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MONTANA

Basic data for thermal springs and wells
as recorded in GEOTHERM

By

James D. Bliss

Open-File Report 83-432

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has not been reviewed for conformity
with U.S. Geological Survey
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Menlo Park, California

July 1983

MASTER

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INTRODUCTION

GEOTHERM, a computerized information system now off-line, was used to maintain data on the geology, geochemistry and hydrology of geothermal sites primarily within the United States. The system was proposed at the First Geothermal Implementation Conference in New Zealand in 1974 (Swanson, 1977) and was active until 1983. The primary mission was to provide a broad informational framework for the Geothermal Research Program (Duffield and Guffanti, 1981). GEOTHERM was used to support national geothermal assessments--in 1978 (Muffler, 1979) and 1982 (Reed, 1983). It was however a public system and provided data to both public and private sectors. A detailed discussion on databases in GEOTHERM and a general scheme of how the information system operated can be found in Bliss and Rapport (1983).

This report on Montana is one of a series intended to preserve the data collected for GEOTHERM and make the data available to the public. States with significant geochemical data for geothermal fluids will be covered in individual reports such as this. A report will also be issued to cover miscellaneous data collected for sites in the central and eastern United States. The data presented in this series is also available as a data file on the internationally-available General Electric Mark III service, a timeshare network. Those interested in accessing that system should contact the Energy Resource Center, University of Oklahoma, Norman, Oklahoma 73070. It is anticipated that a portion of the data will also be available on magnetic tape from the National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161. It will not be available until after the completion of the open-file series.

GEOTHERM INDEXES

Three computer-generated indexes are found in appendices A, B, and C of this report. The indexes give one line summaries of each GEOTHERM record describing the chemistry of geothermal springs and wells in the sample file for Montana. Each index is sorted by different variables to assist the user in locating geothermal records describing specific sites.

Appendix A (p. 145-149) is sorted by the county name and the name of the source. Also given are latitude, longitude (both in decimal minutes), township, range, section, GEOTHERM record identifier, and temperature ($^{\circ}\text{C}$). In conducting a search of Appendix A, site names are quite useful for locating springs or wells for which a specific name is commonly used, but sites which do not have specific names are more difficult to locate. It is suggested that site titles which begin with words such as warm, hot, unnamed, pumped, well, or spring be checked. Descriptive text found as part of the site name and the site coordinates should be used to assist in determining location.

Appendix B (p. 150-154) is sorted by county, township, range, and section. Also given are name of source, GEOTHERM record identifier, and temperature (°C). Records missing items used for sorting will be listed first.

Appendix C (p. 155-160) is first sorted into one-degree blocks by latitude, and longitude, and then by name of source. Adjacent one-degree blocks which are published as a 1:250,000 map are combined under the appropriate map name. Also given are GEOTHERM record identifier, and temperature (°C). Records missing items used for sorting will be listed first. Numbers with blank in the same position as zero will be given first.

GEOTHERM SAMPLE FILE

GEOTHERM sample file contains 225 records for Montana (Table 1). Records may be present which are duplicates. A record may contain data on location, sample description, analysis type (water, condensate, or gas), collection condition, flow rates, and the chemical and physical properties of the fluid. Stable and radioactive isotopic data are occasionally available. Some records may contain only location and temperature. When sufficient chemical data was available, the charge balance (percentage of difference in anion- and cation-milliequivalents) was computed and added to the record. Many of the numeric fields in the sample file can be directly qualified. The qualifier code precedes the number when appropriate. The codes and their meaning are given in Table 1.

Each thermal spring or well usually is represented by several records. This may document temporal changes in the geothermal fluids. Judgement on what constituted acceptable data was extremely complicated and the primary attempt was to insure that each GEOTHERM record faithfully reproduced the published data. On occasion, glaring inconsistencies or data clearly of poor quality were excluded. Regrettably, no database can be constructed or supported without the introduction of errors. The user, therefore, is advised to check with the published literature whenever possible. Users should carefully and critically evaluate the records they use.

This compilation should contain all of the chemical data for geothermal fluids in Montana published as of December, 1981. However, no claim is made for completeness, and published sources have probably been missed. For example, Sonderegger and Bergantino (1981) contains data missed here. About 12% of the records in this list contains information which was unpublished at the time of data entry. A critically evaluated and corrected list of over 2000 records for the United States was extracted from the sample file and issued as a reference document for the national lowtemperature geothermal resource assessment (Reed and others, 1983). This, along with a list of geothermal springs by Berry, and others (1980) may be useful to some users.

GEOTHERM BIBLIOGRAPHY

A bibliography is given in Appendix D (p. 161). The abbreviated form of the reference (called code) is identified as the record source in the full record list and is used to sort the entries in this appendix. Codes with a leading "*" identify records based on information which was unpublished at the time the record was prepared. Codes with a trailing "*" in the full GEOTHERM record are also described in greater detail in Appendix D and are listed ahead of published sources.

ACKNOWLEDGMENTS

Contributions and support to GEOTHERM have been made by many in both federal and state agencies. This includes the U.S. Department of Energy (and associated contractors), and U.S. National Oceanic and Atmospheric Administration. Data-entry forms for most sites in Montana were prepared by the staff of Montana Bureau of Mines and Geology or the U.S. Geological Survey.

REFERENCES CITED

- Berry, G. W., Grim, P. J., and Ikelman, J. A., 1980, Thermal springs list for the United States: National Oceanic and Atmospheric Administration, Key to Geophysical Records Document No. 12, 59 p.
- Bliss, J. D., and Rapport, Amy, 1983, GEOTHERM: the U.S. Geological Survey geothermal information system: Computers & Geosciences, v. 9, no. 1, p. 35-39.
- Duffield, W. A., and Guffanti, Marianne, 1981, The geothermal research program of the U.S. Geological Survey: U.S. Geological Survey Open-File Report 81-564, 108 p.
- Muffler, L. J. P., ed., 1979, Assessment of geothermal resources of the United States--1978: U.S. Geological Survey Circular 790, 163 p.
- Reed, M. J., ed., 1983, Assessment of low-temperature geothermal resources of the United States--1982: U.S. Geological Survey Circular 892.
- Reed, M. J., Mariner, R. H., Brook, C. A., and Sorey, M. L., 1983, Selected data for low-temperature (less than 90°C) geothermal systems in the United States; reference data for U.S. Geological Survey Circular 892: U.S. Geological Survey Open-File Report 83-250, 129 p.
- Sonderegger, J. L., and Bergantino, R. N., 1981, Geothermal resources map of Montana: Montana Bureau of Mines and Geology Hydrogeologic Map 4, text, 7 p.
- Swanson, J. R., 1977, GEOTHERM data file: Geothermal Resources Council Transactions, v. 1, p. 285.

TABLE 1

State of Montana: computer-generated listing of records describing geothermal-fluid samples. [A few records may be for cold springs or wells--this was to provide ground-water references for some studies.]

ORGANIZATION: Records are sorted by county and then by the name of the spring or well. Order is the same in Appendix A.

UTM: The UTM Easting label was omitted. The UTM Easting figure is given directly below the Northing label.

QUALIFICATION CODES: All numeric attributes may be qualified. The codes and their meaning:

L = less than

G = greater than

E = estimated

T = trace (no numeric value reported)

N = not detected (not followed by number)

Q = qualified (other data in qualification field)

R = midpoint of range (actual range in qualification field)

REFERENCE: An expanded citation of the reference is found in Appendix D. The abbreviated form used in this table is called "CODE" in the appendix. Unpublished sources are preceded with "*". Those which begin and end with a "*" are also found in Appendix D.

RECORD 00001

GEOTERM SAMPLE FILE

GEOTERM FILE 101 0046004

NAME OF SAMPLE SOURCE... ANDERSON'S PASTURE

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 135 002W 18 SE OF SW NE

LAT/LONG... 44-42.15 N 111-53.30 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... BEAVERHEAD

NORTHING... 4950070.

GEOLOGIC PROVINCE..

429622.

MAP REFERENCE..... LOWER RED ROCK LAKE 1162500

OTHER LOCALITY INFORMATION: ELEVATION 6840 FEET

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/10/03 SONDEREGGER, J.L.

SAMPLE NUMBER..... 78MJ438

TEMPERATURE (C)..... R 25.7

AMBIENT TEMP (C)..... 3.9

DISCHARGE..... 0.3407 L/MIN

PERTINENT LITHOLOGY..... DISCHARGE-PERMIAN; SOURCE-MADISON GROUP, PLEISTOCENE VOLCANICS.

OTHER SAMPLE INFORMATION.. TWO SPRINGS. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 7.4

SPECIFIC CONDUCTANCE.... 649.

TOTAL DISSOLVED SOLIDS... 394.

CHARGE IMBALANCE (% DIFF)... 0.4

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3..... N	LI... 0.05		
AL.... 0.051		CR.....	MG... 24.	SB... L 0.2	
AS.... 0.0136					
AT....		CU.....	MO... SE... L 0.002		
B.... 0.2		F..... 1.7	NA... 28.	SI02. 21.	
BE....		FE(TOT). L 0.01	NH... S04.. 114.		
BI....		GA.....	NH4.. L 0.04	SR... 0.54	
BR.... 0.1					
CA.... 67.		HCO3.... 246.	NO3.. 0.16		
CA-MG.		MG..... L 0.0003	PB... U.... 0.0024		
CD....		H2S.... L 0.1			
CI.... 9.7		I..... 0.010			
CO....		K..... 7.3			

QUALIFICATION FIELD..... TWO SPRINGS HAVE COMBINED FLOW OF 6796 L/MIN. TEMPERATURE RANGE IS 23.5- 28.0 C.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00002

GEOTERM FILE 101 0046005

GEOTERM SAMPLE FILE

NAME OF SAMPLE SOURCE... APEX HOT SPRINGS (BIRCH CREEK)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 055 009W 10 SE OF NE NE

LAT/LONG... 45-25.20 N 112-41.50 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... BEAVERHEAD

NORTHING... 5030743.

GEOLOGIC PROVINCE..

367645.

MAP REFERENCE..... GLEN 1124000

OTHER LOCALITY INFORMATION: ELEVATION 5240 FEET

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/05/25 SONDEREGGER, J.L.
 SAMPLE NUMBER..... 7840909
 TEMPERATURE (C)..... 23.0
 AMBIENT TEMP (C)..... 5.6
 DISCHARGE..... 2839. L/MIN
 PERTINENT LITHOLOGY..... DISCHARGE-PENNSYLVANIAN; SOURCE-MADISON GROUP
 OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 7.8
 SPECIFIC CONDUCTANCE..... 520.
 CHARGE IMBALANCE (% DIFF).... 0.3
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3....	N			
AL.... 0.12	CR....		MG.... 16.		
H....	F.... 0.6		NA.... 23.	S102.. 20.	
HE....	FE(TOT). L 0.01		NB....	S04.. 135.	
CA.... 62.	HCO3.... 146.		NO3.. 0.92		
CL.... 12.					
CO....	K.... 3.2				

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00003

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0046019

NAME OF SAMPLE SOURCE... BROWNS HOT SPRING

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 GEOLOGIC PROVINCE..
 MAP REFERENCE..... DALYS 1124000

LAT/LONG... 45-06.27 N 112-45.07 W
 UTM ZONE... 12
 NORTHING... 4995834.
 362228.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/21 SONDEREGGER, J.L.
 TEMPERATURE (C)..... 23.7
 AMBIENT TEMP (C)..... 5.5
 DISCHARGE..... 0 4164. L/MIN
 DEPOSITS OR ALTERATION... DEPOSITS OF TRAVERTINE AT SECOND SPRING.
 PERTINENT LITHOLOGY..... MADISON GROUP, TERTIARY VOLCANICS.
 OTHER SAMPLE INFORMATION.. THREE SPRINGS.

WATER ANALYSIS

PH..... 7.4
 SPECIFIC CONDUCTANCE..... 645.

QUALIFICATION FIELD.... FLOW IS FOR ALL 3 SPRINGS.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977; WARING, 1965.

RECORD 00004

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0027025

NAME OF SAMPLE SOURCE... FLKHOHN (POLARIS) HOT SPRINGS

WELL/SPRING NUMBER..... 045-12W-29-ACC
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   04S 012W 29   SW OF SW NE   LAT/LONG... 45-27.47 N 113-06.52 W
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... POLARIS 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTION..... 1974/08/23 ROBERTSON, FOURNIER AND STRONG
 TEMPERATURE (C)..... 49.
 DISCHARGE..... 121. L/MIN
 PERTINENT LITHOLOGY..... GRANITE
 OTHER SAMPLE INFORMATION.. FOUR SPRINGS AND SEVERAL SEEPS; NO GAS; WATER USED IN SWIMMING POOL.
 WATER ANALYSIS
 ALKALINITY..... 81.   AS CaCO3
 ANALYSIS IN MG/L
 AG.... CO3.... LI... 0.05
 AL.... CP.... MG... N
 H.... L 0.1   F.... 1.6   NA... 49.   SiO2.   54.
 HF.... FE(TOT).   NH...   S04..   32.
 CA.... 2.9   HCO3.... 99.
 CU.... K.... 1.0
 OTHER ANALYTICAL DATA... SAR = 9.5
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00005

GEOTHERM FILE 101 0027023

 GEOTHERM SAMPLE FILE
 NAME OF SAMPLE SOURCE... ELKHORN (POLARIS) HOT SPRINGS
 WELL/SPRING NUMBER..... 045-12W-29-ACC
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   04S 012W 29   SW OF SW NE   LAT/LONG... 45-27.47 N 113-06.52 W
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... POLARIS 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTION..... 1964/08/06 MONTANA STATE BOARD OF HEALTH
 TEMPERATURE (C)..... 44.
 PERTINENT LITHOLOGY..... GRANITE
 OTHER SAMPLE INFORMATION.. FOUR SPRINGS AND SEVERAL SEEPS; NO GAS; WATER USED IN SWIMMING POOL.
 WATER ANALYSIS
 ALKALINITY..... 75.   AS CaCO3
 ANALYSIS IN MG/L
 AG.... CO3.... 21.   MG... 1.
 AL.... CP....   NA+K.   42.
 H.... F.... 2.9   NH...   S04..   25.
 HA.... FE+3....   NO3.. N
 HF.... FE(TOT).   0.2
 CA.... 4.   HCO3.... 49.
 CL.... 1.
 OTHER ANALYTICAL DATA... N=0.0
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00006

GEOTHERM FILE 101 0027027

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... ELKHORN (POLARIS) HOT SPRINGS

WELL/SPRING NUMBER..... 04S-12W-29-ACC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 012W 29 SW OF SW NE

LAT/LONG... 45-27.47 N 113-06.52 W

STATE..... MONTANA

COUNTY..... BEAVERHEAD

MAP REFERENCE..... POLARIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/22 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 47.8

DISCHARGE..... 106. L/MIN

PERTINENT LITHOLOGY..... GRANITE

OTHER SAMPLE INFORMATION.. FOUR SPRINGS AND SEVERAL SEEPS; NO GAS; WATER USED IN SWIMMING POOL. SAMPLED IN 1974 FOR GAS ANALYSIS.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 241.

ANALYSIS IN MG/L

H..... L 9.1 F..... 2.8 NA... SI02. 52.

HE..... FE(TOT). NO... SO4.. 30.

CL..... 2.3

ISOLAPES 10/2001

OTHER ANALYTICAL DATA... GROSS ALPHA = 8 PICOCURIES/L., GROSS BETA = 0.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00007

GEOTHERM FILE 101 0027026

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... ELKHORN (POLARIS) HOT SPRINGS

WELL/SPRING NUMBER..... 04S-12W-29-ACC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 012W 29 SW OF SW NE

LAT/LONG... 45-27.47 N 113-06.52 W

STATE..... MONTANA

COUNTY..... BEAVERHEAD

MAP REFERENCE..... POLARIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/07/27 MONTANA BUREAU OF MINES AND GEOLOGY

DISCHARGE..... 1703. L/MIN

PERTINENT LITHOLOGY..... GRANITE

OTHER SAMPLE INFORMATION.. FOUR SPRINGS AND SEVERAL SEEPS; NO GAS; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

P..... 8.4

SPECIFIC CONDUCTANCE..... 219.

ALKALINITY..... 74.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 221.

