-08-81 | 9.5 | |
| 2S17E09BDAC | Adamson | S | -- | -- | -- | -- | -- | Khc | 3,990 | -- | -- | -- | 04-02-81 | 6.5 | C |
| 2S17E11ADAD | J. Mysse | W | -- | 35 | 6 | -- | -- | Khc | 4,137 | 17.7 | 04-01-81 | -- | -- | -- | |
| 2S17E11ADBA | J. Mysse | W | 1960 | 60 | 6 | -- | -- | Khc | 4,170 | -- | -- | 8.6 | 04-01-81 | 10.0 | C |
| 2S17E15DCAD | C. Booth | S | -- | -- | -- | -- | -- | Khc | 4,640 | -- | -- | -- | 04-01-81 | 6.5 | |
| 2S17E15DCDC | C. Booth | S | -- | -- | -- | -- | -- | Khc | 4,680 | -- | -- | -- | 04-02-81 | 5.5 | C |
| 3S12E12DACA | V. Browning | W | 1956 | 7 | 24 | 7 | 7 | Qal | 4,880 | 4.2 | 07-07-81 | -- | -- | -- | |
| 3S12E13BCDA | W. Haas, Jr. | W | -- | -- | 6 | -- | -- | Qal | 4,890 | 2.9 | 07-07-81 | 12 | 07-07-81 | 6.5 | |
| 3S12E13CBBA | W. Haas, Jr. | W | -- | 40 | 6 | 40 | -- | Qal | 4,890 | 5.8 | 07-07-81 | 8.6 | 07-07-81 | 6.0 | |
| 3S13E04AABD | E. Deegan | W | 1967 | 30 | 5 | 30 | 12 | Qal | 4,920 | 5.1 | 04-02-81 | 6 | 04-02-81 | 4.0 | C |
| 3S13E04ABAD | R. Hanson | W | 1966 | 21 | 4 | 21 | -- | Qal | 4,922 | 8.8 | 04-01-81 | 5.5 | 04-01-81 | 3.5 | C |
| 3S13E05BACD | Engle Ranch | W | 1949 | 9 | -- | 9 | -- | Qal | 4,842 | -- | -- | 3.8 | 04-01-81 | 5.0 | C |
| 3S13E14CCCA | B. Warp | W | 1954 | 20 | 6 | 20 | -- | Qal | 5,385 | 2.8 | 04-02-81 | 3.0 | 04-02-81 | 5.5 | C |
| 3S13E15ADCB | K. Schilling | W | 1976 | 19 | 6 | 19 | -- | Qal | 5,300 | 10.2 | 04-10-81 | 5.5 | 04-10-81 | 7.0 | C |
| 3S13E15BABA | L. Schilling | S | -- | -- | -- | -- | -- | Qal | 5,240 | -- | -- | -- | 04-10-81 | 4.5 | C |
| 3S13E21BABB | A. Schallenberger | S | -- | -- | -- | -- | -- | Qal | 5,360 | -- | -- | -- | 04-09-81 | 5.0 | |
| 3S13E21BCBA | A. Schallenberger | S | -- | -- | -- | -- | -- | Qal | 6,390 | -- | -- | -- | 04-09-81 | 7.5 | C |
| 3S13E29ABAB | Anderson Spring | S | -- | -- | -- | -- | -- | Mm | 5,540 | -- | -- | 30E | 10-06-81 | 25.0 | C |
| 3S16E09DACC | C. Hedrick | W | -- | 160 | 6 | 160 | -- | Kli | 5,320 | 40R | -- | 2.9 | 04-10-81 | 10.0 | |
| 4S12E25CBBD | U.S. Govt. | W | -- | -- | -- | -- | -- | Qal | 5,360 | -- | -- | -- | 03-30-81 | 5.5 | C |
| 4S13E05ADCB | U.S. Govt. | S | -- | -- | -- | -- | -- | Mm | 6,300 | -- | -- | 670 | 10-06-81 | 5.0 | C |