CHARGE IMBALANCE (% DIFF)... 1.4

ANALYSIS IN MG/L

AG.... CO3..... 3.0 LI... 0.05

AL.... CR.... MG... 1.5

AS.... CS..... MN... N

ISOLAPES 10/2001

H..... F..... 2.6 NA... 46. S102. 57.
 HE..... FE(TOT). N NH... S04.. 29.
 CA.... 1.8 HCO3.... 77. NO3.. 0.7
 CL.... 1.8
 CO.... K..... 0.7

OTHER ANALYTICAL DATA... OH = 0.01 CO2 = 0.51 N = .16 SAR = 6.8

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00008

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027024

NAME OF SAMPLE SOURCE... ELKHORN (POLARIS) HOT SPRINGS
 WELL/SPRING NUMBER..... 04S-12W-29-ACC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 012W 29 SW OF SW NE LAT/LONG... 45-27.47 N 113-06.52 W
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... POLARIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

PERTINENT LITHOLOGY..... GRANITE

OTHER SAMPLE INFORMATION.. FOUR SPRINGS AND SEVERAL SEEPS; NO GAS; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

PH..... 8.0
 ALKALINITY..... 74. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 167.
 CHARGE IMBALANCE (% DIFF)... 1.2
 ANALYSIS IN MG/L

ISOTOPE (0/001)

AG.... CO3.... 2.0 LI... 0.06
 AL.... CR.... MG... N
 H.... 0.22 F..... 43. S102. 47.
 HE.... FE(TOT). NH... S04.. 26.
 CA.... 2.0 HCO3.... 86.
 CL.... 0.8
 CO.... K..... 3.5

OTHER ANALYTICAL DATA... CO2 = 1.4 MG/L. SAR = 8.3

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00009

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046025

NAME OF SAMPLE SOURCE... ELKHORN HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 012W 29 NE OF SW LAT/LONG... 45-27.47 N 113-06.52 W
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 GEOLOGIC PROVINCE.. 21 UTM ZONE... +12
 MAP REFERENCE..... POLARIS 1162500 NORTHING... 5035757.
 3J5129.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/20 MARINER GROUP

TEMPERATURE (C)..... 44.5
 AMBIENT TEMP (C)..... 2.9
 DISCHARGE..... 400. L/MIN
 OTHER SAMPLE INFORMATION.. FOUR SPRINGS AND SEVERAL SEEPS; WATER USED IN SWIMMING POOL FLOW OF 28 GPM REPORTED FOR
 1976/07/22

WATER ANALYSIS

P..... 8.9
 SPECIFIC CONDUCTANCE..... 209.
 ALKALINITY..... 85. AS HCO₃
 TOTAL DISSOLVED SOLIDS... 177.
 CHARGE IMBALANCE (% DIFF)... 3.9

ANALYSIS IN MG/L

Al....		CO ₃	4.	LI....	0.05	S....	
AR....	0.017	CR....		MG....	L 0.1	SB....	
AS....		CS....		MN....	L 0.02		
B....	0.04	F....	2.6	NA....	48.	SI02..	55.
BF....		FE(II)..	L 0.02	NB....		SO4..	27.
CA....	1.9	HCO ₃	77.	PB....	L 0.1		
CA-MG..		Hg.....					
CD....		H ₂ S.....	0.9				
CL....	1.7						
Cu....		K.....	0.7	KB....	L 0.02	ZN....	L 0.01

ISOTOPES 10/001

DEL D OF WATER..... -155.1
 DEL O(18) OF WATER... -20.25

GAS ANALYSIS

DATE/ANALYST..... 1974/08/20 (COLLECTION DATE)

ANALYSIS IN VOLUME %

CH₄.. L 0.1
 C₂H₆..
 CO₂.. 0.2
 N₂... 98.

ISOTOPES 100701

OTHER ANALYTICAL DATA... DISSOLVED NH₄ AS N = L 0.13 + O₂ PLUS AR = 2.4

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 COMPILER CROSS INDEX... MEH-455
 REFERENCE..... MANNING AND OTHERS, 1976B

RECORD 00010

GEOCHEMICAL SAMPLE FILE

GEOTHERM FILE 101 0027017

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
 WELL/SINKING NUMBER..... 055-15N-25-CBA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... JACKSON 1124000
 LAT/LONG... 45-22.07 N 113-24.18 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1977/07/12 U.S. GEOLOGICAL SURVEY
 SAMPLE NUMBER..... 2
 TEMPERATURE (C)..... 54.3
 DISCHARGE..... 1003. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS OVERLYING BELT SUPERGROUP.

OTHER SAMPLE INFORMATION.. SECOND OF TWO SAMPLES THIS DATE. SPRINGS ISSUE 250 METERS E. OF TOWN OF JACKSON; GASSY
 SPRINGS; INACTIVE RESORT.

WATER ANALYSIS

P..... 8.8
 SPECIFIC CONDUCTANCE..... 1092.

ANALYSIS IN MG/L
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00011

GEOTHERM FILE 101 0027015

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
 WELL/SPRING NUMBER..... 055-015W-25-CHA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES   T5S 015W 25   NE OF NW SW   LAT/LONG... 45-22.07 N 113-24.18 W
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... JACKSON 112400v

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/07/12 U.S.G.S.

SAMPLE NUMBER..... 1

TEMPERATURE (C)..... 54.3

DISCHARGE..... 1003. L/MIN

PERMANENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS OVERLYING BELT SUPERGROUP

OTHER SAMPLE INFORMATION.. FIRST OF TWO SAMPLES THIS DATE. SPRINGS ISSUE 250 METERS E. OF TOWN OF JACKSON GASSY

SPRINGS INACTIVE RESORT.

WATER ANALYSIS

PH..... 6.8
 SPECIFIC CONDUCTANCE.... 1092.
 ALKALINITY..... 500.   AS CaCO3
 TOTAL DISSOLVED SOLIDS... 670.
 CHARGE IMBALANCE (% DIFF)... 2.9

ANALYSIS IN MG/L

ISOTOPES 10/001

AG....	CO3....	LI....	0.36		
AL....	CR....	MG....	3.4		
BA....	FE....	NA....	240.	5102.	47.
BE....	FE(TOT)...	NH....		504..	46.
BI....	GA....	NH4..		SR...	0.56
CA.... 11.	MC03.... 610.				
CL.... 8.1					
CO....	K..... 11.				

OTHER ANALYTICAL DATA... CO2 = 155. MG/L SAR = 16.0

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00012

GEOTHERM FILE 101 0027081

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
 WELL/SPRING NUMBER..... 055-015W-25-CHA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES   T5S 015W 25   NE OF NW SW   LAT/LONG... 45-22.07 N 113-24.18 W
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... JACKSON 112400v

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1947/09/21 FOURNIER AND ROBERTSON
 TEMPERATURE (C)..... 58.
 PERTINENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS OVERLYING BELT SUPERGROUP.
 OTHER SAMPLE INFORMATION.. SPRINGS ISSUE 250 METERS E. OF TOWN OF JACKSON; GASSY SPRINGS; INACTIVE RESORT.

WATER ANALYSIS

PH..... 8.6
 ALKALINITY..... 502. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 660.
 CHARGE IMBALANCE (% DIFF)... 2.0
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO ₃	21.	LI...	0.35		
AL....	CH....		MG...	3.5		
N....	0.90		NA...	240.	SI02.	44.
HE....	FE(TOT)...		NH...		SO4...	46.
CA....	6.7					
CL....	6.					
CO....						
	K.....	11.				

OTHER ANALYTICAL DATA... SAR = 19.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00013

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
 WELL/SPRING NUMBER..... 055-015W-25-CBA

GEOTHERM FILE NO: 0027084

LOCATION

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... JACKSON 1124000

TOWNSHIP-RANGE

055 015W 25 NE OF NW SW

COORDINATES

LAT/LONG... 45-22.07 N 113-24.18 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/23 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 60.
 PERTINENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS OVERLYING BELT SUPERGROUP.
 OTHER SAMPLE INFORMATION.. SPRINGS ISSUE 250 METERS EAST OF TOWN OF JACKSON; GASSY SPRINGS; INACTIVE RESORT

WATER ANALYSIS

PH..... 7.1
 SPECIFIC CONDUCTANCE.... 1130.
 ALKALINITY..... 506. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 672.
 CHARGE IMBALANCE (% DIFF)... 2.3
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO ₃	LI...	0.37	S....		
AL....	CH....	MG...	3.5	SB...		
N....	0.77	NA...	230.	SI02.	47.	
HE....	FE(TOT)...	NH...		SO4...	51.	
HI....	6.13	NH4...		SH...	0.56	
CA....	12.					
CL....	8.6					
CO....						
	K.....	12.				

DEL D OF WATER..... -153.6
 DEL O(18) OF WATER... -19.45

OTHER ANALYTICAL DATA... DISSOLVED NITRATE PLUS NITRITE = 0.01 P = 0.01 GROSS ALPHA = 16 PICOCURIES/L, GROSS BETA = 28
 PICOCURIES/L. SAR = 15. CO₂ FOR WATER = 78.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00014

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027083

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS

WELL/SPRING NUMBER..... 055-015W-25-CHA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW

STATE..... MONTANA

COUNTY..... BEAVERHEAD

MAP REFERENCE..... JACKSON 1124000

LAT/LONG... 45-22.07 N 113-24.18 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1974/06/21 ROBERTSON, FOURNIER, STRONG

TEMPERATURE (C)..... 59.

DISCHARGE..... 3596. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTS OVERLYING BELT SUPERGROUP.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE 250 METERS EAST OF TOWN OF JACKSON; GASSY SPRINGS; INACTIVE RESORT.

WATER ANALYSIS

ALKALINITY..... 517. AS CaCO3

TOTAL DISSOLVED SOLIDS... 698.

CHARGE IMBALANCE (% DIFF)... 2.2

ANALYSIS IN MG/L

ISOTOPIES (0/001)

AG....	CO3....	LI...	0.35		
AL....	CR....	MG...	3.2		
H.... 0.05	F.... 1.3	NA...	250.	SI02.	49.
HF....	FE(TOT)...	NB...		S04..	50.
CA.... 11.	HCO3.... 630.				
CL.... 11.					
CO....	K..... 11.				

GAS ANALYSIS

DATE/ANALYST..... 1974/08/16 (COLLECTION DATE)

ANALYSIS IN VOLUME %

ISOTOPIES (00/01)

CH4.. 0.1			
C2H6.		N2... 82.	
CO2.. 16.		O2... 0 2.9	

OTHER ANALYTICAL DATA... SAR = 17.

QUALIFICATION FIELD.... 02 PLUS AR = 2.9

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00015

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027082

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS

WELL/SPRING NUMBER..... 055-15W-25-HC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW

STATE..... MONTANA

COUNTY..... BEAVERHEAD

MAP REFERENCE..... JACKSON 1124000

LAT/LONG... 46-22.07 N 113-24.18 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/07/26 MONTANA BUREAU OF MINES AND GEOLOGY
 TEMPERATURE (C)..... 58.
 PERTINENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS OVERLYING BELT SUPERGROUP.
 OTHER SAMPLE INFORMATION.. SPRINGS ISSUE 250 METERS EAST OF TOWN OF JACKSON; GASSY SPRINGS; INACTIVE RESORT.

WATER ANALYSIS

PH..... 9.0
 SPECIFIC CONDUCTANCE..... 1020.
 ALKALINITY..... 580. AS CaCO_3
 TOTAL DISSOLVED SOLIDS... 906.
 CHARGE IMBALANCE (% DIFF)... 18.6

ANALYSIS IN MG/L

AG....	CO_3	54.	LI....	0.37		
AL....	CH....		MG....	3.2		
AS....	CS....		MN....	0.04		
B....	F....	2.8	NA....	230.	5102.	57.
BE....	FE(TOT)...	0.35	NH....		504..	49.
CA....	HCO_3	490.	NO ₃ ..	0.1		
CL....						
CO....	K.....	10.				

ISOTOPIES 10/001

OTHER ANALYTICAL DATA... OM = 0.01 CO_2 = 1.01 N = 0.02 SAR = 22.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00616

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027080

NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS

WELL/SPRING NUMBER..... 055-015W-25-CHA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 055 015W 25 NE OF NW SW LAT/LONG... 45-22.07 N 113-24.18 W
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 MAP REFERENCE..... JACKSON 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/08/06 MONTANA STATE BOARD OF HEALTH
 TEMPERATURE (C)..... 57.
 PERTINENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS OVERLYING BELT SUPERGROUP.
 OTHER SAMPLE INFORMATION.. SPRINGS ISSUE 250 METERS E. OF TOWN OF JACKSON; GASSY SPRINGS. INACTIVE RESORT.

WATER ANALYSIS

ALKALINITY..... 500. AS CaCO_3
 ANALYSIS IN MG/L

ISOTOPIES 10/001

AG....	CO_3	N	MG....	2.0		
AL....	CH....					
B....	F....	1.9	NA+K.	240.		
BE....	FE+3....		NH....		504..	43.
CA....	FE(TOT)...	0.140	NO ₃ ..	N		
CL....	HCO_3	610.				

OTHER ANALYTICAL DATA... N = 0.0

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00017

GEOTHERM FILE 101 0027079

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JACKSON (JARDINE, BIG HOLE) RANGER STATION

LOCATION

TOWNSHIP=RANGE

COORDINATES

LAT/LONG... 45-21.58 N 113-23.18 W

COUNTRY..... UNITED STATES

USS 015W 25

STATE..... MONTANA

COUNTY..... BEAVERHEAD

MAP REFERENCE..... JACKSON 1124000

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/07/13 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER..... 2

TEMPERATURE (C)..... 14.5

WATER ANALYSIS

PH..... 7.6

SPECIFIC CONDUCTANCE..... 150.

ANALYSIS IN MG/L

F.....

NA...

S102. 23.

ISOLAPES 10/001

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00018

GEOTHERM FILE 101 0027078

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JACKSON (JARDINE, BIG HOLE) RANGER STATION

LOCATION

TOWNSHIP=RANGE

COORDINATES

LAT/LONG... 45-21.58 N 113-23.18 W

COUNTRY..... UNITED STATES

USS 015W 25

STATE..... MONTANA

COUNTY..... BEAVERHEAD

MAP REFERENCE..... JACKSON 1124000

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/07/13 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER..... 1

TEMPERATURE (C)..... 14.5

OTHER SAMPLE INFORMATION.. FIRST OF TWO SAMPLES COLLECTED SAME DAY.

WATER ANALYSIS

PH..... 7.6

SPECIFIC CONDUCTANCE..... 150.

ALKALINITY..... 60.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 112.

CHARGE IMBALANCE (% DIFF)... 3.9

ANALYSIS IN MG/L

AG....

COJ.... W

LI.... 0.04

AL....

CA....

MG.... 0.1

AS....

CS....

MN.... N

H.... 0.03

F..... 0.4

NA.... 36.

S102. 23.

HE....

FE(100)... 0.04

NU....

S04... 13.

HI....

GA....

NH4...

SH... 0.01

CA.... 0.3

HCO3.... 73.

CL.... 2.1

K..... 0.7

CO....

R..... 0.7

ISOLAPES 10/001

OTHER ANALYTICAL DATA... CO2 = 2.6 MG/LSAR = 15.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00019

GEOTHERM FILE ID: 0046036

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JACKSON HOT SPRINGS (JARDINE, BIG HOLE)
 WARING NUMBER..... 25

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T5S 01SW 25 NE OF NW SW
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 GEOLOGIC PROVINCE..

LAT/LONG... 45-22.07 N 113-24.18 W
 UTM ZONE... +12
 NORTHING... 5026405.
 311818.

MAP REFERENCE..... JACKSON 1124000

OTHER LOCALITY INFORMATION: ELEVATION 6470 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/16

TEMPERATURE (C)..... 58.0

AIR TEMP (C)..... 4.1

DISCHARGE..... 6 1000. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTARY ROCKS. MISSOULA GROUP.

OTHER SAMPLE INFORMATION.. GASSY SPRINGS. INACTIVE RESORT.

WATER ANALYSIS

PH..... 6.8

SPECIFIC CONDUCTANCE..... 972.

ALKALINITY..... 500.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 672.

CHARGE IMBALANCE (% DIFF)... 2.5

ANALYSIS IN MG/L

AG....	CO3..... L 0.1	LI... 0.32	S....		
AL.... L 0.001	CH.....	MG... 3.7	SB...		
AS....	CS..... L 0.1	MN... 0.04			
AU....	CU..... L 0.01				
B.... 0.83	F..... 2.0	NA... 240.	SI02.. 52.		
BE....	FE(TOT). L 0.02	NB...	SO4.. 45.		
BI....	GA.....	NH4.. L 0.13			
BR....	GE.....	NI... L 0.01			
CA.... 10.	HCO3.... 616.				
CA+MG.	HG..... L 0.0001	PB... L 0.1			
CI.... L 0.001	H2S..... 0.6				
CL.... 7.7					
CO.... L 0.05	K..... 10.	RH... 0.03	ZN... 0.12		

ISOTOPIES 10/001

DEL D OF WATER..... -153.5
 DEL D(18) OF WATER... -20.44

GAS ANALYSIS

DATE/ANALYST..... 1974/08/20 (COLLECTION DATE)

ANALYSIS IN VOLUME %

CH4.. L 0.1

C2H6..

CO2.. 10.

N2... 82.

O2... 0 2.9

OTHER ANALYTICAL DATA... CO2 FOR WATER = 155.1 N FOR WATER = L 0.10

QUALIFICATION FIELD..... O2 PLUS AR = 2.9

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

ISOTOPIES 10/001

COMPILED CROSS INDEX... NEM-454
 REFERENCE..... LEONARD AND OTHERS, 1978; WHITE AND WILLIAMS, 19751-

RECORD 00020

GEOTHERM FILE ID: 0046044

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... LOVELLS HOT SPRING

WARPING NUMBER..... 28

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08S 009W 28 SE OF NW

LAT/LONG... 45-06.65 N 112-42.85 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... BEAVERHEAD

NORTHING... 4996475.

GEOLOGIC PROVINCE..

365154.

MAP REFERENCE..... ELEVATION 5490 FEET.

OTHER LOCALITY INFORMATION: ELEVATION 5490 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/21

TEMPERATURE (C)..... 19.4

AMBIENT TEMP (C)..... 5.6

DISCHARGE..... 13249 L/MIN

PERTINENT LITHOLOGY..... SOURCE: MADISON GROUP, TERTIARY SEDIMENTS AND VOLCANICS.

OTHER SAMPLE INFORMATION.. FOUR SPRINGS. WATER USED LOCALLY.

WATER ANALYSIS

PH..... 7.9

SPECIFIC CONDUCTANCE..... 620.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDENEGGER, JOHN L.

COMPILED AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDENEGGER AND OTHERS, 1977

RECORD 00021

GEOTHERM FILE ID: 0046047

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... MC MENOMNEY HATCH

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 09S 010W 29 NE OF NE NE

LAT/LONG... 45-01.72 N 112-50.73 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... BEAVERHEAD

NORTHING... 4987574.

GEOLOGIC PROVINCE..

354615.

MAP REFERENCE..... DALYS 1124000

OTHER LOCALITY INFORMATION: ELEVATION 5449 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/03/24

TEMPERATURE (C)..... 19.6

AMBIENT TEMP (C)..... 5.7

DISCHARGE..... 10980 L/MIN

PERTINENT LITHOLOGY..... MADISON-BEAVERHEAD CONTACT

OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 7.4

SPECIFIC CONDUCTANCE..... 722.

TOTAL DISSOLVED SOLIDS... 480.7

CHANGE IMBALANCE (% DIFF)... 0.1

ANALYSIS IN MG/L

AG..... CO3..... N

AL..... CR.....

LI... 0.04

MG... 27.5

ISOLUPES 10/2001

AS.... 0.0145
 H.....
 HE.....
 CA.....
 CA-MG.....
 CL..... 16.15
 CO.....
 F..... 0.7
 FE(TOT). L 0.01
 MC03..... 217.
 MG.....
 NA.... 28.3
 NB....
 NU3.... 0.668
 PB.... L 0.05
 S102. 17.5
 S04.. 191.
 K..... 4.5
 ZN.... 0.01

OTHER ANALYTICAL DATA... MBMG FIELD CHECK (1978/06/21): FLOW 27633 L/MIN, SP.CONDUCTANCE: 600 UMHS/CM. FOR SAMPLE 1
 AND 730 UMHS/CM. FOR SAMPLE 2.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEKEGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEKEGGER, JOHN L., M.B.M.G.

RECORD 00022

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0046049

NAME OF SAMPLE SOURCE... MEDICINE LODGE (WARM SPRINGS)
 LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 12S 011W 07 SE OF NW NE
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 GEOLOGIC PROVINCE..

LAT/LONG... 44-48.56 N 112-58.95 W
 UTM ZONE... 12
 NORTHING... 4963595.
 343230.

MAP REFERENCE..... DEER CANYON 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/20

TEMPERATURE (C)..... 11.0

AMBIENT TEMP (C)..... 4.3

DISCHARGE..... 0 12227. L/MIN

PERTINENT LITHOLOGY..... SOURCE BELIEVED TO BE MADISON GROUP.

OTHER SAMPLE INFORMATION.. MEASURED DATA NOT VERIFIED.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 412.

QUALIFICATION FIELD..... MAXIMUM FLOW IN EARLY WINTER.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEKEGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEKEGGER AND OTHERS, 1977

RECORD 00023

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0046064

NAME OF SAMPLE SOURCE... STAUBENMEYER RANCH

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 13S 002W 17 NE OF NW SW
 STATE..... MONTANA
 COUNTY..... BEAVERHEAD
 GEOLOGIC PROVINCE..

LAT/LONG... 44-42.05 N 111-52.68 W
 UTM ZONE... 12
 NORTHING... 4949876.
 430439.

MAP REFERENCE..... LOWER RED ROCK LAKE 1162500

OTHER LOCALITY INFORMATION: ELEVATION 6750 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/10/03

SAMPLE NUMBER..... LAH NO. 78M0440

TEMPERATURE (C)..... 24.0

AMBIENT TEMP (C)..... 4.0

DISCHARGE..... 6795.6 L/MIN

PERTINENT LITHOLOGY..... PLIESTOCENE RHYOLITE
 OTHER SAMPLE INFORMATION.. CHEMISTRY SUGGESTS MADISON GROUP SOURCE. CHEMISTRY NOT VERIFIED.
 WATER ANALYSIS

PH..... 7.5
 SPECIFIC CONDUCTANCE..... 646.
 TOTAL DISSOLVED SOLIDS.... 390.
 CHARGE IMBALANCE (% DIFF)... 0.6

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3..... N	LI... 0.05		
AL.... 0.044		CR.....	MG... 25.		
AS.... 0.016					
R.... 0.2		F..... 1.8	NA... 26.	SI02.	20.
HE....		FE(10T)... 0.01	NB...	S04..	114.
HT....		GA.....	NH4..	SR...	0.51
HR.... 0.1					
CA.... 68.		MC03.... 244.	NO3.. 0.33		
CA+MG.		MG.....	PB...	U....	0.0022
CD....		M2S..... L 0.1			
CL.... 9.3					
CO....		R..... 6.8			

QUALIFICATION FIELD..... COMBINED FLOW OF FIVE SPRINGS

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00024

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID# 0046042

NAME OF SAMPLE SOURCE... LODGEPOLE 1

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 26N 025E 24 NE OF SW
 STATE..... MONTANA
 COUNTY..... BLAINE
 GEOLOGIC PROVINCE..

LAT/LONG... 47-59.58 N 108-26.75 W
 UTM ZONE... 12
 NORTING... 5318499.
 690616.

MAP REFERENCE..... BEAR MOUNTAIN 1124000

OTHER LOCALITY INFORMATION: ELEVATION 3700 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/10/04

TEMPERATURE (C)..... 26.0

AMBIENT TEMP (C)..... 4.7

DISCHARGE..... 8900. L/MIN

PERTINENT LITHOLOGY..... LODGEPOLE SPRINGS ISSUE FROM THE MADISON GROUP.

OTHER SAMPLE INFORMATION.. ANALYSIS IS FROM SPRING 1. FIELD DATA FROM DICK FELTIS, USGS

WATER ANALYSIS

PH..... 8.0
 SPECIFIC CONDUCTANCE..... 1430.
 ALKALINITY..... 125.
 TOTAL DISSOLVED SOLIDS.... 1175.
 CHARGE IMBALANCE (% DIFF)... 2.0

AS CAC03

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3..... N			
AL....		CR.....	MG... 69.		
AS....		CS.....	MN... L 0.01		
R....		F..... 0.9	NA... 52.5	SI02.	15.
HA....		FE+3.... L 0.01			

RE.... FE(TOT). NO... S04.. 650.
 CA.... 18/. MC03.... 153. NO3.. 1.7
 CL.... 38.
 CO.... K..... 8.5

OTHER ANALYTICAL DATA... HARDNESS AS CaCO3 1747.1 SAR = 0.8

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00025

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046011

NAME OF SAMPLE SOURCE... REDFORD HOT SPRINGS

WAKING NUMBER..... 21

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T7N 00E 23 NW OF NW NE

LAT/LONG... 46-21.27 N 111-33.90 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... BROADWATER

NORTHING... 5133373.

GEOLOGIC PROVINCE..

456530.

MAP REFERENCE..... TOWNSEND 1162500

OTHER LOCALITY INFORMATION: ELEVATION 3880 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/12/09 GROFF, S.L.

SAMPLE NUMBER..... MSRM LAB NO. CW-372

TEMPERATURE (C)..... 23.3

AMBIENT TEMP (C)..... 6.5

DISCHARGE..... 5110. L/MIN

PERTINENT LITHOLOGY..... SPRING SOURCE IS MADISON GROUP.

OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

TOTAL DISSOLVED SOLIDS... 266.

ANALYSIS IN MG/L

ISOTOPES 10/001

AG.... CO3.... N

AL.... CH.....

MG... 22.

H.... F..... 0.7

NA.... FE+3....

NA+K. 8.

ME.... FE(TOT). N

NO... S04.. 103.

CA.... 5/. MC03.... 155.

CL.... 9.

OTHER ANALYTICAL DATA... 1978/06/28: FLOW = 5892 L/MIN, TEMPERATURE = 23.6C, CONDUCTANCE = 467 UMHOS/CM., PH = 7.2

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00026

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046034

NAME OF SAMPLE SOURCE... GREYSUN WARM SPRING

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T6N 00E 21 NW OF NW NE

LAT/LONG... 46-28.47 N 111-31.30 W

STATE..... MONTANA

COUNTY..... BROADWATER

MAP REFERENCE..... DUCK CREEK PASS 1162500

OTHER LOCALITY INFORMATION: ELEVATION 3820 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/03
 TEMPERATURE (C)..... 17.9
 DISCHARGE..... 3407. L/MIN
 PERTINENT LITHOLOGY..... TERTIARY VOLCANICS

WATER ANALYSIS

PH..... 7.6
 SPECIFIC CONDUCTANCE..... 610.

QUALIFICATION FIELD..... FLOW INCREASES IN FALL; PERHAPS DUE TO IRRIGATION OF BENCHES ABOVE SPRING.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00027

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0046054

NAME OF SAMPLE SOURCE... PLUNKET SPRING (NAVE'S, HOCKEL)

WARNING NUMBER..... 23

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 64N 001E 27 NE OF NE

LAT/LONG... 46-04.60 N 111-34.80 W

STATE..... MONTANA

UTM ZONE... 12

COUNTY..... BROADWATER

NORTHING... 5101997.

GEOLOGIC PROVINCE..

454566.

M-P REFERENCE..... HAVERSHURG 1162500

OTHER LOCALITY INFORMATION: ELEVATION 4180 FEET. AT PLUNKET LAKE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1979/07/17 WYATT, GLEN M.

SAMPLE NUMBER..... 79N1561

POINT OF COLLECTION.. S.E. CORNER OF PLUNKET LAKE

TEMPERATURE (C)..... 0 16.5

AMBIENT TEMP (C)..... 6.3

DISCHARGE..... E 15142.

PERTINENT LITHOLOGY..... SPRINGS ISSUE FROM MADISON GROUP. ALONG FOLD AXIS?

OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

DATE/ANALYST..... 1979/07/17 ABERCHROMBIE, FRANK N.

PH..... 8.64

SPECIFIC CONDUCTANCE..... 398.

ALKALINITY..... 99. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 259.

CHARGE IMBALANCE (% DIFF)... 19.2

ANALYSIS IN MG/L

ISOTHERMS (0/001)

AG....		CO ₃	16.	Mg....	24.		
AL....		CH....		MN....	L 0.002		
AS....	0.0017	CS....		NA....	22.	S102.	10.
BA....	0.11	FE....	0.7	NH....		S04..	87.
BE....		FE(TOT). L	0.002	NH4....		SR...	0.45
BT....		GA....		NO ₃ ..	3.1		
CA....	49.	HCO ₃	87.				
CL....	9.0						
CO....		K.....	2.4				

OTHER ANALYTICAL DATA... FIELD VALUES: PH = 7.93, HCO₃ = 188., SC = 490.

QUALIFICATION FIELD..... TEMPERATURE MEASURED IN LAKE. 6-02-78.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00028

GEOTHERM FILE ID: 0046067

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... TOSTON HOT SPRINGS

LOCATION TOWNSHIP-RANGE 04N 003E 06 SE OF NE NE

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... BROADWATER

GEOLOGIC PROVINCE..

MAP REFERENCE..... TOSTON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/11/24

SAMPLE NUMBER..... MSRM LAB NO. CN-339

TEMPERATURE (C)..... 13.9

AMBIENT TEMP (C)..... 6.5

DISCHARGE..... 3469.

PERTINENT LITHOLOGY..... MADISON GROUP.

OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED; NOT IN REFERENCE.

WATER ANALYSIS

TOTAL DISSOLVED SOLIDS... 238.

ANALYSIS IN MG/L

AG....	CO3..... N				
AL....	CR.....	MG...	14.		
H....	F..... 0.8				
HA....	FE+3....	NA+K...	20.		
HE....	FE(TOT). N	NH....		504..	60.
CA.... 57.	HCO3.... 204.	NO3...	0.7		
CL.... 8.					

ISOTOPES 10/001

OTHER ANALYTICAL DATA... 1978/06/02: FLOW 61 75708 L/MIN; TEMP. 15.2 C; PH 7.5

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00029

GEOTHERM FILE ID: 0046071

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... WAMNER HOT SPRINGS

LOCATION TOWNSHIP-RANGE 05N 001E 22 NW OF NW SE

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... BROADWATER

GEOLOGIC PROVINCE..

MAP REFERENCE..... MADERSBURG 1162500

OTHER LOCALITY INFORMATION: ELEVATION 4100 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/02

SAMPLE NUMBER..... LAB NO. 7BM0910

TEMPERATURE (C)..... 18.0

AMBIENT TEMP (C)..... 6.3

DISCHARGE..... 402. L/MIN

PERTINENT LITHOLOGY..... SPRING ISSUES FROM ALLUVIUM, TERTIARY SEDIMENTS; PRECAMBRIAN.

OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

COORDINATES

LAT/LONG... 46-10.33 N 111-35.15 W

UTM ZONE... +12

NORTHING... 5113125.

454777.

WATER ANALYSIS

PH..... 8.3
 SPECIFIC CONDUCTANCE..... 215.
 CHARGE IMBALANCE (% DIFF)... 2.0
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3..... N				
AL....	CR.....	MG...	6.8		
H.....	F..... 0.2	NA...	5.4	SI02..	16.
HE.....	FE(TOT)...	NB...		SO4..	17.
CA.... 26.	HC03.... 101.	NU3..	1.0		
CL.... 1.9					
CO....	K..... 0.9				

QUALIFICATION FIELD..... CONDUCTANCE AND PH FROM FIELD DATA.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00030

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046030

NAME OF SAMPLE SOURCE... GIANT SPRINGS

LOCATION

LOTHSHIP=RANGE

COORDINATES

COUNTRY..... UNITED STATES 21N 004E 33 NE OF SE NW

LAT/LONG... 47-32.05 N 111-13.73 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... CASCADE

NORTHING... 5264334.

GEOLOGIC PROVINCE..

482776.

MAP REFERENCE..... NORTHEAST GREAT FALLS 1:24000

OTHER LOCALITY INFORMATION: ON MISSOURI RIVER NEAR STATE FISH HATCHERY.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1965/04/25

SAMPLE NUMBER..... MSRM LAB NO. 604

TEMPERATURE (C)..... 12.

AMBIENT TEMP (C)..... 6.2

DISCHARGE..... 340687 L/MIN

OTHER SAMPLE INFORMATION.. INCLUDED DUE TO HIGH DISCHARGE; ONLY 5.5 DEGREES C ABOVE AMBIENT AIR TEMPERATURE.

WATER ANALYSIS

TOTAL DISSOLVED SOLIDS... 414.

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3..... N				
AL....	CR.....	MG...	32.		
H.....	F..... 0.9				
HA....	FE+3....	NA+K.. N			
HE....	FE(TOT) N	NB...		SO4..	157.
CA.... 104.	HC03.... 235.	NU3..	1.6		
CL.... H.					

OTHER ANALYTICAL DATA... 1941 ANALYSIS: SI02 = 20.8 MG/L, TEMP. = 11.7 C, TOTAL FLOW = 1027800 L/MIN (677100 L/MIN FROM SPRINGS ON SHORE).

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00031

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046002

NAME OF SAMPLE SOURCE... ANACONDA HOT SPRINGS
 WARNING NUMBER..... 16
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   NE OF NE NE
 STATE..... MONTANA   04N 01W 13
 COUNTY..... DEER LODGE
 GEOLOGIC PROVINCE..
 MAP REFERENCE..... ANACONDA 1162500
 OTHER LOCALITY INFORMATION: ELEVATION 5490 FEET
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1978/06/23 SONDEREGGER, J.L.
 SAMPLE NUMBER..... 78M1059
 TEMPERATURE (C)..... 21.7
 AMBIENT TEMP (C)..... 4.6
 DISCHARGE..... 12.   L/MIN
 PERTINENT LITHOLOGY..... TERTIARY VOLCANICS ON MADISON GROUP.
 OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED. INACTIVE GEYSER.
 WATER ANALYSIS
 PH..... 7.0   AT(C)   22.
 SPECIFIC CONDUCTANCE..... 2624.
 TOTAL DISSOLVED SOLIDS... 2300.
 CHARGE IMBALANCE (% DIFF)... 0.6
 ANALYSIS IN MG/L
 AG.... CO3.... LI... 0.25
 AL.... CR.... MG... 67.
 AS.... CS.... MN... 0.48
 N.... F.... 2.5   NA... 147.   S102.   23.
 HE.... FE(TOT)... 1.2   NH...   S04...   1362.
 CA.... 470.   HCO3.... 439.   NO3... L 0.01
 CH.... H2S.... PU4... 0.79
 CL.... 7.0
 CU.... K.... 11.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

ISOTOPES (0/001)

RECORD 00032

GEOTHERM FILE 101 0002902

GEOTHERM SAMPLE FILE
 NAME OF SAMPLE SOURCE... GREYSUN HOT SPRINGS (FAIRMONT)
 WARNING NUMBER..... 17
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   SW OF NE NW
 STATE..... MONTANA   03N 01W 02
 COUNTY..... DEER LODGE
 MAP REFERENCE..... ANACONDA 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1974/08/19
 TEMPERATURE (C)..... 70.0
 DISCHARGE..... 1000.   L/MIN
 PERTINENT LITHOLOGY..... QUATERNARY FILL AND TERTIARY VOLCANIC OVERLYING GRANITE.
 OTHER SAMPLE INFORMATION.. ISSUES IN CONCRETE TANKS. EXTENSIVE RESORT DEVELOPMENT. SPORADIC GAS DISCHARGE.
 WATER ANALYSIS
 PH..... 8.4
 SPECIFIC CONDUCTANCE..... 701.