| 4S13E12BABB | U.S. Govt. | S | -- | -- | -- | -- | -- | Pz | 6,620 | -- | -- | 63 | 10-06-81 | 4.0 | C |
| 4S13E12BCCD | U.S. Govt. | S | -- | -- | -- | -- | -- | Qg | 6,400 | -- | -- | 450E | 10-06-81 | 4.5 | C |
| 4S13E12BDCC | U.S. Govt. | S | -- | -- | -- | -- | -- | Qg | 6,440 | -- | -- | 130 | 10-06-81 | 4.0 | C |

Table 2.--*Major chemical constituents and physical properties of water from wells and springs*

[Constituents are dissolved and in milligrams per liter, except as indicated. Analyses by Montana Bureau of Mines and Geology. Water source: W, well; S, spring. Abbreviations: micromhos, micromhos per centimeter at 25° Celsius; °C, degrees Celsius; <, less than]

| Sampling site | Water source | Date (month-day-year) | Specific conductance (micromhos) | Onsite pH (units) | Water temperature (°C) | Hardness (Ca, Mg) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Sodium adsorption ratio |
|---|---|---|---|---|---|---|---|---|---|---|
| 01N14E12CACB | W | 03-31-81 | 347 | 8.8 | 10.0 | 18 | 6.9 | 0.2 | 68 | 7 |
| 01N14E12CCAD | W | 03-17-81 | 455 | 7.4 | 10.0 | 140 | 43 | 7.3 | 30 | 1 |
| 01N14E23BDAB | W | 03-18-81 | 456 | 7.4 | 11.0 | 160 | 44 | 12 | 9.4 | .3 |
| 01N14E30CBBD | W | 04-08-81 | 540 | 7.7 | 9.5 | 240 | 66 | 19 | 22 | .6 |
| 01N15E21BADA | W | 03-18-81 | 526 | 7.0 | 12.0 | 250 | 64 | 22 | 8.3 | .2 |
| 01N15E29DCAD | W | 03-31-81 | 502 | 7.6 | 9.5 | 230 | 65 | 17 | 12 | .4 |
| 01N15E33ABBC1 | W | 03-31-81 | 571 | 7.2 | 10.5 | 250 | 69 | 19 | 20 | .6 |
| 01S12E23ACBD | W | 03-10-81 | 228 | 9.3 | 11.5 | 8 | 3.2 | <.1 | 42 | -- |
| 01S13E09BBCD | W | 03-31-81 | 712 | 7.2 | 9.0 | 280 | 85 | 16 | 35 | .9 |
| 01S13E12AADD | S | 04-08-81 | 266 | 7.5 | 7.5 | 110 | 32 | 6.8 | 11 | .5 |
| 01S14E02BAAA | W | 03-17-81 | 329 | 7.1 | 11.5 | 150 | 38 | 13 | 5.7 | .2 |
| 01S14E03BDBB | W | 05-19-79 | 200 | 8.6 | 12.0 | 30 | 6.9 | 1.4 | 34 | 3 |
| 01S14E10CCAD | W | 03-17-81 | 298 | 7.6 | 6.5 | 130 | 36 | 10 | 4.8 | .2 |
| 01S14E21ACAD | W | 03-11-81 | 269 | 7.5 | 12.0 | 84 | 25 | 5.1 | 5.5 | .3 |
| 01S14E28AAAD | W | 03-11-81 | 313 | 7.3 | 10.0 | 140 | 41 | 8.9 | 8.1 | .3 |
| 01S15E01DAAC | W | 03-13-81 | 397 | 6.8 | 10.0 | 120 | 36 | 7.0 | 19 | .7 |
| 01S15E06ADCA | W | 03-10-81 | 187 | 9.8 | 10.0 | 9 | 3.2 | .2 | 35 | 5 |