ALKALINITY..... 100. AS HCO₃
 TOTAL DISSOLVED SOLIDS... 640.
 CHARGE IMBALANCE (% DIFF)... 4.3

ANALYSIS IN MG/L

AG....		CO ₃		LI... 0.64	S....	
AL.... 0.016		CR....		MG... L 0.1	SB...	
AS....		CS.... L 0.1		MN... L 0.02		
AU....		CU.... L 0.01				
H.... 0.3		F..... 18.		NA... 165.	SI02.	85.
HF....		FE(TOT). L 0.02		NH...	S04..	180.
HN....		GE....		NI... L 0.02		
CA.... 3.9		HCO ₃ .... 166.				
CA+MG.		HG.... L 0.0001		PB... L 0.1		
CD.... L 0.01		H ₂ S.... 1.6				
CL.... 17.						
CO.... L 0.05		K..... 3.9		RH... 0.04	ZN... L 0.01	

ISOTOPES (0/001)

DEL D OF WATER..... -149.1
 DEL O(18) OF WATER... -18.6

GAS ANALYSIS

DATE/ANALYST..... 1974/08/19 (COLLECTION DATE)

ANALYSIS IN VOLUME %

CH₄.. 0.0
 C₂H₆.
 CO₂.. 0.6
 N₂... 96.

ISOTOPES (00/01)

OTHER ANALYTICAL DATA... NH₄ = L 0.13; O₂ AND AR = 2.9; OXYGEN SHIFT = +1.29

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 COMPILER CROSS INDEX... NEM-456
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00033

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027011

NAME OF SAMPLE SOURCE... GREGSON HOT SPRINGS (FAIRMONT)

WELL/SPRING NUMBER..... 03N-010W-02-HDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 03N 010W 02 SW OF SE NW

LAT/LONG... 46-02.62 N 112-48.63 W

STATE..... MONTANA

COUNTY..... DEER LODGE

MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/09/10 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. SPRINGS ISSUE INTO CONCRETE-LINED POOLS

TEMPERATURE (C)..... 70.

PERTINENT LITHOLOGY..... QUATERNARY FILL AND TERTIARY VOLCANIC ROCKS OVERLYING GRANITE

OTHER SAMPLE INFORMATION.. EXTENSIVE RESORT DEVELOPMENT; SPORADIC GAS DISCHARGE

WATER ANALYSIS

PH..... 8.3
 SPECIFIC CONDUCTANCE.... 852.
 ALKALINITY..... 128. AS CaCO₃

ANALYSIS IN MG/L

H....		F.....		NA... SI02.	78.
HE....		FE(TOT).		NH... S04..	180.
CA....		HCO ₃ .... 156.			
CL.... 17.					

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... CARBON DIOXIDE = 1.1 MG/L; GROSS ALPHA = 2 PICOCURIES/L.; GROSS BETA = 2 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00034

GEOTERM. SAMPLE FILE

GEOTERM FILE ID: 0027008

NAME OF SAMPLE SOURCE... GREGSON HOT SPRINGS (FAIRMONT)

WELL/SPRING NUMBER..... 03N-010W-02-BDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T3N 010W 02 SW OF SE NW

LAT/LONG... 46-02.62 N 112-48.63 W

STATE..... MONTANA

COUNTY..... DEER LODGE

MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1965/04/08 MONTANA STATE BOARD OF HEALTH

POINT OF COLLECTION.. SPRINGS ISSUE INTO CONCRETE-LINED POOLS

TEMPERATURE (C)..... 68.

DISCHARGE..... E 1000. L/MIN

PERTINENT LITHOLOGY..... QUATERNARY FILL AND TERTIARY VOLCANIC ROCKS OVERLYING GRANITE

OTHER SAMPLE INFORMATION.. EXTENSIVE RESORT DEVELOPMENT; SPORADIC GAS DISCHARGE.

WATER ANALYSIS

ALKALINITY..... 149. AS CaCO₃

ANALYSIS IN MG/L

ISOTOPES (0/00)

AG....	CO ₃	6.			
AL....	CR.....		MG...	2.0	
H....	F.....	18.			
HA....	FE+3....		NA+K...	182.	
HE....	FE(TOT). N		NB...		504.. 180.
CA.... 4.9	HCO ₃	170.	NU3.. N		
CL.... 29.					

OTHER ANALYTICAL DATA... N NOT DETECTED IN WATER ANALYSIS. GROSS ALPHA = 2 PICOCURIES/LI GROSS BETA = 2

PICOCURIES/L.

QUALIFICATION FIELD..... 02 = 02 + AR.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00035

GEOTERM. SAMPLE FILE

GEOTERM FILE ID: 0027010

NAME OF SAMPLE SOURCE... GREGSON HOT SPRINGS (FAIRMONT)

WELL/SPRING NUMBER..... 03N-010W-02-BDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T3N 010W 02 SW OF SE NW

LAT/LONG... 46-02.62 N 112-48.63 W

STATE..... MONTANA

COUNTY..... DEER LODGE

MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG

POINT OF COLLECTION.. SPRINGS ISSUE INTO CONCRETE-LINED POOLS

TEMPERATURE (C)..... 73.

DISCHARGE..... 151. L/MIN

PERTINENT LITHOLOGY..... QUATERNARY FILL AND TERTIARY VOLCANIC ROCKS OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. EXTENSIVE RESORT DEVELOPMENT; SPORADIC GAS DISCHARGE

WATER ANALYSIS

ALKALINITY..... 161. AS CaCO_3

TOTAL DISSOLVED SOLIDS... 589.

CHARGE IMBALANCE (% DIFF)... 0.1

ANALYSIS IN MG/L

AG....		CO_3	3.0	LI...	0.7	S....	
AL....		CH....		MG...	N	SB...	
H....	0.3	F....	11.	NA...	180.	SI02.	83.
HE....		FE(TOT).		NB...		S04..	200.
CA....	4.0	HCO_3	190.				
CL....	9.3						
CO....		K.....	4.1				

ISOTOPES (0/001)

DEL D OF WATER..... -149.1

DEL O(18) OF WATER... -18.6

OTHER ANALYTICAL DATA... ISOTOPES DATA 8/19/74

QUALIFICATION FIELD... ISOTOPIC ANALYSIS DATED 8/19/74, REPORTED IN MARINER AND OTHERS, 1976.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00036

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027009

NAME OF SAMPLE SOURCE... GREGSON HOT SPRINGS (FAIRMONT)

WELL/SPRING NUMBER..... 03N-010W-02-BUC

LOCATION

TOWNSHIP=RANGE

COORDINATES

COUNTRY..... UNITED STATES 03N 010W 02 SW OF SE NW

LAT/LONG... 46-02.62 N 112-48.63 W

STATE..... MONTANA

COUNTY..... DEER LODGE

MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

POINT OF COLLECTION.. SPRINGS ISSUE INTO CONCRETE-LINED POOLS

TEMPERATURE (C)..... 71.

PERTINENT LITHOLOGY..... QUATERNARY FILL AND TERTIARY VOLCANIC ROCKS OVERLYING GRANITE

OTHER SAMPLE INFORMATION.. EXTENSIVE RESORT DEVELOPMENT; SPORADIC GAS DISCHARGE

WATER ANALYSIS

PH..... 8.4

ALKALINITY..... 136. AS CaCO_3

TOTAL DISSOLVED SOLIDS... 542.

CHARGE IMBALANCE (% DIFF)... 18.9

ANALYSIS IN MG/L

AG....		CO_3	3.	LI...	0.78		
AL....		CH....		MG...	N		
H....	0.36	F....		NA...	180.	SI02.	77.
HE....		FE(TOT).		NB...		S04..	180.
CA....	4.0	HCO_3	160.				
CL....	13.						
CO....		K.....	4.7				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... CO_2 = 1.1 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00037

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027013

NAME OF SAMPLE SOURCE... WARM SPRINGS (STATE HOSPITAL)
 WELL/SPRING NUMBER..... 05N-10W-24-A
 MARKING NUMBER..... 15

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... DEER LODGE

05N 010W 24 NE

LAT/LONG... 46-10.67 N 112-47.67 W

MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/04/21 Fournier and Robertson
 POINT OF COLLECTION.. SAMPLE FROM OUTFLOW PIPE S. OF HILL.
 TEMPERATURE (C)..... 78.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE FROM TOP OF CARBONATE MOUND; SOME GAS, NOT COLLECTED

WATER ANALYSIS

pH..... 7.9
 ALKALINITY..... 123. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 1160.
 CHARGE IMBALANCE (% DIFF)... 2.8

ANALYSIS IN MG/L

AG....	CO ₃	N	LI...	0.38		
AL....	CH....		MG...	29.		
H....	0.13		FA....	120.	SI02.	50.
HE....			FE(TOT)...		SO4..	680.
CA....	180.	HC03....	150.			
CL....	6.0					
CU....		K.....	24.			

ISOTOPES (0/00)

OTHER ANALYTICAL DATA... CARBON DIOXIDE = 3.0 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILE AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00038

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046070

NAME OF SAMPLE SOURCE... WARM SPRINGS (STATE HOSPITAL)
 MARKING NUMBER..... 15

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... DEER LODGE
 GEOLOGIC PROVINCE..

05N 010W 24 NE

LAT/LONG... 46-10.67 N 112-47.67 W

MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/19
 POINT OF COLLECTION.. SAMPLE FROM OUTFLOW PIPE AT SOUTHSIDE OF HILL.
 TEMPERATURE (C)..... 77.0
 AMBIENT TEMP (C)..... 5.6
 DISCHARGE..... 600. L/MIN

DEPOSITS OR ALTERATION.... SPRINGS ISSUE FROM TOP OF CARBONATE MOUND.
 OTHER SAMPLE INFORMATION.. GAS, BUT UNCOLLECTABLE.

WATER ANALYSIS

PH..... 6.5
 SPECIFIC CONDUCTANCE..... 1510.
 ALKALINITY..... 256. AS HCO₃
 TOTAL DISSOLVED SOLIDS... 1310.
 CHARGE IMBALANCE (% DIFF)... 1.1
 ANALYSIS IN MG/L

AG....	CO ₃	L 1.	LI...	0.36	S....	
AL.... L 0.001	CR....		MG...	22.	SB...	
AS....	CS....		MN...	0.05		
H.... 0.1	F....	3.9	NA...	120.	SI02.	56.
HE....	FE(TOT)...	0.05	NH...		S04..	670.
CA.... 220.	HCO ₃	258.				
CA+MG.	MG....		PH... L 0.1			
CO....	H ₂ S....	0.7				
CL.... 5.0						
CO....	K.....	26.	RB...	0.16	ZN...	0.11

ISOTOPE 10/001

DEL D OF WATER..... -152.3
 DEL O(18) OF WATER... -19.97

OTHER ANALYTICAL DATA... OXYGEN SHIFT = +0.32
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00039

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027012

NAME OF SAMPLE SOURCE... WARM SPRINGS (STATE HOSPITAL)
 WELL/SPRING NUMBER..... MSN-10W-24-A
 WARING NUMBER..... 15

LOCATIONTOWNSHIP-RANGECOORDINATES

COUNTRY..... UNITED STATES 05N 010W 24 NE
 STATE..... MONTANA
 COUNTY..... DEER LODGE
 MAP REFERENCE..... ANACONDA 1162500

LAT/LONG... 46-10.67 N 112-47.67 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1965/04/08 MONTANA BUREAU OF MINES AND GEOLOGY
 POINT OF COLLECTION.. SAMPLE FROM OUTFLOW PIPE S. OF HILL
 TEMPERATURE (C)..... 71.
 DISCHARGE..... 227. L/MIN

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE FROM TOP OF CARBONATE MOUND; SOME GAS, NOT COLLECTED

WATER ANALYSIS

ALKALINITY..... 213. AS CaCO₃
 ANALYSIS IN MG/L

ISOTOPE 10/001

AG....	CO ₃	N			
AL....	CH....		MG...	17.	
H....	F....	4.0			
HA....	FE+3....		NA+K.	150.	
HE....	FE(TOT)...	1.3	NH...		
CA.... 230.	HCO ₃	260.	N03..	N	S04.. 700.
CL.... 9.0					

OTHER ANALYTICAL DATA... N NOT DETECTED

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00040

GEO THERM SAMPLE FILE

GEOTHERM FILE ID: 0027014

NAME OF SAMPLE SOURCE... WARM SPRINGS (STATE HOSPITAL)
 WELL/SPRING NUMBER..... NSN-10W-24-A
 WARING NUMBER..... 15

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   USN 010W 24   NE

COORDINATES

LAT/LONG... 46-10.67 N 112-47.67 W

STATE..... MONTANA
 COUNTY..... DEER LODGE
 MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG
 POINT OF COLLECTION.. SAMPLE FROM OUTFLOW PIPE S. OF HILL
 TEMPERATURE (C)..... 78.
 DISCHARGE..... 114. L/MIN

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE FROM TOP OF CARBONATE MOUND; SOME GAS, NOT COLLECTED.

WATER ANALYSIS

ALKALINITY..... 180. AS CaCO₃
 ANALYSIS IN MG/L

ISOTOPIES (0/001)

AG....	CO ₃	LI... 0.420	S....	DEL D OF WATER.....	-152.3
AL....	CR....	MG... 22.	SB....	DEL O(18) OF WATER...	-19.97
R.... 0.3	F.... 2.4	NA... 130.	56.		
ME....	FE(TOT)...	NB... 504..	940.		
CA.... 190.	HCO ₃ .... 220.				
CO....	K..... 23.				

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00041

GEO THERM SAMPLE FILE

GEOTHERM FILE ID: 0027075

NAME OF SAMPLE SOURCE... WARM SPRINGS (STATE HOSPITAL)
 WELL/SPRING NUMBER..... NSN-10W-24-A
 WARING NUMBER..... 15

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   USN 010W 24   NE

COORDINATES

LAT/LONG... 46-10.67 N 112-47.67 W

STATE..... MONTANA
 COUNTY..... DEER LODGE
 MAP REFERENCE..... ANACONDA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/09/10 U.S. GEOLOGICAL SURVEY
 POINT OF COLLECTION.. SAMPLE FROM FLOW-PIPE S. OF HILL
 TEMPERATURE (C)..... 78.
 DISCHARGE..... 189. L/MIN

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE FROM TOP OF CARBONATE MOUND; SOME GAS, NOT COLLECTED

WATER ANALYSIS

P.H..... 6.8
 SPECIFIC CONDUCTANCE..... 1465.
 ALKALINITY..... 208. AS CaCO₃

ISOTOPIES (0/001)

AG....	CO ₃	LI... 420.	SI02.	53.
H.... 309.	F.....	NA... 5102.		

HE.... FE(TOT)..... NO... 504.. 680.
 CA.... HCO3.... 254.

CL.... 5.7
 OTHER ANALYTICAL DATA... CO2 = 91 MG/LI GROSS ALPHA = 27 PICOCURIES/L, GROSS BETA = 40 PICOCURES/L.
 REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00042

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046088

NAME OF SAMPLE SOURCE... WARM SPRINGS STATE HOSPITAL WELL
 WELL/SPRING NUMBER..... 05N-10W-13-UCC

LOCATION..... TOWNSHIP=RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 010W 13 SW OF SW SE
 STATE..... MONTANA
 COUNTY..... DEER LODGE
 MAP REFERENCE..... ANACONDA 1162500

LAT/LONG... 46-12.33 N 112-53.00 W

OTHER LOCALITY INFORMATION: WELL LOCATED ADJACENT TO HEATING PLANT

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1980/04/16 SONDENEGGER, JOHN L.
 SAMPLE NUMBER..... 8000063
 POINT OF COLLECTION.. DISCHARGE PIPE ABOUT 5 FT. FROM CASING
 TEMPERATURE (C)..... 67.
 AMBIENT TEMP (C)..... 5.6
 WELL DEPTH (M)..... 457.
 DISCHARGE..... 87. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTS

OTHER SAMPLE INFORMATION.. REDRILLING IN 1981 INCREASED FLOW TO 43 GPM, ODOR STRONG, GAS BUBBLES, FOAM (DRILLING
 DETERGENT?). CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

DATE/ANALYST..... 1980/07/31 ABERCROMBIE, FRANK N.
 PH..... 7.03
 SPECIFIC CONDUCTANCE..... 1662.
 ALKALINITY..... 238. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 1273.
 CHANGE IMBALANCE (% DIFF)... 3.5

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3....	LI...	0.43		
AL....	CR....	MG...	25.		
AS....	CS....	MN...	0.22		
B....	F....	NA...	114.	5102.	38.
HF....	FE(TOT)...	NH...		504..	685.
HI....	GA....	NH4...		SR...	3.4
CA.... 210.	HCO3.... 290.	NO3..	0.04		
CL.... 7.1					

CO.... K..... 32.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDENEGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDENEGGER, JOHN L., MBMG

RECORD 00043

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046018

NAME OF SAMPLE SOURCE... BROOKS HOT SPRINGS

LOCATION

COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
 STATE..... MONTANA   17N 018E 19   SE OF NW SE
 COUNTY..... FERGUS
 GEOLOGIC PROVINCE..