| 01S15E14BBBC | S | 03-19-81 | 427 | 8.1 | 10.0 | 170 | 33 | 22 | 19 | .6 |
| 01S15E22ABCC | W | 03-12-81 | 280 | 7.5 | 9.0 | 120 | 38 | 5.8 | 7.9 | .3 |
| 01S15E22ACCC | S | 03-19-81 | 256 | 7.2 | 4.0 | 110 | 35 | 5.4 | 5.9 | .2 |
| 01S16E08BCBB | W | 03-10-81 | 470 | 7.6 | 10.0 | 170 | 54 | 9.3 | 31 | 1 |
| 01S16E08BDDB | W | 03-12-81 | 595 | 7.6 | 9.0 | 220 | 63 | 15 | 41 | 1 |
| 01S16E22CBBA | W | 03-12-81 | 353 | 7.0 | 9.0 | 130 | 41 | 6.3 | 10 | .4 |
| 01S16E22CBBC | S | 03-12-81 | 348 | 7.5 | 10.0 | 140 | 47 | 6.9 | 12 | .4 |
| 01S16E25AAAC | W | 03-11-81 | 352 | 7.6 | 9.5 | 160 | 51 | 6.7 | 11 | .4 |
| 01S16E36CBDA | W | 03-31-81 | 333 | 7.2 | 9.0 | 140 | 46 | 5.9 | 9.4 | .4 |
| 01S17E29BDDD | W | 03-10-81 | 406 | 7.9 | 10.5 | 58 | 22 | .8 | 67 | 4 |
| 01S17E33DACB | W | 03-10-81 | 600 | 7.5 | 9.0 | 180 | 51 | 13 | 57 | 2 |
| 01S17E35ABAB | W | 03-11-81 | 693 | 7.6 | 8.5 | 190 | 48 | 16 | 80 | 3 |
| 02S13E01DBBC | W | 03-12-81 | 377 | 7.4 | 10.0 | 160 | 47 | 11 | 9.1 | .3 |
| 02S13E11CDCC | W | 03-31-81 | 337 | 7.7 | 9.5 | 150 | 43 | 12 | 5.0 | .2 |
| 02S13E15BBCD | W | 04-02-81 | 2,220 | 7.1 | 49.0 | 1,500 | 450 | 79 | 13 | .2 |
| 02S13E15CABB | W | 03-18-81 | 359 | 7.1 | 6.5 | 170 | 47 | 12 | 4.8 | .2 |
| 02S13E20ABBA | W | 03-31-81 | 417 | 7.6 | 10.5 | 170 | 46 | 14 | 16 | .5 |
| 02S13E33CDAD | W | 04-08-81 | 732 | 7.7 | 7.5 | 380 | 100 | 30 | 8.6 | .2 |
| 02S15E03ABBA | S | 03-19-81 | 377 | 7.1 | 7.0 | 180 | 60 | 7.5 | 8.2 | .3 |
| 02S16E10BACD | W | 03-19-81 | 364 | 7.8 | 8.0 | 153 | 53 | 5.1 | 12 | .4 |
| 02S16E12DCBA | W | 04-01-81 | 371 | 7.9 | 10.0 | 134 | 38 | 9.5 | 23 | .9 |
| 02S17E09BDAC | S | 04-02-81 | 570 | 7.5 | 6.5 | 190 | 52 | 16 | 43 | 1 |
| 02S17E11ADBA | W | 04-01-81 | 933 | 7.6 | 10.0 | 150 | 36 | 14 | 67 | 2 |
| 02S17E15DCDC | S | 04-02-81 | 557 | 7.9 | 5.5 | 230 | 49 | 26 | 29 | .8 |
| 03S13E04AABD | W | 04-02-81 | 427 | 7.5 | 4.0 | 210 | 56 | 16 | 6.1 | .2 |
| 03S13E04ABAD | W | 04-01-81 | 413 | 7.4 | 3.5 | 200 | 54 | 15 | 5.6 | .2 |
| 03S13E05BACD | W | 04-01-81 | 237 | 7.1 | 5.0 | 100 | 25 | 10 | 5.0 | .2 |
| 03S13E14CCCA | W | 04-02-81 | 511 | 7.2 | 5.5 | 250 | 71 | 17 | 9.5 | .3 |
| 03S13E15ADCB | W | 04-10-81 | 627 | 7.7 | 7.0 | 290 | 81 | 22 | 14 | .4 |