COORDINATES

LAT/LONG... 43-13.02 N 109-28.27 W
 UTM ZONE... +12
 NORTING... 47858J2.
 624178.

MAP REFERENCE..... LEWISTOWN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/09/23 M.D.F. (USGS-WRD)
 SAMPLE NUMBER..... MBMG ANALYSIS NO. 75M1510
 TEMPERATURE (C)..... 19.5
 DISCHARGE..... 256522 L/MIN

PERTINENT LITHOLOGY..... SPRING RISES INTO POND FROM ALLUVIUM OVERLYING CRETACEOUS ROCKS (KOTENAI ON COLORADO).

SOURCE OF RECHARGE MAY BE JUDITH MOUNTAINS TO THE EAST.

OTHER SAMPLE INFORMATION.. USED FOR IRRIGATION.

WATER ANALYSIS

PH..... 7.7
 SPECIFIC CONDUCTANCE..... 882.
 ALKALINITY..... 0 195.   AS CaCO3
 TOTAL DISSOLVED SOLIDS... 622.
 CHARGE IMBALANCE (± DIFF)... 0.1

ANALYSIS IN MG/L

AG....   CO3..... N
 AL....   CR.....   MG... 40.3
 AS....   CS.....   MN... L 0.01
 H....   F..... 1.3   NA... 3.4   SiO2. 8.9
 HE....   FE(10T). L 0.01   NH...   SO4.. 336.
 CA.... 133.   HCO3.... 195.   NO3.. 0.8
 CL.... 0.95
 CO....   K..... 1.4

ISOTOPE 10/001

OTHER ANALYTICAL DATA... 78/06/14: TEMP. = 19.8 C ; FLOW = 28352 L/MIN. ; S.C. = 900 UMHOS/CM. ; PH = 7.32

QUALIFICATION FIELD..... ALKALINITY NOT DETERMINED IN THE FIELD

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGER, JOHN L.
 COMPILED AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SUNDEREGGER AND OTHERS, 1977

RECORD 00044

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046024

NAME OF SAMPLE SOURCE... DUNFEE CREEK SPRINGS (NO. 2)

LOCATION

COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
 STATE..... MONTANA   12N 023E 19   NW OF NW
 COUNTY..... FERGUS
 GEOLOGIC PROVINCE..

COORDINATES

LAT/LONG... 46-47.55 N 108-52.52 W
 UTM ZONE... +12
 NORTING... 5184079.
 662156.

MAP REFERENCE..... ROUNDUP 11250000

OTHER LOCALITY INFORMATION: SPRINGS ALONG NORTH FLANK OF DUNFEE CREEK DOME. ON SE SIDE OF MADISON RIDGE. UP DUNFEE CANYON, ELEV. 5100 FT.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/06/13 DUNOVAN, J.J.
 TEMPERATURE (C)..... 21.1
 AMBIENT TEMP (C)..... 7.8
 DISCHARGE..... 8706. L/MIN

PERTINENT LITHOLOGY..... SPRINGS IN MADISON LIMESTONE.

WATER ANALYSIS

P1..... 7.25
 SPECIFIC CONDUCTANCE..... 1960.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977; WARING, 1965

RECORD 00045

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027064

NAME OF SAMPLE SOURCE... ROZEMAN (FERRIS) HOT SPRINGS
 WELL/SPRING NUMBER..... 02S-04E-14-0AD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 004E 14 SE OF NE SE

LAT/LONG... 45-39.63 N 111-11.17 W

STATE..... MONTANA

COUNTY..... GALLATIN

MAP REFERENCE..... ROZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG

TEMPERATURE (C)..... 51.0

DISCHARGE..... 189. L/MIN

PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL

WATER ANALYSIS

ALKALINITY..... 131. AS CaCO3

TOTAL DISSOLVED SOLIDS... 471.

CHARGE IMBALANCE (% DIFF)... 0.7

ANALYSIS IN MU/L

ISOTOPES (0/001)

AG....	CO3....	LI...	0.04		
AL....	CR....	MG...	1.8		
H.... 0.15	F.... 7.5	NA...	135.	SI02.	64.
HE....	FE(TOT)...	NB...		S04..	120.
CA.... 8.5	HC03.... 160.				
CL.... 52.					
CO....	K.... 3.2				

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976H

RECORD 00046

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027063

NAME OF SAMPLE SOURCE... ROZEMAN (FERRIS) HOT SPRINGS
 WELL/SPRING NUMBER..... 02S-04E-14-0AD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 004E 14 SE OF NE SE

LAT/LONG... 45-39.63 N 111-11.17 W

STATE..... MONTANA

COUNTY..... GALLATIN

MAP REFERENCE..... ROZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1966/11/14 MONTANA STATE BOARD OF HEALTH

DISCHARGE..... 227. L/MIN

PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL.

WATER ANALYSIS

ALKALINITY..... 110. AS CaCO3

ANALYSIS IN MU/L

ISOTOPES (0/001)

AG....	CO3.....	21.			
AL....	CR.....		MG...	N	
H.....	F.....	13.			
HA....	FE+3....		NA+K.	150.	
HE....	FE(TOT). N		NH...		
CA....	MCU3....	91.	NU3..	N	
CL....					

OTHER ANALYTICAL DATA... DISSOLVED NITRATE AS N = .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00047

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027066

NAME OF SAMPLE SOURCE... BOZEMAN (FERRIS) HOT SPRINGS

WELL/SPRING NUMBER..... 02S-04E-14-DAD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 004E 14 SE OF NE SE

LAT/LONG... 45-39.63 N 111-11.17 W

STATE..... MONTANA

COUNTY..... GALLATIN

MAP REFERENCE..... BOZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/07/09 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 54.4

PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 819.

ANALYSIS IN MG/L

ISOTOPIES (0/001)

H.....	F.....	10.	NA...	SI02.	63.
HE....	FE(TOT).		NH...	S04..	130.
HI....	UA.....		NH4..	SR...	0.160
CL....					

OTHER ANALYTICAL DATA... GROSS ALPHA = 1 PICOCURIE/L. AND GROSS BETA = 4 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00048

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027065

NAME OF SAMPLE SOURCE... BOZEMAN (FERRIS) HOT SPRINGS

WELL/SPRING NUMBER..... 02S-04E-14-DAD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 004E 14 SE OF NE SE

LAT/LONG... 45-39.63 N 111-11.17 W

STATE..... MONTANA

COUNTY..... GALLATIN

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... BOZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/02/04 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 54.6

DISCHARGE..... 284. L/MIN

PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL.

WATER ANALYSIS

PH.....	9.5	
SPECIFIC CONDUCTANCE.....	703.	
ALKALINITY.....	93.	AS CaCO3
TOTAL DISSOLVED SOLIDS...	436.	
CHARGE IMBALANCE (% DIFF)...	0.9	

ANALYSIS IN MG/L

AG....		CO3.....	15.	LI....	0.04				
AL....		CR.....		MG...	2.4				
AS....	0.004	CS.....		MN...	0.03				
AU....		CU.....	0.001	MO...	0.011				
H....	0.22	F.....	12.	NA...	130.	SE...	N		
HE....		FE(TQT) N		NB...		SiO2..		57.	
HI....		GA.....		NH4...		SO4...		120.	
HR....		GE.....		NI....	N	SR...		0.16	
CA....	7.0	HCO3.....	83.						
CA+MG.		HG.....	N	PH...	0.002				
CD....	N	H2S.....		PO4...		V....		0.0003	
CL....	48.								
CO....		K.....	3.1			ZN...	N		

LSUIOPES 10/001

OTHER ANALYTICAL DATA... DISSOLVED CO2 = .11 NO2 + NO3 AS N = .021 P = .02
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPIILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00049

GÖTHERN-SÄMPLÉ-LILÉ

GEUTHERM FILE ID: 0027062

NAME OF SAMPLE SOURCE... ROZEMAN HOT SPRINGS (FERRIS)
WELL/SPRING NUMBER..... 02S-U4E-14-UAD

LOCATION

COUNTRY..... UNITED STATES 025 004E 14 SE OF NE SE

COORDINATES

LAT/LONG... 45-39.63 N 111-11.17 W

STATE..... MONTANA
COUNTY..... GALLATIN

COUNTY.....GALLATIN

MAP REFERENCE..... BOZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1951/09/22 HACKETT AND OTHERS

TEMPERATURE (C)..... 60.0

DISCHARGE..... 454. L/MIN

PERTINENT LITHOLOGY..... THICK ALLOVIUM AND TERTIARY FILL

WATER ANALYSIS

PH.....	8.7	
SPECIFIC CONDUCTANCE.....	619.	
ALKALINITY.....	104.	AS CAC03
TOTAL DISSOLVED SOLIDS....	451.	
CHARGE IMBALANCE (% DIFF)...	2.5	

ANALYSIS IN MO/L

AG....		COJ....	8.				
AL....		CR....		MG...	0.4		
N....	0.21	F....	10.	NA...	140.	SI02.	60.
ME....		FE(TOT)...	0.02	NU...		S04..	120.
CA....	3.5	MCUJ....	110.	NUJ..	0.2		
CL....	51.						
CO....		K.....	3.3				

ISOLORES 10/001

OTHER ANALYTICAL DATA... DISSOLVED CO₂ = .4

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00050

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027061

NAME OF SAMPLE SOURCE... BOZEMAN HOT SPRINGS WELL

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 05S 004E 14 SE OF NE SE LAT/LONG... 45-39.62 N 111-11.17 W

STATE..... MONTANA

COUNTY..... GALLATIN

MAP REFERENCE..... BOZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/02/04 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 48.3

WELL DEPTH (M)..... 139.

DISCHARGE..... 7.6 L/MIN

PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL.

OTHER SAMPLE INFORMATION.. WELL WATER LEVEL IS +10.67 M. ABOVE M.P. (TOP OF CA SING .3 M. ABOVE LSD ON 11/13/76).

... WATER USED FOR SWIMMING POOL.

WATER ANALYSIS

PH..... 8.0

SPECIFIC CONDUCTANCE..... 682.

ALKALINITY..... 54.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 361.

CHARGE IMBALANCE (% DIFF)... 2.9

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG.... CO3..... N

AL.... CR.....

H.... F..... 11.

MG... 0.6

NA... 120.

S102.

31.

HE.... FE(TOT).....

NH... 110.

S04..

CA.... 4.4 HCO3.... 66.

CL.... 50.

CO.... K..... 1.2

OTHER ANALYTICAL DATA... CO2 = .91 NO2 PLUS NO3 AS N = .001 P = .061 SECOND SAMPLE REPORTED CA = 5.9 AND SR = .02

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00051

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0046015

NAME OF SAMPLE SOURCE... BOZEMAN HOT SPRINGS WELL

WARNING NUMBER..... 35

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 004E 14 SE OF NE SE LAT/LONG... 45-39.63 N 111-11.17 W

STATE..... MONTANA

COUNTY..... GALLATIN

GEOLOGIC PROVINCE..

MAP REFERENCE..... BOZEMAN 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/25

POINT OF COLLECTION.. WELL USED BY SWIMMING POOL

TEMPERATURE (C)..... 50.0
 AMBIENT TEMP (C)..... 5.8
 PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL.
 OTHER SAMPLE INFORMATION.. SPRINGS NO LONGER ACTIVE. WELL FLOW IN 1976 REPORTED AS 283.9 L/MIN IN 1965 AS 227.1 L/MIN.

WATER ANALYSIS

PH..... 8.6
 SPECIFIC CONDUCTANCE..... 624.
 ALKALINITY..... 132. AS HCO3
 TOTAL DISSOLVED SOLIDS... 498.
 CHARGE IMBALANCE (% DIFF)... 5.5

ANALYSIS IN MG/L

AG....		CO3.....	3.	LI....	0.04	S....	
AL....		CR.....		MG....	2.7	SB....	
AS....		CS.....		MN....	L 0.02		
H....	0.2	F.....	9.2	NA....	120.	SI02..	66.
HE....		FE(TOT)..	0.02	NB....		SO4..	110.
CA....	9.5	HCO3....	132.				
CA+MG..		MG.....		PB....	L 0.1		
CI....		H2S.....	0.6				
CL....	46.						
CU....		K.....	2.8	NB....	0.03	ZN....	L 0.01

ISOTOPES (0/001)

DEL D OF WATER..... -151.3
 DEL D(18) OF WATER... -19.46

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGEN, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00052

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046016

NAME OF SAMPLE SOURCE... BRIDGER CANYON WARM SPRING

WELL/SPRING NUMBER..... 1S-6E-34-UCDU

LOCATION

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... GALLATIN
 GEOLOGIC PROVINCE.. 21

TOWNSHIP-RANGE

01S 006E 34 SE OF SW NW

COORDINATES

LAT/LONG... 45-42.44 N 110-58.53 W

MAP REFERENCE..... BUZEMAN PASS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

TEMPERATURE (C)..... 21.0
 DISCHARGE..... 0 379. L/MIN

OTHER SAMPLE INFORMATION.. WATER USED TO RAISE TROUT. DATE OF ANALYSIS UNKNOWN. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

DATE/ANALYST..... FEDERAL FISH HATCHERY STAFF

PH..... 7.7
 SPECIFIC CONDUCTANCE..... 448.
 TOTAL DISSOLVED SOLIDS... 264.
 CHARGE IMBALANCE (% DIFF)... 5.3

ANALYSIS IN PPM

AG....		CO3.....	11	MG....	23.	SI02..	0.2
AL....		CR.....		NA....	4.3	SO4..	80.
H....		F.....	0.47	NB....			
HE....		FE(TOT)..	L 0.025	NO3..	0.05		
CA....	55.	HCO3....	209.	PO4..	0.01		
CI....		H2S.....					
CL....	0.19						

ISOTOPES (0/001)

CO..... K..... 1.4 ZN... L 0.001
 QUALIFICATION FIELD..... FLOW RANGES FROM 291 TO 1056 L/MIN.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00053

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046008

NAME OF SAMPLE SOURCE... BEARMOUTH WARM SPRINGS #1
 LOCATION TOWNSHIP-RANGE
 COUNTRY..... UNITED STATES 11N 014W 11 SW OF SW SE
 STATE..... MONTANA
 COUNTY..... GRANITE
 GEOLOGIC PROVINCE..
 MAP REFERENCE..... BEARMOUTH 1162500

COORDINATES

LAT/LONG... 46-43.03 N 113-19.32 W
 UTM ZONE... 12
 NORTING... 5176205.
 322666.

OTHER LOCALITY INFORMATION: 3840 FEET ELEVATION.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/17 DONOVAN, J.J.
 TEMPERATURE (C)..... 20.2
 AMBIENT TEMP (C)..... 6.6
 PERTINENT LITHOLOGY..... SPRING AT BASE OF MADISON LIMESTONE.
 OTHER SAMPLE INFORMATION.. SEEPAGE DISCHARGE OF SPRING FEEDS POND.

WATER ANALYSIS

PH..... 7.6
 SPECIFIC CONDUCTANCE..... 642.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00054

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046009

NAME OF SAMPLE SOURCE... BEARMOUTH WARM SPRINGS #2
 LOCATION TOWNSHIP-RANGE
 COUNTRY..... UNITED STATES 11N 014W 12 SE OF SW
 STATE..... MONTANA
 COUNTY..... GRANITE
 GEOLOGIC PROVINCE..
 MAP REFERENCE..... BEARMOUTH 1162500

COORDINATES

LAT/LONG... 46-43.08 N 113-18.33 W
 UTM ZONE... 12
 NORTING... 5176190.
 323800.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/03/18 HOETICHER, A.J.
 SAMPLE NUMBER..... MBMG LAB. NO. 72M0109
 TEMPERATURE (C)..... 15.0
 AMBIENT TEMP (C)..... 6.3
 PERTINENT LITHOLOGY..... POND AT BASE OF MADISON.
 OTHER SAMPLE INFORMATION.. SPRING DISCHARGES INTO POND.

WATER ANALYSIS

PH..... 7.1
 SPECIFIC CONDUCTANCE..... 610.
 ALKALINITY..... 100. AS CAC03
 TOTAL DISSOLVED SOLIDS... 521.
 CHARGE IMBALANCE (% DIFF)... 0.7
 ANALYSIS IN MG/L

ISOLQUES 10/001

AG....		CO3.....	N				
AL....		CR.....		MG...	28.		
AS....		CS.....		MN...	0.01		
H.....		F.....	0.5	NA...	7.6	SI02.	16.
HE....		FE(TOT)...	0.03	NB...		SO4...	103.
CA....	89.	HCO3....	220.	NO3..	0.2		
CL....	1.5						
CU....		K.....	1.8				

OTHER ANALYTICAL DATA... MBMG 78/06/17: TEMP. = 19.6 C; FLOW 4126 L/MIN.; S.C. = 584 UMHOS/CM. PH = 7.5
 REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGEN, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGEN AND OTHERS, 1977

RECORD 00055

GEOTERM SAMPLE FILE

GEOTERM FILE 101 0046051

NAME OF SAMPLE SOURCE... NIMROD SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY.....	UNITED STATES	11N 01SW 14	NE OF SE SW	LAT/LONG...	46-42.33 N 113-27.43 W
STATE.....	MONTANA			UTM ZONE...	+12
COUNTY.....	GRANITE			NORTHING...	5175152.
GEOLOGIC PROVINCE..					312166.