| 03S13E15BABA | S | 04-10-81 | 651 | 7.6 | 4.5 | 310 | 85 | 23 | 19 | .5 |
| 03S13E21BCBA | S | 04-09-81 | 308 | 7.7 | 7.5 | 150 | 41 | 11 | 2.3 | .1 |
| 03S13E29ABAB | S | 04-09-81 | 530 | 8.0 | 20.0 | 270 | 72 | 22 | 2.1 | .1 |
| 04S12E25CBBD | W | 03-30-81 | 121 | 7.6 | 5.5 | 43 | 9.4 | 4.7 | 2.3 | .2 |
| 04S13E05ADCB | S | 04-10-81 | 186 | 8.0 | 5.0 | 90 | 27 | 5.8 | 2.0 | .1 |
| 04S13E12BABB | S | 10-06-81 | 362 | 7.3 | 4.0 | 190 | 45 | 18 | 1.4 | .0 |
| 04S13E12BCCD | S | 10-06-81 | 305 | 7.8 | 4.5 | 160 | 43 | 12 | 1.0 | .0 |
| 04S13E12BDCC | S | 10-06-81 | 341 | 7.8 | 4.0 | 180 | 52 | 12 | 1.2 | .0 |

Table 2.--*Major chemical constituents and physical properties of water from wells and springs*--Continued

| Sampling site | Potassium (K) | Bicarbonate ($HCO_3$) | Carbonate ($CO_3$) | Alkalinity, total as $CaCO_3$ | Sulfate ($SO_4$) | Chloride (Cl) | Fluoride (F) | Silica ($SiO_2$) | Dissolved solids (sum of constituents) | Nitrate, as N |
|---|---|---|---|---|---|---|---|---|---|---|
| 01N14E12CACB | <0.1 | 180 | 0 | 150 | 9.4 | 7.8 | 0.6 | 15 | 198 | 0.02 |
| 01N14E12CCAD | .9 | 240 | 0 | 190 | 6.5 | 12 | .7 | 17 | 233 | .03 |
| 01N14E23BDAB | 1 | 160 | 0 | 130 | 42 | 2.0 | .4 | 12 | 201 | .02 |
| 01N14E30CBBD | 2 | 310 | 0 | 250 | 29 | 7.0 | .4 | 27 | 325 | .60 |
| 01N15E21BADA | 3 | 300 | 0 | 240 | 21 | 1.6 | .3 | 20 | 287 | .16 |
| 01N15E29DCAD | 2 | 290 | 0 | 240 | 25 | 1.4 | .3 | 15 | 280 | .38 |
| 01N15E33ABBC1 | .4 | 330 | 0 | 270 | 27 | 2.0 | .4 | 24 | 322 | .13 |
| 01S12E23ACBD | <.1 | 81 | 0 | 66 | 30 | 4.0 | .4 | 13 | 132 | .01 |
| 01S13E09BBCD | 2 | 290 | 0 | 240 | 77 | 28 | .4 | 18 | 405 | .05 |
| 01S13E12AADD | 2 | 140 | 0 | 110 | 18 | 1.8 | .1 | 16 | 156 | .39 |
| 01S14E02BAAA | .9 | 180 | 0 | 150 | 21 | 1.7 | .4 | 15 | 185 | .24 |
| 01S14E03BDBB | .2 | 83 | 0 | 68 | 32 | 1.2 | 3.0 | 12 | 134 | .14 |
| 01S14E10CCAD | .8 | 140 | 0 | 110 | 30 | 1.6 | .2 | 12 | 164 | .20 |
| 01S14E21ACAD | .2 | 120 | 0 | 100 | 20 | 1.0 | .2 | 20 | 137 | .53 |
| 01S14E28AAAD | .3 | 170 | 0 | 140 | 20 | 1.1 | .2 | 17 | 178 | .20 |
| 01S15E01DAAC | .5 | 160 | 0 | 130 | 27 | 3.9 | .3 | 11 | 182 | .38 |
| 01S15E06ADCA | <.1 | 44 | 10 | 53 | 15 | 3.9 | 5.1 | 12 | 106 | <.01 |