MAP REFERENCE..... BEAUMOUTH 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/03/18
 SAMPLE NUMBER..... MBMG LAB NO. 12-112
 TEMPERATURE (C)..... 19.0
 AMBIENT TEMP (C)..... 6.7

PERTINENT LITHOLOGY..... SPRINGS OCCUR NEAR BASE OF MADISON LIMESTONE OVERLYING CAMBRIAN CARBONATE ROCKS. FROM
 TERTIARY SEDIMENTS.

WATER ANALYSIS

PH..... 7.6
 SPECIFIC CONDUCTANCE..... 856.
 ALKALINITY..... 138. AS CaCO3.
 TOTAL DISSOLVED SOLIDS... 715.
 CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3.....	N				
AL....	0.07	CR.....		MG...	36.		
AS....		CS.....		MN...	0.01		
H.....		F.....	0.8	NA...	15.5	SI02.	21.
HE....		FE(TOT)...	0.01	NB...		SO4...	340.
CA....	126.	HCO3....	168.	NO3..	0.4		
CL....	2.1						
CU....		K.....	3.4				

OTHER ANALYTICAL DATA... MBMG 19/8/06/17: TEMP.=20.5 C, FLOW= 12185. L/MIN., PH= 7.76, S.C.= 856 UMHOS/CM.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGEN, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGEN AND OTHERS, 1977

RECORD 00056

GEOTERM SAMPLE FILE

GEOTERM FILE 101 0027114

NAME OF SAMPLE SOURCE... ALMAHRA HOT SPRINGS (NORTH)

WELL/SPRING NUMBER..... 08N-UJW-16-AAC2
 WARING NUMBER..... 18
 LOCATION
 COUNTRY..... UNITED STATES TOWNSHIP-RANGE SW OF NE NE
 STATE..... MONTANA 08N 003W 16
 COUNTY..... JEFFERSON COORDINATES
 MAP REFERENCE..... CLANCY 1162500 LAT/LONG... 46-26.98 N 111-58.83 W
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1976/06/29 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 59.4
 DISCHARGE..... 30. L/MIN
 WATER ANALYSIS
 PH..... 7.2
 SPECIFIC CONDUCTANCE..... 827.
 TOTAL SUSPENDED SOLIDS... 740.
 ANALYSIS IN MG/L
 H..... F..... NA... S102. 67.
 HE..... FE(TOT). NO... S04.. 140.
 CL.... 11. K..... 10.
 GAS ANALYSIS
 DATE/ANALYST..... 1976/06/29 (COLLECTION DATE)
 ANALYSIS IN VOLUME %
 CO2.. 02... 0 4.1
 OTHER ANALYTICAL DATA... DISSOLVED GROSS ALPHA AS U-NAT. = .291 DISSOLVED GROSS BETA AS CS-137 = 81 PICOCURIES/L.
 DISSOLVED GROSS BETA AS SR90/Y90 = 66 PICOCURIES/L. DISSOLVED RA-226 RADON METHOD = 40 PICOCURIES/L. DISSOLVED
 RADON 222 = 3000 PICOCURIES/L. DISSOLVED URANIUM (DIRECT FLOUROMETRIC) = .9 PICOCURIES/L.
 QUALIFICATION FIELD... OXYGEN VALUE IN GAS ANALYSIS REPRESENTS O2+AR.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00057

GEOTHERM FILE 101 0027113

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (NORTH)
 WELL/SPRING NUMBER..... 08N-UJW-16-AAC2
 WARING NUMBER..... 18
 LOCATION
 COUNTRY..... UNITED STATES TOWNSHIP-RANGE SW OF NE NE
 STATE..... MONTANA 08N 003W 16
 COUNTY..... JEFFERSON COORDINATES
 MAP REFERENCE..... CLANCY 1162500 LAT/LONG... 46-26.98 N 111-58.83 W
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1974/08/29 ROBERISON, FOURNIER AND STRONG
 TEMPERATURE (C)..... 59.0
 DISCHARGE..... 16. L/MIN
 OTHER SAMPLE INFORMATION.. ISOTOPIC SAMPLE DATED 8/23/74 FROM MARINER AND OTHERS, 1976B
 WATER ANALYSIS
 ALKALINITY..... 418. AS CaCO3
 ANALYSIS IN MG/L
 AG..... CO3..... LI... 0.38 S...
 AL..... CR..... MG... 3.2 SB...
 H..... 0.2 F..... 4.8 NA... 220. S102. 65.
 HE..... FE(TOT). NO... S04.. 93.

ISOTOPES (0/001)

DEL D OF WATER..... -146.5
 DEL O(18) OF WATER... -19.23

CA.... 19. MC03.... 510.
 CO.... K..... 10.
 QUALIFICATION FIELD.... ISOTOPIC SAMPLE DATED 8-23-74, FROM MARINER AND OTHERS, 1976.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00058

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027112

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (NORTH)
 WELL/SPRING NUMBER..... OHN-03W-16-AAC2
 WARING NUMBER..... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES UBN 003W 16 SW OF NE NE
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... CLANCY 1162500
 LAT/LONG... 46-26.98 N 111-58.83 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/07/29 KACZMAREK
 TEMPERATURE (C)..... 50.0

WATER ANALYSIS

PH..... 7.0
 ANALYSIS IN MG/L

ISOTOPES (D/001)

AL.... CR..... MG... 3.3
 H.... F..... NA... 150. S102. 37.
 CA.... 21.
 CL.... 13.
 CO.... K..... 10.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00059

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046000

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (NORTH)
 WARING NUMBER..... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES UBN 003W 16 SW OF NE NE
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... CLANCY 1162500
 LAT/LONG... 46-26.98 N 111-58.83 W
 UTM ZONE... +12
 NORthing... 5144259.
 424693.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/23
 POINT OF COLLECTION.. GALVANIZED PIPE FROM SPRING TO SWIMMING POOL.
 TEMPERATURE (C)..... 56.5
 AMBIENT TEMP (C)..... 5.8

DISCHARGE..... E 40. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK

OTHER SAMPLE INFORMATION.. NUMEROUS SMALL CARBONATE MOUNDS.

WATER ANALYSIS

PH..... 7.2

SPECIFIC CONDUCTANCE..... 429.
 ALKALINITY..... 484. AS HCO₃
 TOTAL DISSOLVED SOLIDS... 660.
 CHARGE IMBALANCE (A DIFF)... 5.0
 ANALYSIS IN MG/L

AG....		CO ₃	L 1.0	LI...	0.32	S....	
AL....	0.001	CR....		MG...	3.5	SB...	
AS....		CS....	L 0.1	MN...	L 0.02		
AM....		CU....	L 0.01				
H....	0.24	F....	8.4	NA...	220.	SI02.	60.
HE....		FE(TOT)...	L 0.02	NB...		SO ₄ ..	89.
HR....		GE....		NI...	L 0.02		
CA....	14.	HCO ₃	480.				
CA-MG...		MG....	L 0.0001	PB...	L 0.1		
CO....	L 0.01	H ₂ S....	L 0.5	PO ₄ ..	L 0.02		
CL....	10.						
CO....	L 0.05	K....	9.5	KB...	0.05	ZN...	0.06

ISOTHERMS 10/2001
 DEL D OF WATER..... -146.5
 DEL D(18) OF WATER... -19.23

OTHER ANALYTICAL DATA... AMMONIA AS NI L 0.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00060

GEOCHEMICAL SAMPLE FILE

GEOCHEM FILE 101 0027111

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (NORTH)

WELL/SPRING NUMBER..... 08N-U3W-16-AAC2

WATER NUMBER..... 1H

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 003W 16 SW OF NE NE

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 116250W

LAT/LONG... 46-26.98 N 111-58.83 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/29 FOURNIER AND ROBERTSON

TEMPERATURE (C)..... 53.0

WATER ANALYSIS

P..... 8.5
 ALKALINITY..... 359. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 637.
 CHARGE IMBALANCE (A DIFF)... 4.0
 ANALYSIS IN MG/L

AG....		CO ₃	9.	LI...	0.33		
AL....		CR....		MG...	0.3		
H....	0.25	F....		NA...	200.	SI02.	64.
HE....		FE(TOT)...		NB...		SO ₄ ..	88.
CA....	4.0	HCO ₃	420.				
CL....	49.						
CO....		K....	11.				

ISOTHERMS 10/2001

OTHER ANALYTICAL DATA... CO₂ = 2.2

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00061

GEOCHEMICAL SAMPLE TITLE

GEOTHERM FILE 101 0027105

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER... 08N-U3W-16-ACD
WATER NUMBER... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY... UNITED STATES 08N 003W 16 SE OF SW NE

LAT/LONG... 46-26.78 N 111-58.97 W

STATE... MONTANA

COUNTY... JEFFERSON

MAP REFERENCE... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR... 1976/12/02 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)... 54.4

DISCHARGE... 189. L/MIN

WATER ANALYSIS

pH... 8.8

SPECIFIC CONDUCTANCE... 1510.

ALKALINITY... 572. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 1000.

TOTAL SUSPENDED SOLIDS... 1000.

CHARGE IMBALANCE (% DIFF)... 4.3

ANALYSIS IN MG/L

AL... CR... MG... 4.3

S... F... NA... 300.

HI... FE(TOT)... 504.. 100.

CA... 27. HCO₃... 698.CA-MG... H₂... PB... U.... L 0.0004

CL... 24.

CO... K... 16.

OTHER ANALYTICAL DATA... CO₂ = 177. MG/L. RADIATION DATA AS PICOCURIES/L: DISSOLVED GROSS BETA AS CS-137 = 210.,
DISSOLVED GROSS BETA AS SR-90/Y-90 = 170., DISSOLVED RA-226 = 73., DISSOLVED RA-222 = 17,000., DISSOLVED URANIUM
(DIRECT FLUOREMETRIC) = 10.4

REFERENCE AND IDENTIFICATION

COMPILED BY... FALLS, HAMILYN

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE... LEONARD AND OTHERS, 1978.

RECORD 00062

GEOCHEMICAL SAMPLE TITLE

GEOTHERM FILE 101 0027069

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER... 08N-U3W-16-ACD
WATER NUMBER... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY... UNITED STATES 08N 003W 16 SE OF SW NE

LAT/LONG... 46-26.78 N 111-58.97 W

STATE... MONTANA

COUNTY... JEFFERSON

MAP REFERENCE... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR... 1967/09/29 FOURNIER AND ROBERTSON

TEMPERATURE (C)... 54.0

PERMEANT LITHOLOGY... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS.

WATER ANALYSIS

pH... 8.8

ALKALINITY..... 543. AS CaCO3

CHARGE IMBALANCE (% DIFF)... 5.2

ANALYSIS IN MG/L

AG....		CO3....	21.	LI...	0.7		
AL....		CR....		MG...	4.5		
H....	0.46	F....		NA...	330.		
HE....		FE(TOT)...		NH...		504..	160.
CA....	6.8	HCO3....	620.				
CL....	22.						
CO....		K.....	17.				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... DISSOLVED CO2 = 2.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00063

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027067

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)

WELL/SPRING NUMBER..... 08N-03W-10-ACD

WELLING NUMBER..... 10

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 003W 16 SE OF SW NE

LAT/LONG... 46-26.78 N 111-58.97 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1102500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1959/01/12 MONTANA STATE BOARD OF HEALTH

PERTINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS

WATER ANALYSIS

ALKALINITY..... 500. AS CaCO3

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3....	N	MG...	18.		
AL....		CR....		NA+K...	248.		
H....		F....	1.5	NH...		504..	150.
HA....		FE+3....		NH3..	L 0.1		
HE....		FE(TOT)...	0.2				
CA....	75.	HCO3....	610.				
CL....	15.						

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00064

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027071

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)

WELL/SPRING NUMBER..... 08N-03W-10-ACD

WELLING NUMBER..... 10

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 003W 16 SE OF SW NE

LAT/LONG... 46-26.78 N 111-58.97 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1102500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/04/08 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 55.
 DISCHARGE..... 189. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS

WATER ANALYSIS

PH..... 6.7
 SPECIFIC CONDUCTANCE..... 1580.
 ALKALINITY..... 504. AS CaCO_3
 TOTAL DISSOLVED SOLIDS... 953.
 CHARGE IMBALANCE (% DIFF)... 0.0
 ANALYSIS IN MG/L

AG....	CO3.... N	LI....	0.710	S....	
AL....	CR....	MG....	5.2	SB....	
AS.... 0.036	CS....	MN....	0.020		
AU....	CU.... N	MO....	0.015	SE... N	
B.... 0.410	F.... 9.0	NA....	310.	SI02..	61.
BE.... 0.010	FE(TOT).. 0.120	NB....		S04..	150.
BI....	GA....	NH4..		SR....	1.9
BR....	GE....	NI....	0.01		
CA.... 27.	HCO3.... 712.	PO....	0.002	V....	0.0007
CA+MG.	HG.... N				
CD.... N	H2S....				
CL.... 20.					
CO....	K..... 17.	ZN... N			

ISOTOPES 10/001

DEL D OF WATER..... -149.0
 DEL O(18) OF WATER... -18.35

OTHER ANALYTICAL DATA... $\text{CO}_2 = 227.1$ $\text{NO}_2 + \text{NO}_3$ AS N = .001 P = .021 SECOND SAMPLE SAME DATE REPORTS: CA = 26, SI02 = 59, SH = 1.60

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00065

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027070

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
 WELL/SPRING NUMBER..... 08N-UJW-16-ACU
 WARING NUMBER..... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 003W 16 SE OF SW NE LAT/LONG... 46-26.78 N 111-58.97 W
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1973/07/29 KACZMARAK
 TEMPERATURE (C)..... 54.0
 DISCHARGE..... 1893. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS.

WATER ANALYSIS

PH..... 7.5
 ANALYSIS IN MG/L
 H....
 HE....
 CA.... 26.
 CL.... 20.
 CO....
 K..... 15.

ISOTOPES 10/001

NA.... 270.
 NB....
 S04.. 54. -

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00066

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027074

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
 WELL/SPRING NUMBER..... 08N-03W-16-ACD
 WADING NUMBER..... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES   08N 003W 16   SE OF SW NE   LAT/LONG... 46-26.78 N 111-58.97 W
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/08/17 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 55.0
 DISCHARGE..... 189. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK; NUMEROUS SMALL CARBONATE MOUNDS.
 OTHER SAMPLE INFORMATION.. ABNORMAL LEVELS OF RADIOACTIVITY REPORTED.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 1540.
 TOTAL DISSOLVED SOLIDS... 1301.
 TOTAL SUSPENDED SOLIDS... 1300.
 ANALYSIS IN MU/L

ISOTOPE (0/001)

CO..... K..... 16.
 OTHER ANALYTICAL DATA... RADIATION DATA IN PICOCURIES/L: DISSOLVED GROSS ALPHA AS U-NAT. = .310 MG/L; SUSPENDED GROSS ALPHA AS U-NAT. = L .0004 MG/L; DISSOLVED GROSS BETA AS CS-137 = 270; SUSPENDED GROSS BETA AS CS-137 = L0.4; DISSOLVED GROSS BETA AS SR90/Y90 = 230; SUSPENDED GROSS BETA AS SR90/Y90 = L0.4; DISSOLVED RA-226 = 61.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00067

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027073

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
 WELL/SPRING NUMBER..... 08N-03W-16-ACD
 WADING NUMBER..... 18

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES   08N 003W 16   SE OF SW NE   LAT/LONG... 46-26.78 N 111-58.97 W
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/12/02 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 54.4
 DISCHARGE..... 189. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK; NUMEROUS SMALL CARBONATE MOUNDS.
 OTHER SAMPLE INFORMATION.. ABNORMAL LEVELS OF RADIOACTIVITY REPORTED.

WATER ANALYSIS

PH..... 6.8
 SPECIFIC CONDUCTANCE..... 1510.

ALKALINITY..... 572. AS CACU3

TOTAL DISSOLVED SOLIDS... 1000.

CHARGE IMBALANCE (% DIFF)... 4.3

ANALYSIS IN MG/L

AL....

CR.....

MG...

4.3

ISOTOPES 10/001

H.....

F.....

NA...

300.

HE.....

FE(TOT)

NU...

504.. 160.

CA.....

27.

HCO3....

698.

CL.....

20.

CO.....

K.....

16.

OTHER ANALYTICAL DATA... CO2 = 177 MG/L. RADIATION DATA IN PICOCURIES/L. IS DISSOLVED GROSS ALPHA AS U-NAT = .890,
DISSOLVED GROSS BETA AS CS-137 = 210., DISSOLVED GROSS BETA AS SR90/Y90 = 170., DISSOLVED RA-226 = 73., DISSOLVED
RA-222 = 17000.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00068

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027072

NAME OF SAMPLE SOURCE... ALMAMBA HOT SPRINGS (SOUTH)

WELL/SPRING NUMBER..... 08N-03W-16-ACD

WATER NUMBER..... 18

LOCATIONTOWNSHIP=RANGECOORDINATES

COUNTRY..... UNITED STATES

08N 003W 16 SE OF SW NE

LAT/LONG... 46-26.78 N 111-58.97 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/04/28 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 55.5

DISCHARGE..... 189. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS.

OTHER SAMPLE INFORMATION.. ABNORMAL LEVELS OF RADIOACTIVITY REPORTED.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 1570.

TOTAL DISSOLVED SOLIDS... 1000.

ANALYSIS IN MG/L

GAS ANALYSIS

DATE/ANALYST..... 1976/04/29

ANALYSIS IN VOLUME %

CH4... N

ISOTOPES 100/01

C2H6...

N2... 86.2

CO2... 8.1

OTHER ANALYTICAL DATA... DISSOLVED GROSS ALPHA AS U-NAT = .930, DISSOLVED GROSS BETA AS CS-137 = 220, DISSOLVED
GROSS BETA AS SR 90/Y 90 = 170., DISSOLVED RADON 222 = 10,000., (ALL IN PICO-CURIES/L). GAS ANALYSIS OF 2 SAMPLES
1976/04/29 = 02 PLUS AK = 5.7, 6.01 SAMPLE NO.2 CONTAINED N2 = 85.2, CH4 = 0.0, CO2 = 9.6

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00069

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027106

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-U3W-16-ACD
WATER NUMBER..... 18

LOCATION
COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
STATE..... MONTANA   08N 003W 16   SE OF SW NE
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1162500

COORDINATES
LAT/LONG... 46-26.78 N 111-58.97 W

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1977/08/12 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 54.4
DISCHARGE..... 189. L/MIN

WATER ANALYSIS
SPECIFIC CONDUCTANCE..... 1460.
ANALYSIS IN MG/L
CL..... 20.

ISOTOPIES 10/001

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00070

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027068

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-U3W-16-ACD
WATER NUMBER..... 18

LOCATION
COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
STATE..... MONTANA   08N 003W 16   SE OF SW NE
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1162500

COORDINATES
LAT/LONG... 46-26.78 N 111-58.97 W

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1964/08/05 MONTANA STATE BOARD OF HEALTH
TEMPERATURE (C)..... 51.

PERMINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNUS.

WATER ANALYSIS
ALKALINITY..... 582.   AS CaCO3
ANALYSIS IN MG/L

ISOTOPIES 10/001

AG....	CO3....	N			
AL....	CR....		MG...	5.0	
NA....	F....	7.8			
HA....	FE3....		NA+K...	314.	
HF....	FE(II)...	0.8	NB...		
CA....	MG3....	719.	NO3... N	504..	150.
CL....					

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976 B

RECORD 00071

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027117

NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (COLLECTION DATE)
WELL/SPRING NUMBER..... 08N-U3W-16-AAC

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP=RANGE   COORDINATES
 STATE..... MONTANA   08N 003W 16   SW OF NE NE   LAT/LONG... 46-27.01 N 111-58.83 W
 COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/06/29 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 54.0 AT (M)..... 31.

DISCHARGE..... 151. L/MIN

WATER ANALYSIS

PH..... 6.8

SPECIFIC CONDUCTANCE..... 1040.

TOTAL SUSPENDED SOLIDS... 660.

ANALYSIS IN MU/L

H.....

F.....

NA...

S102.

61.

HE.....

FE(TOT).

NH...

S04...

90.

CL..... 9.9

CO.....

K..... 9.5

OTHER ANALYTICAL DATA... DISSOLVED GROSS ALPHA AS U-NAT. = .241 DISSOLVED GROSS BETA AS CS-137 = 69 PICOCURIES/L.
 DISSOLVED GROSS BETA AS SR90/Y90 = 57 PICOCURIES/L. DISSOLVED RA-226 (RADON METHOD) = 27 PICOCURIES/L. DISSOLVED
 RA-222 = 11.000 PICOCURIES/L. DISSOLVED URANIUM (DIRECT FLOUROMETRIC) = .9 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00072

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027115

NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (NORTH)

WELL/SPRING NUMBER..... 08N-003W-16-AAC

WATERING NUMBER..... 16

LOCATION

COUNTRY..... UNITED STATES   TOWNSHIP=RANGE   COORDINATES

STATE..... MONTANA   08N 003W 16   SW OF NE NE   LAT/LONG... 46-27.02 N 111-58.83 W

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/04/29 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 52.2 AT (M)..... 31.

DISCHARGE..... 174. L/MIN

WATER ANALYSIS

PH..... 6.8

SPECIFIC CONDUCTANCE..... 1040.

TOTAL SUSPENDED SOLIDS... 720.

ANALYSIS IN MU/L

AG.....

CO3.....

LI...

0.36

S....

ISOTOPES (U/001)

DEL D OF WATER..... -147.3

DEL O(18) OF WATER... -19.93

AL.....

CR.....

MG...

0.02

SH...

AS..... 0.025

CS.....

MN...

0.023

SE... N

AI.....

CU.....

1.

H..... 0.41

FE(TOT).

0.12

HE..... N

GA.....

NH4..

SR... 1.

HI.....

GE.....

NI...

0.002

HP.....

HI.....

PH...

0.002

CA.....

H2S.....

PO4..

V....

0.001

CO.....

CO.... K.....
 GAS ANALYSIS
 DATE/ANALYST..... 1976/04/29 (COLLECTION DATE)
 ANALYSIS IN VOLUME %

ZN... N

ISOTOPIES (00/01)

CH4... N
 C2H6...
 CO2... 6.5
 N2... 89.9
 O2... 4.2
 OTHER ANALYTICAL DATA... DISSOLVED GROSS ALPHA AS U-NAT. = .41; DISSOLVED GROSS BETA AS CS-137 = 110. PICOCURIES/L.;
 DISSOLVED GROSS BETA AS SR90/Y90 = 83 PICOCURIES/L.; DISSOLVED RA-226 (RADON METHOD) = 28 PICOCURIES/L.
 QUALIFICATION FIELD... 02 = 02 + AR.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00073

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027118

NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (NORTH)
 WELL/SPRING NUMBER..... 08N-03W-16-AAC

LOCATIONTOWNSHIP-RANGECOORDINATES

COUNTRY..... UNITED STATES 08N 003W 16 SW OF NE NE
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... CLANCY 1162500
 LAT/LONG... 46-27.01 N 111-58.83 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/12/02 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 52.2 AT (M)... 31.

WATER ANALYSIS

P..... 7.0
 SPECIFIC CONDUCTANCE..... 1000.
 ALKALINITY..... 378. AS CaCO3
 TOTAL SUSPENDED SOLIDS... 680.
 CHARGE IMBALANCE (% DIFF)... 3.8
 ANALYSIS IN MG/L

ISOTOPIES (00/001)

AL....	CR.....	MG...	3.3
H....	F.....	NA...	190.
HE....	FE(TOT)...	NB...	504.. 86.
CA.... 18.	HCO3.... 461.	PH...	U.... 0.0008
CA+MG.	MG.....		
CL.... 10.			
CO....	K.....		9.6

GAS ANALYSIS
 DATE/ANALYST..... 1976/12/02 (COLLECTION DATE)
 ANALYSIS IN VOLUME %

ISOTOPIES (00/001)

CH4... L 0.1
 C2H6... L 0.1
 CO2... 7.7
 N2... 89.4
 O2... 1.9
 OTHER ANALYTICAL DATA... CO2 = 74.1 DISSOLVED GROSS ALPHA AS U-NAT. = .36; DISSOLVED GROSS BETA AS CS-137 = 90
 PICOCURIES/L.; DISSOLVED GROSS BETA AS SR90/Y90 = 73 PICOCURIES/L.; DISSOLVED RA-226 (RADON METHOD) = 28
 PICOCURIES/L.; DISSOLVED RADON 222 = 24.000 PICOCURIES/L.; DISSOLVED URANIUM (DIRECT FLOWMETERIC) = .8 PICOCURIES/L.
 QUALIFICATION FIELD... 02 = 02 + AR.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00074

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027116

NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (NORTH)

WELL/SPRING NUMBER... 00N-03W-16-AAC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY... UNITED STATES 00N 003W 16 SW OF NE NE

LAT/LONG... 47-27.01 N 111-58.83 W

STATE... MONTANA

COUNTY... JEFFERSON

MAP REFERENCE... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION... 1976/04/29 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)... 52.0 AT (M)... J1.

DISCHARGE... 174. L/MIN

WATER ANALYSIS

PH... 6.8

SPECIFIC CONDUCTANCE... 1040.

ALKALINITY... 380. AS CaCO3

TOTAL DISSOLVED SOLIDS... 613.

CHANGE IMBALANCE (% DIFF)... 3.8

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG... CO3... N

AL... CH... 3.9

H... F... 7.4

HE... FE(TOT)... 190. 5102. 58.

CA... 17. NC03... 463. 504.. 88.

CL... 8.7

CO... K... 9.9

OTHER ANALYTICAL DATA... CO2 = 117.1 NO2 + NO3 = .021 P = .02

REFERENCE AND IDENTIFICATION

COMPILED BY... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE... LEONARD AND OTHERS, 1978

RECORD 00075

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046014

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS

WELL/SPRING NUMBER... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY... UNITED STATES 05N 004W 10 NW OF NE SW

LAT/LONG... 46-11.88 N 112-05.62 W

STATE... MONTANA

UTM ZONE... 12

COUNTY... JEFFERSON

NORTHING... 5116410.

GEOLOGIC PROVINCE...

415615.

MAP REFERENCE... BOULDER 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION... 1974/08/22

POINT OF COLLECTION... ROUND CONCRETE TANK BEHIND HOTEL

TEMPERATURE (C)... 76.0

AMBIENT TEMP (C)... 5.4

DISCHARGE... 2233.

PERTINENT LITHOLOGY... GRANITE BEDROCK

WATER ANALYSIS

PH... 8.5

SPECIFIC CONDUCTANCE... 523.

ALKALINITY..... 139. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 420.
 CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

AG....	CO3....	4.	LI...	0.24	S....	
AL....	CR....		MG...	L 0.1	SB...	
AS....	CS....	L 0.1	MN...	L 0.02		
AU....	CU....	L 0.01				
B....	F....	11.	NA...	120.	SI02.	108.
BE....	FE(TOT)...	0.02	NB...		S04..	74.
BR....	GE....		NI...	L 0.02		
CA....	HC03....	161.				
CA+MG.	HG....	0.0001	PB...	L 0.1		
CD....	H2S....	L 0.5				
CL....						
CO....	K....	3.8	KB...	0.06	ZN...	L 0.01

ISOTOPE 10/001

DEL D OF WATER..... -146.5
 DEL O(18) OF WATER... -19.03

OTHER ANALYTICAL DATA... DISSOLVED AMMONIA NITROGEN AS N = L .1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00076

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0002906

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS

WELL/SPRING NUMBER..... 05N-JU4W-10-CAB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 004W 04 NW OF NE SW LAT/LONG... 46-11.88 N 112-05.62 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... BOULDER, MONT. 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/22

POINT OF COLLECTION.. FROM OPEN STAND PIPE SOUTHEAST OF HOTEL.

TEMPERATURE (C)..... 62.0

PERTINENT LITHOLOGY..... GRANITE BEDROCK.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN CONCRETE TANK NEAR SWIMMING POOL.

WATER ANALYSIS

P.I..... 8.5

SPECIFIC CONDUCTANCE..... 525.

ALKALINITY..... 171.

CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

AS HCO3

AG....	CO3....		LI...	0.22	S....	
AL....	CR....		MG...	L 0.1	SB...	
AS....	CS....		MN...	L 0.02		
B....	F....	11.	NA...	120.	SI02.	106.
BE....	FE(TOT)...		NB...		S04..	74.
CA....	HC03....	171.				
CD....	H2S....	L 0.5				
CL....						
CO....	K....	3.8	KB...	0.06	ZN...	0.01

ISOTOPE 10/001

DEL D OF WATER..... -146.1
 DEL O(18) OF WATER... -18.91

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... MARINER AND OTHERS, 1976b

RECORD 00077

GEOHEM SAMPLE FILE

GEOHEM FILE 101 0027051

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
 WELL/SPRING NUMBER..... 05N-04W-10-CAH
 MARKING NUMBER..... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 004W 10 NW OF NE SW
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... BOULDER 1162504

LAT/LONG... 46-11.88 N 112-05.62 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/04/27 U.S. GEOLOGICAL SURVEY
 POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL
 TEMPERATURE (C)..... 74.4

PERTINENT LITHOLOGY..... GRANITE BEDROCK.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 622.
 ALKALINITY..... 139. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 410.
 CHARGE IMBALANCE (% DIFF)... 0.2

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3....	LI....	0.25		
AL....	CR....	MG....	N		
H....	0.57	F....	12.	SI02.	96.
HE....		FE(TOT)...	0.02	S04..	74.
HI....		GA....		SR...	0.16
CA....	2.3	HCO3....	169.		
CL....	18.				
CO....		K.....	3.8		

OTHER ANALYTICAL DATA... DISSOLVED NO2 PLUS NO3 = .001 P = .011 SAMPLE DATED 7-15-76 SHOWS GROSS ALPHA AND GROSS BETA = 0.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00078

GEOHEM SAMPLE FILE

GEOHEM FILE 101 0027049

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
 WELL/SPRING NUMBER..... 05N-04W-10-CAH
 MARKING NUMBER..... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 004W 10 NW OF NE SW
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... BOULDER 1162504

LAT/LONG... 46-11.88 N 112-05.62 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG
 POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL
 TEMPERATURE (C)..... 76.0

PERTINENT LITHOLOGY..... GRANITE BEDROCK.

OTHER SAMPLE INFORMATION.. ISOTOPIIC SAMPLE 1 DATE 8/22/74; ISOTOPIIC SAMPLE 2 (SAME DATE) REPORTS DEL D FOR WATER =

-10.5 AND DEL 18.0 FOR WATER = -19.03

WATER ANALYSIS

ALKALINITY..... 104. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 437.

CHARGE IMBALANCE (% DIFF)... 3.8

ANALYSIS IN MG/L

AG....	CO ₃	LI...	0.26	S....	
AL....	CR....	MG...	N	SB...	
R.... 0.53	F.... 6.9	NA...	124.	SI02..	100.
HE....	FE(TOT)..	NH...		S04..	74.
CA.... 2.3	HCO ₃ .... 200.				
CL.... 24.					
CO....	K..... 3.8				

ISOTOPES 10/2001

DEL D OF WATER..... -146.0

DEL O(18) OF WATER... -18.91

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00079

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027047

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS

WELL/SPRING NUMBER..... 05N-04W-10-CAB

WORKING NUMBER..... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 004W 10 NW OF NE SW

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... BOULDER 1162500

LAT/LONG... 46-11.88 N 112-05.62 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL

TEMPERATURE (C)..... 67.0

PERTINENT LITHOLOGY..... GRANITE BEDROCK

WATER ANALYSIS

P..... 8.4

ALKALINITY..... 144. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 407.

CHARGE IMBALANCE (% DIFF)... 10.3

ANALYSIS IN MG/L

AG....	CO ₃ .... 3.	LI...	0.21		
AL....	CR....	MG...	N		
R.... 0.63	F....	NA...	120.	SI02..	95.
HE....	FE(TOT)..	NH...		S04..	79.
CA.... 3.3	HCO ₃ .... 170.				
CL.... 17.					
CO....	K..... 5.5				

ISOTOPES 10/2001

OTHER ANALYTICAL DATA... CO₂ = 1.1 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00080

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027048

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
 WELL/SPRING NUMBER..... 05N-04W-10-CAB
 WARING NUMBER..... 19

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   05N 004W 10   NW OF NE SW   COORDINATES
 STATE..... MONTANA   LAT/LONG... 46-11.88 N 112-05.62 W
 COUNTY..... JEFFERSON
 MAP REFERENCE..... BOULDER 1162500

SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1973/07/23 KACZMAREK
 POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL
 TEMPERATURE (C)..... 75.0
 DISCHARGE..... 6 3785. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK.

WATER ANALYSIS
 P..... 8.3
 ANALYSIS IN MG/L
 AL..... CR..... MG... 0.7
 H..... F..... NA... 100.   SI02.   64.
 CA... 6.0
 CL... 18.
 CO... K..... 2.5

REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00081

GEOOTHERM SAMPLE FILE

GEOOTHERM FILE ID: 0027046

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
 WELL/SPRING NUMBER..... 05N-04W-10-CAB
 WARING NUMBER..... 19

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   05N 004W 10   NW OF NE SW   COORDINATES
 STATE..... MONTANA   LAT/LONG... 46-11.88 N 112-05.62 W
 COUNTY..... JEFFERSON
 MAP REFERENCE..... BOULDER 1162500

SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1964/11/24 MONTANA STATE BOARD OF HEALTH
 POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL
 TEMPERATURE (C)..... 78.0
 DISCHARGE..... 946. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK

WATER ANALYSIS
 ALKALINITY..... 148.   AS CaCO3
 ANALYSIS IN MG/L
 AG..... CO3..... 15.
 AL..... CR..... MG... N
 H..... F..... 15.
 NA..... FE+3..... NA+K.   132.
 ME..... FE(TOT). N   NB...   504..   78.
 CA... 4.0   HCO3... 150.   NO3.. N
 CL... 22.