| 01S15E14BBBC | <.1 | 230 | 0 | 190 | 12 | 4.3 | .8 | 21 | 228 | .89 |
| 01S15E22ABCC | <.1 | 140 | 0 | 120 | 17 | 1.0 | .1 | 15 | 156 | .10 |
| 01S15E22ACCC | .3 | 130 | 0 | 100 | 19 | .9 | .1 | 13 | 142 | .08 |
| 01S16E08BCBB | .3 | 270 | 0 | 220 | 18 | 3.3 | .5 | 19 | 268 | .06 |
| 01S16E08BDDB | .6 | 300 | 0 | 250 | 39 | 11 | .7 | 20 | 341 | 1.0 |
| 01S16E22CBBA | .5 | 160 | 0 | 130 | 17 | 1.2 | .3 | 12 | 169 | .11 |
| 01S16E22CBBC | .3 | 190 | 0 | 150 | 20 | 1.1 | .2 | 13 | 193 | .08 |
| 01S16E25AAAC | <.1 | 200 | 0 | 160 | 15 | 1.5 | .2 | 16 | 199 | .10 |
| 01S16E36CBDA | <.1 | 180 | 0 | 150 | 14 | .8 | .1 | 15 | 182 | .10 |
| 01S17E29BDDD | .3 | 210 | 0 | 180 | 16 | 9.1 | 1.8 | 11 | 233 | .09 |
| 01S17E33DACB | .7 | 330 | 0 | 270 | 36 | 3.7 | .7 | 9.4 | 333 | .09 |
| 01S17E35ABAB | 2 | 350 | 0 | 280 | 66 | 9.4 | .6 | 9.5 | 401 | .01 |
| 02S13E01DBBC | 1 | 180 | 0 | 150 | 24 | 1.2 | .3 | 12 | 195 | .84 |
| 02S13E11CDCC | 3 | 180 | 0 | 150 | 23 | 1.4 | .1 | 8.7 | 182 | .42 |
| 02S13E15BBCD | 12 | 120 | 0 | 97 | 1,300 | 2.0 | 2.8 | 31 | 1,980 | .04 |
| 02S13E15CABB | 3 | 180 | 0 | 150 | 33 | 1.3 | .2 | 9.2 | 198 | .34 |
| 02S13E20ABBA | 3 | 230 | 0 | 190 | 20 | 2.0 | .1 | 8.6 | 222 | .55 |
| 02S13E33CDAD | 2 | 240 | 0 | 190 | 200 | 1.3 | .3 | 9.6 | 472 | .20 |
| 02S15E03ABBA | <.1 | 230 | 0 | 190 | 12 | .9 | .2 | 15 | 215 | .21 |
| 02S16E10BACD | <.2 | 200 | 0 | 170 | 15 | .8 | .1 | 14 | 200 | .04 |
| 02S16E12DCBA | .6 | 200 | 0 | 160 | 16 | 4.9 | .4 | 10 | 200 | .17 |
| 02S17E09BDAC | 0.9 | 300 | 0 | 240 | 35 | 3.4 | .3 | 7.4 | 304 | .24 |
| 02S17E11ADBA | 1 | 140 | 0 | 120 | 100 | 36 | 1.2 | 7.5 | 339 | 3.7 |
| 02S17E15DCDC | 3 | 310 | 0 | 250 | 28 | 3.4 | .2 | 8.8 | 303 | 2.4 |
| 03S13E04AABD | 2 | 190 | 0 | 150 | 63 | .7 | .2 | 11 | 248 | .18 |
| 03S13E04ABAD | 1 | 180 | 0 | 150 | 58 | .7 | .1 | 9.7 | 232 | .16 |
| 03S13E05BACD | 1 | 85 | 0 | 70 | 42 | .7 | .1 | 13 | 139 | .40 |
| 03S13E14CCCA | .4 | 260 | 0 | 210 | 47 | .8 | .2 | 12 | 286 | .17 |
| 03S13E15ADCB | 2 | 290 | 0 | 240 | 76 | 2.2 | .1 | 13 | 353 | .54 |
| 03S13E15BABA | 2 | 380 | 0 | 310 | 45 | 1.9 | .2 | 14 | 376 | .52 |
| 03S13E21BCBA | 2 | 150 | 0 | 130 | 34 | .2 | .1 | 10 | 176 | .06 |
| 03S13E29ABAB | 3 | 160 | 0 | 130 | 130 | .5 | .5 | 12 | 326 | .12 |
| 04S12E25CBBD | 1 | 54 | 0 | 44 | 8.6 | .4 | .1 | 16 | 70 | .07 |
| 04S13E05ADCB | .5 | 110 | 0 | 88 | 6.2 | .2 | -- | 12 | 106 | .10 |
| 04S13E12BABB | 1 | 210 | 0 | 170 | 11 | .1 | .1 | 6.4 | 186 | .04 |
| 04S13E12BCCD | .5 | 190 | 0 | 150 | 6.8 | .1 | .1 | 5.5 | 162 | .07 |
| 04S13E12BDCC | .6 | 209 | 0 | 170 | 5.8 | .1 | .1 | 6.3 | 181 | .07 |

Table 3.--*Trace element concentrations of water from wells and springs*

[Constituents are dissolved, except as indicated, and data values are in micrograms per liter. Analyses by Montana Bureau of Mines and Geology. <, less than]

| Sampling site | Water source | Date (month-day-year) | Aluminum (Al) | Boron (B) | Cadmium (Cd) | Chromium (Cr) | Copper (Cu) | Iron (Fe) | Lead (Pb) |
|---|---|---|---|---|---|---|---|---|---|
| 01N14E12CACB | W | 03-31-81 | -- | -- | -- | -- | -- | 10 | -- |
| 01N14E12CCAD | W | 03-17-81 | 60 | 180 | 6 | 62 | 24 | 50 | 40 |
| 01N14E23BDAB | W | 03-18-81 | -- | -- | -- | -- | -- | 180 | -- |
| 01N14E30CBBD | W | 04-08-81 | -- | -- | -- | -- | -- | <2 | -- |
| 01N15E21BADA | W | 03-18-81 | 30 | 110 | 2 | <2 | 12 | 40 | 40 |
| 01N15E29DCAD | W | 03-31-81 | -- | -- | -- | -- | -- | 30 | -- |
| 01N15E33ABBC1 | W | 03-31-81 | -- | -- | -- | -- | -- | 20 | -- |
| 01S12E23ACBD | W | 03-10-81 | -- | -- | -- | -- | -- | 40 | -- |
| 01S13E09BBCD | W | 03-31-81 | <30 | <20 | <2 | <2 | 7 | 50 | <40 |
| 01S13E12AADD | S | 04-08-81 | <30 | <20 | 2 | <2 | 12 | 10 | 70 |
| 01S14E02BAAA | W | 03-17-81 | -- | -- | -- | -- | -- | <2 | -- |
| 01S14E03BDBB | W | 05-19-79 | -- | 340 | -- | -- | -- | 60 | -- |
| 01S14E10CCAD | W | 03-17-81 | <30 | <20 | <2 | <2 | <2 | 70 | <40 |
| 01S14E21ACAD | W | 03-11-81 | -- | -- | -- | -- | -- | 60 | -- |
| 01S14E28AAAD | W | 03-11-81 | -- | -- | -- | -- | -- | 70 | -- |
| 01S15E01DAAC | W | 03-13-81 | -- | -- | -- | -- | -- | 60 | -- |
| 01S15E06ADCA | W | 03-10-81 | 70 | 540 | 3 | -- | 5 | 50 | 50 |
| 01S15E14BBBC | S | 03-19-81 | -- | -- | -- | -- | -- | 30 | -- |
| 01S15E22ABCC | W | 03-12-81 | <30 | 70 | 4 | <2 | 13 | 70 | 40 |
| 01S15E22ACCC | S | 03-19-81 | <30 | 50 | 4 | <2 | 7 | 30 | <40 |
| 01S16E08BCBB | W | 03-10-81 | -- | -- | -- | -- | -- | 80 | -- |
| 01S16E08BDDB | W | 03-12-81 | -- | -- | -- | -- | -- | 40 | -- |
| 01S16E22CBBA | W | 03-12-81 | -- | -- | -- | -- | -- | 50 | -- |
| 01S16E22CBBC | S | 03-12-81 | -- | -- | -- | -- | -- | 60 | -- |
| 01S16E25AAAC | W | 03-11-81 | 60 | 40 | 6 | 3 | 9 | 50 | 100 |
| 01S16E36CBDA | W | 03-31-81 | -- | -- | -- | -- | -- | 30 | -- |
| 01S17E29BDDD | W | 03-10-81 | -- | -- | -- | -- | -- | 50 | -- |
| 01S17E33DACB | W | 03-10-81 | -- | -- | -- | -- | -- | 50 | -- |
| 01S17E35ABAB | W | 03-11-81 | -- | -- | -- | -- | -- | 90 | -- |
| 02S13E01DBBC | W | 03-12-81 | 60 | 60 | 2 | 6 | 14 | 50 | 40 |
| 02S13E11CDCC | W | 03-31-81 | -- | -- | -- | -- | -- | 20 | -- |
| 02S13E15BBCD | W | 04-02-81 | -- | -- | -- | -- | -- | 700 | -- |
| 02S13E15CABB | W | 03-18-81 | -- | -- | -- | -- | -- | 60 | -- |
| 02S13E20ABBA | W | 03-31-81 | -- | -- | -- | -- | -- | 30 | -- |
| 02S13E33CDAD | W | 04-08-81 | -- | -- | -- | -- | -- | 130 | -- |
| 02S15E03ABBA | S | 03-19-81 | -- | -- | -- | -- | -- | 30 | -- |
| 02S16E10BACD | W | 03-19-81 | <30 | <20 | <2 | <2 | <2 | <2 | <40 |
| 02S16E12DCBA | W | 04-01-81 | <30 | 110 | <2 | <2 | 6 | 30 | <40 |
| 02S17E09BDAC | S | 04-02-81 | <30 | <20 | <2 | <2 | <2 | 30 | <40 |
| 02S17E11ADBA | W | 04-01-81 | <30 | <20 | 4 | 3 | 6 | 80 | 40 |
| 02S17E15DCDC | S | 04-02-81 | -- | -- | -- | -- | -- | 6 | -- |
| 03S13E04AABD | W | 04-02-81 | -- | -- | -- | -- | -- | 8 | -- |
| 03S13E04ABAD | W | 04-01-81 | -- | -- | -- | -- | -- | 10 | -- |
| 03S13E05BACD | W | 04-01-81 | -- | -- | -- | -- | -- | 3 | -- |
| 03S13E14CCCA | W | 04-02-81 | <30 | <20 | <2 | <2 | 9 | 100 | <40 |
| 03S13E15ADCB | W | 04-10-81 | -- | -- | -- | -- | -- | <2 | -- |
| 03S13E15BABA | S | 04-10-81 | -- | -- | -- | -- | -- | 5 | -- |
| 03S13E21BCBA | S | 04-09-81 | <30 | <20 | <2 | <2 | 20 | 9 | 70 |
| 03S13E29ABAB | S | 04-09-81 | <30 | <20 | 5 | 2 | 9 | 4 | <40 |
| 04S12E25CBBD | W | 03-30-81 | -- | -- | -- | -- | -- | 40 | -- |
| 04S13E05ADCB | S | 04-10-81 | <30 | <20 | <2 | <2 | <2 | <2 | <40 |
| 04S13E12BABB[1] | S | 10-06-81 | <30 | -- | <2 | 2 | 13 | <2 | <40 |
| 04S13E12BCCD[1] | S | 10-06-81 | 30 | -- | 2 | 2 | 2 | <2 | <40 |
| 04S13E12BDCC[1] | S | 10-06-81 | 350 | -- | <2 | <2 | 4 | <2 | <40 |

[1]Constituents are reported as total concentration.

Table 3.--*Trace element concentrations of water from wells and springs*--Continued

| Sampling site | Lithium (Li) | Manganese (Mn) | Molybdenum (Mo) | Nickel (Ni) | Silver (Ag) | Strontium (Sr) | Titanium (Ti) | Vanadium (V) | Zinc (Zn) | Zirconium (Zr) |
|---|---|---|---|---|---|---|---|---|---|---|
| 01N14E12CACB | 30 | 6 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01N14E12CCAD | 10 | 10 | <20 | <10 | <2 | 990 | 3 | 8.0 | 10 | <4 |
| 01N14E23BDAB | 5 | 6 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01N14E30CBBD | 30 | 3 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01N15E21BADA | 6 | 1 | <20 | <10 | <2 | 570 | 16 | 6.0 | 9 | <4 |
| 01N15E29DCAD | 60 | 5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01N15E33ABBC1 | <2 | 5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S12E23ACBD | 20 | 1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S13E09BBCD | 60 | 330 | <20 | 60 | <2 | 920 | 10 | <1 | <4 | <4 |
| 01S13E12AADD | <2 | <1 | <20 | 10 | <2 | 140 | <1 | <1 | 10 | <4 |
| 01S14E02BAAA | <2 | <1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S14E03BDBB | 20 | 10 | -- | -- | -- | 220 | -- | -- | -- | -- |
| 01S14E10CCAD | <2 | <1 | <20 | <10 | <2 | 180 | <1 | <1 | 10 | <4 |
| 01S14E21ACAD | 3 | 2 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S14E28AAAD | 5 | 52 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S15E01DAAC | 20 | 4 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S15E06ADCA | 30 | 1 | 20 | <10 | 4 | 290 | 12 | 7.0 | 60 | 4 |
| 01S15E14BBBC | <2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S15E22ABCC | 3 | 5 | <20 | <10 | 7 | 290 | 12 | 7.0 | 60 | <4 |
| 01S15E22ACCC | <2 | 2 | <20 | <10 | 4 | 270 | 14 | 5.0 | <3 | <4 |
| 01S16E08BCBB | 6 | 87 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S16E08BDDB | 6 | 11 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S16E22CBBA | 10 | 3 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S16E22CBBC | 7 | 1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S16E25AAAC | 2 | 6 | <20 | <10 | <2 | 330 | 15 | 3.0 | <4 | <4 |
| 01S16E36CBDA | <2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S17E29BDDD | 20 | 24 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S17E33DACB | 20 | 3 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01S17E35ABAB | 30 | 96 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S13E01DBBC | 10 | 3 | <20 | 10 | 8 | 340 | 9 | 9.0 | 10 | 8 |
| 02S13E11CDCC | 30 | 4 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S13E15BBCD | 110 | 25 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S13E15CABB | 3 | 3 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S13E20ABBA | 40 | 5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S13E33CDAD | 30 | 20 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S15E03ABBA | <2 | 3 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02S16E10BACD | <2 | <1 | <20 | <10 | <2 | 620 | <1 | <1 | <3 | <4 |
| 02S16E12DCBA | 8 | 26 | <20 | <10 | <2 | 2,200 | 4 | <1 | 270 | <4 |
| 02S17E09BDAC | 9 | 3 | <20 | 40 | <2 | 1,000 | 7 | <1 | 8 | <4 |
| 02S17E11ADBA | 30 | 2 | <20 | <10 | <2 | 1,200 | <1 | <1 | 7 | <4 |
| 02S17E15DCDC | 10 | 1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03S13E04AABD | <2 | <1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03S13E04ABAD | <2 | 3 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03S13E05BACD | <2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03S13E14CCCA | <2 | <1 | <20 | <10 | <2 | 390 | <1 | <1 | 7 | <4 |
| 03S13E15ADCB | 20 | 2 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03S13E15BABA | 20 | 5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03S13E21BCBA | <2 | <1 | <20 | <10 | <2 | 210 | 4 | <1 | 30 | <4 |
| 03S13E29ABAB | <2 | 1 | <20 | <10 | <2 | 450 | 7 | 6.0 | 6 | 4 |
| 04S12E25CBBD | <2 | 14 | -- | -- | -- | -- | -- | -- | -- | -- |
| 04S13E05ADCB | <2 | <1 | <20 | <10 | <2 | 49 | 5 | 21 | <4 | <4 |
| 04S13E12BABB | <2 | 1 | <20 | <10 | <2 | 170 | 28 | 1.0 | <4 | <3 |
| 04S13E12BCCD | <2 | <1 | <20 | <10 | <2 | 140 | 24 | 24 | <4 | <3 |
| 04S13E12BDCC | <2 | <1 | 40 | 10 | <2 | 190 | 49 | <1 | 6 | <3 |