OTHER ANALYTICAL DATA... DISSOLVED NITRATE AS N= .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00082

GEOTHERM FILE ID: 0027050

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
 WELL/SPRING NUMBER..... 05N-04W-10-CAB
 WARING NUMBER..... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 004W 10 NE OF NE SW
 STATE..... MONTANA
 COUNTY..... JEFFERSON
 MAP REFERENCE..... BOULDER 1102500

LAT/LONG... 46-11.88 N 112-05.62 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/03/26 U.S. GEOLOGICAL SURVEY
 POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL
 TEMPERATURE (C)..... 76.0
 PERTINENT LITHOLOGY..... GRANITE BEDROCK.
 OTHER SAMPLE INFORMATION.. ISOTOPIC SAMPLE DATE: 3/31/76

WATER ANALYSIS

PH..... 8.8
 SPECIFIC CONDUCTANCE..... 579.
 ALKALINITY..... 140. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 416.
 CHARGE IMBALANCE (% DIFF)... 1.2

ANALYSIS IN MG/L

AG....	CO ₃	LI...	0.26	S....	
AL....	CR....	MG...	0.1	SB...	
AS.... 0.018	CS....	MN... N			
AU....	CU.... N	MU...	0.044	SE... N	
H.... 0.57	F.... 12.	NA...	120.	SI02.. 95.	
HE....	FE(TOT).. 0.01	NB...		SO4... 80.	
HI....	GA....	NH4..		SR... 0.14	
HR....	GE....	NI...	0.007		
CA.... 2.8	HCO ₃ .... 171.				
CA+MG..	HG.... N	PH...	0.001		
CD.... N	H ₂ S....	PO4..		V.... 0.0007	
CL.... 17.					
CO....	K..... 4.0				

ISOTOPES (0/00)

DEL D OF WATER..... -148.0
 DEL O(18) OF WATER... -18.60

OTHER ANALYTICAL DATA... CO₂ = 0.4 MG/L NO₂ PLUS NO₃ = .001 P = .03 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00083

GEOTHERM FILE ID: 0027052

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... BOULDER SPRING - 1
 WELL/SPRING NUMBER..... 05N-04W-10-CAB
 WARING NUMBER..... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES USN 004W 10 NW OF NE SW
 STATE..... MONTANA

LAT/LONG... 46-11.88 N 112-05.62 W

COUNTY..... JEFFERSON
 MAP REFERENCE..... BOULDER 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1973/07/28 KACZMAREK
 TEMPERATURE (C)..... 59.0
 DISCHARGE..... 7.6 L/MIN
 WATER ANALYSIS

P..... 7.0

ANALYSIS IN MG/L

H..... F..... NA... 82. S102. 100. ISOTOPES (0/001)

CA.... 10.

CL.... 22.

CO.... K..... 3.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00084

 GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027053

NAME OF SAMPLE SOURCE... BOULDER SPRING - 2

WELL/SPRING NUMBER..... 05N-004W-10-CAB

WATER NUMBER..... 19

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T5N 004W 10 NW OF NE SW

LAT/LONG... 46-11.88 N 112-05.62 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... BOULDER 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/07/28 KACZMAREK

TEMPERATURE (C)..... 64.0

DISCHARGE..... 19. L/MIN

WATER ANALYSIS

P..... 7.0

ANALYSIS IN MG/L

H..... F..... NA... 74. S102. 97. ISOTOPES (0/001)

CA.... 10.

CL.... 17.

CO.... K..... 3.2

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00085

 GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027054

NAME OF SAMPLE SOURCE... BOULDER TUNNEL

WELL/SPRING NUMBER..... 05N-004W-10-CAB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T5N 004W 10 NW OF NE SW

LAT/LONG... 46-11.88 N 112-05.62 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... BOULDER, MONT. 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1973/07/28
 TEMPERATURE (C)..... 42.0
 DISCHARGE..... 7.6 L/MIN

WATER ANALYSIS

PH..... 7.0

ANALYSIS IN MG/L

H..... F..... NA... 84. SI02. 97. ISOTOPES 10/001
 CA... 10.
 CL... 22.
 CO... K..... 3.3

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00086

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027107

NAME OF SAMPLE SOURCE... MILLBROOK FLOWING WELL

WELL/SPRING NUMBER..... 08N-UJW-16-BDA

LOCATION

COUNTRY..... UNITED STATES TOWNSHIP-RANGE UBN 003W 16 NE OF SE NW

STATE..... MONTANA

COUNTY..... JEFFERSON

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... CLANCY 1162500

OTHER LOCALITY INFORMATION: ALHAMBRA HOT SPRINGS AREA

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/07/13 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 30. AT (M).. 95.

DISCHARGE..... 57. L/MIN

WATER ANALYSIS

PH..... 6.9
 SPECIFIC CONDUCTANCE..... 1650.
 ALKALINITY..... 646. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 1060.
 TOTAL SUSPENDED SOLIDS... 1200.
 CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

AG..... CO3..... N LI... 0.83
 AL..... CR..... MG... 5.6
 AS... 0.02 CS..... MN... 0.03
 AU..... CU..... N MO... 0.015 SE... N
 H... 0.48 F..... 8.7 NA... 340. SI02. 67.
 HA..... FE+3... 0.63 NH... S04.. 170.
 HE... N FE(TOT)... NH4.. 2.2
 HI..... GA..... NI... N
 HR..... GE.....
 CA... 32. HCO3... 787.
 CA+MG. MG..... 0.0002 Pb... 0.002 U... 0.0005
 CD... N H2S..... PU4.. V... 0.0006
 CL... 25.
 CO... K..... 20. ZN... 0.02

ISOTOPES 10/001

OTHER ANALYTICAL DATA... CO2 = 141. MG/L.; NO2 + NO3 = .01 MG/L.; P = .01 MG/L. DISSOLVED GROSS ALPHA AS U NAT = .26,
 DISSOLVED GROSS BETA AS CS137 = 81 PICO-CURIES/L. DISSOLVED GROSS BETA AS SR90/Y90 = 65 PICO-CURIES/L. DISSOLVED
 RA226 (RADON METHOD) = 27 PICO-CURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00087

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID# 0027108

NAME OF SAMPLE SOURCE... HILLBROOK FLOWING WELL
 WELL/SPRING NUMBER..... 08N-03W-16-BDA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 03W 16 NE OF SE NW

LAT/LONG... 46-26.87 N 111-59.23 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1162500

OTHER LOCALITY INFORMATION: ALHAMBRA HOT SPRINGS AREA

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/12/02 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 30.0 AT (IN) 95.

DISCHARGE..... 114. L/MIN

WATER ANALYSIS

PH..... 6.8

SPECIFIC CONDUCTANCE..... 1620.

ALKALINITY..... 641. AS CaCO₃

TOTAL SUSPENDED SOLIDS... 1290.

CHARGE BALANCE (% DIFF)... 3.9

ANALYSIS IN MG/L

ISOTOPES (0/001)

AL.....	CR.....	MG...	5.3		
BA.....	FE.....	NA...	340.		
BR.....	FE(TOT)...	NH...		504..	190.
CA..... 36.	HCO ₃ ...				
CA+MG.	MG.....	PH...		U....	0.0008
CL..... 24.					
CO.....	K..... 20.				

OTHER ANALYTICAL DATA... CO₂ = 198. MG/L.; DISSOLVED GROSS ALPHA ASU-NAT. = .56 MG/L.; DISSOLVED GROSS BETA AS CS-137 = 130 PICO-CURIES/L.; DISSOLVED GROSS BETA AS SR90/Y90 = 110 PICO-CURIES/L.; DISSOLVED RA-226 (RADON METHOD) = 37. PICO-CURIES/L.; DISSOLVED RADON 222 = 37.000. PICO-CURIES/L.; DISSOLVED URANIUM (DIRECT FLOW METRIC) = .8 PICO-CURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00088

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID# 0027109

NAME OF SAMPLE SOURCE... HILLBROOK FLOWING WELL
 WELL/SPRING NUMBER..... 08N-03W-16-BDA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 03W 16 NE OF SE NW

LAT/LONG... 46-26.87 N 111-59.23 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... CLANCY 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/08/12 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 28.9

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 1580.

ANALYSIS IN MG/L

CL..... 24.

ISOTOPES 10/001

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00089

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... JEFFERSON RIVER AT RENOVA HOT SPRINGS

GEOTHERM FILE ID: 0027037

WELL/SPRING NUMBER..... 01N-04W -32-DHC

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

01N 004W 32

SW OF NW SE

COORDINATES

LAT/LONG... 45-47.47 N 112-07.58 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... VENUE, MONTANA 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/08/13 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. AT RENOVA HOT SPRINGS

TEMPERATURE (C)..... 21.

WATER ANALYSIS

PH..... 8.7

SPECIFIC CONDUCTANCE..... 440.

ALKALINITY..... 179.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 307.

CHARGE IMBALANCE (% DIFF)... 0.1

ANALYSIS IN MG/L

ISOTOPES 10/001

AG..... CO3..... 5. LI... 0.02

AL..... CH..... MG... 18.

AS..... CS..... MN... 0.02

H..... 0.04 F..... 0.9 NA... 19. SI02. 17.

HE..... FE(TOT). 0.1 NB... 504.. 71.

HI..... GA..... NH4.. SR... 0.44

CA..... 59. HCO3... 208.

CO..... H2S..... PO4.. 0.03

CL..... 9.9

CO..... K..... 4.4

OTHER ANALYTICAL DATA... CO2 = .71 ORTHO-PHOSPHORUS (P) = .015AR = 0.6

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00090

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRING

GEOTHERM FILE ID: 0027043

WELL/SPRING NUMBER..... 20

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

02N 005W 28

SE OF SE NW

COORDINATES

LAT/LONG... 45-53.7 N 112-13.70 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... DRY MOUNTAIN 1124000

OTHER LOCALITY INFORMATION: ABOUT 7 MILES W-NW OF WHITEHALL. LOCATION APPROX.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/23 ROBERTSON, FOURNIER AND STRONG

POINT OF COLLECTION.. AT PIPE

TEMPERATURE (C)..... 61.0

DISCHARGE..... 68. L/MIN

PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. ISOTOPIC SAMPLE 8/18/74 FROM MARINER AND OTHERS, 1976B

WATER ANALYSIS

ALKALINITY..... 110. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 366.

CHARGE IMBALANCE (% DIFF)... 13.2

ANALYSIS IN MU/L

AG....	CO ₃	N	LI....	0.09	S....
AL....	CR....		MG....	N	SB....
H....	0.5	F....	3.1	NA....	100.
HE....	FE(TOT)...		NU....		66.
CA....	2.6	MCU ₃	134.		99.
CL....	27.				
CO....		K....	2.0		

ISOTOPES (0/001)

DEL D OF WATER..... -144.3

DEL O(18) OF WATER... -18.28

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00091

GEO THERM SAMPLE FILE

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRING

MARKING NUMBER..... 20

GEO THERM FILE ID: 0027045

LOCATION

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... DRY MOUNTAIN 1124000

TOWNSHIP-RANGE

02N 005W 28 SE OF SE NW

COORDINATES

LAT/LONG... 45-53.7 N 112-13.70 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/06/21 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. AT PIPE

TEMPERATURE (C)..... 40.

DISCHARGE..... 49. L/MIN

PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. INACTIVE RESORT. PRINCIPAL SPRING ISSUES UNDER ARTESIAN PRESSURE THROUGH TWO INCH PIPE ON

WEST SIDE OF CREEK.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 523.

ANALYSIS IN MU/L

H....	F....	NA...	SI02.	67.

ISOTOPES (0/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00092

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027044

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS
 LOCATION
 COUNTRY..... UNITED STATES   SHIP-RANGE   COORDINATES
 STATE..... MONTANA   02N 005W 28   SE OF SE NW   LAT/LONG... 45-53.7 N 112-13.70 W
 COUNTY..... JEFFERSON
 MAP REFERENCE..... DRY MOUNTAIN 1124000
 OTHER LOCALITY INFORMATION: ABOUT 7 MILES W-NW OF WHITEHALL
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1977/06/21 U.S. GEOLOGICAL SURVEY
 POINT OF COLLECTION.. AT PIPE
 TEMPERATURE (C)..... 60.0
 DISCHARGE..... 49. L/MIN
 PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE
 OTHER SAMPLE INFORMATION.. INACTIVE RESORT. PRINCIPAL SPRING ISSUES UNDER ARTESIAN PRESSURE THROUGH TWO INCH PIPE ON
 WEST SIDE OF CREEK.

WATER ANALYSIS

PH..... 9.1
 SPECIFIC CONDUCTANCE..... 523.

ANALYSIS IN MG/L

AG....	CO3....	LI....	0.09		
AL....	CR....	MG....	N		
AS....	CS....	MN....	N		
BA....	0.29	FE....	5.6	SI02..	61.
BR....	FE(TQT)...	0.06	NA....	98.	504.. 97.
CA....	3.2	GA.....	NH....	SR...	0.1
CL....	22.		NH4..		
CO....	K.....	1.9			

ISOTOPES 10/001

GAS ANALYSIS

DATE/ANALYST..... 1976/08/29
 ANALYSIS

CO2.. 8.9

ISOTOPES 100/01

OTHER ANALYTICAL DATA... DISSOLVED N02 PLUS N03 = .011 SAMPLE DATED 8-13-76 SHOWS GROSS ALPHA = 2 PICOCURIES/L. AND
 GROSS BETA = 2 PICOCURIES; SAMPLE OF 12-16-76 SHOWS GROSS ALPHA = 3 PICOCURIES/L, GROSS BETA = 8 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00093

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027041

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS
 WARNING NUMBER..... 20
 LOCATION
 COUNTRY..... UNITED STATES   SHIP-RANGE   COORDINATES
 STATE..... MONTANA   02N 005W 28   SE OF SE NW   LAT/LONG... 45-53.78 N 112-14.57 W
 COUNTY..... JEFFERSON
 MAP REFERENCE..... DRY MOUNTAIN 1124000
 OTHER LOCALITY INFORMATION: ABOUT 7 MILES W-NW OF WHITEHALL
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1964/08/06 MONTANA STATE BOARD OF HEALTH
 POINT OF COLLECTION.. AT PIPE
 TEMPERATURE (C)..... 57.0
 PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE
 OTHER SAMPLE INFORMATION.. INACTIVE RESORT. PRINCIPAL SPRING ISSUES UNDER ARTESIAN PRESSURE THROUGH TWO INCH PIPE ON

WEST SIDE OF CREEK

WATER ANALYSIS

ALKALINITY..... 87. AS CaCO₃

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO ₃	18.			
AL....	CR....		MG...	N	
HA....	F....	5.4			
HA....	FE+3....		NA+K.	99.	
HE....	FE(TOT)...	0.1	NB...		
CA....	HCO ₃	70.	NO ₃ ..	N	
CL....					

S04.. 93.

OTHER ANALYTICAL DATA... DISSOLVED NITRATE AS N = .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00094

GEOCHEM SAMPLE FILE

GEOCHEM FILE ID: 0027040

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS

WATER NUMBER..... 20

LOCATION

TOWNSHIP-RANGECOORDINATES

COUNTRY..... UNITED STATES 02N 005W 28 SE OF SE NW

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... DRY MOUNTAIN 1124000

OTHER LOCALITY INFORMATION: ABOUT 7 MILES W-NW OF WHITEHALL

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/06/21 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. DOWNSTREAM FROM POOL

TEMPERATURE (C)..... 38.8

DISCHARGE..... 946. L/MIN

PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE

OTHER SAMPLE INFORMATION.. INACTIVE RESORT, PRINCIPAL SPRING ISSUES UNDER ARTESIAN PRESSURE THROUGH TWO INCH PIPE ON

WEST SIDE OF CREEK.

WATER ANALYSIS

P.H..... 8.1

SPECIFIC CONDUCTANCE..... 542.

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO ₃	LI...	0.09		
AL....	CR....	MG...	0.1		
AS....	CS....	MN...	0.004		
B....	F....	5.5	NA...	100.	S102.
HE....	FE(TOT)...	0.07	NB...		70.
HI....	GA....		SR...		95.
CA....	HCO ₃	N			0.09
CL....					
CO....	K.....	2.1			

OTHER ANALYTICAL DATA... NO₂ PLUS NO₃ = .01 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00095

GEOTHERM FILE 101 0027042

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS

WATERING NUMBER..... 20

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

02N 005W 28

SE OF SE NW

COORDINATES

LAT/LONG... 45-53.7 N 112-13.70 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE..... DRY MOUNTAIN 1:24000

OTHER LOCALITY INFORMATION: ABOUT 7 MILES W-NW OF WHITEHALL

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/29 FOURNIER AND ROBERTSON

POINT OF COLLECTION.. AT PIPE

TEMPERATURE (C)..... 61.0

PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE

OTHER SAMPLE INFORMATION.. INACTIVE RESORT. PRINCIPAL SPRING ISSUES UNDER ARTESIAN PRESSURE THROUGH TWO INCH PIPE ON WEST SIDE OF CREEK.

WATER ANALYSIS

PH..... 8.2

ALKALINITY..... 84.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 334.

CHANGE IMBALANCE (% DIFF)... 7.7

ANALYSIS IN MG/L

ISOLOPES 10/001

AG....

CO3..... N

LI... 0.1

AL....

CH.....

MG... 0.1

H..... 0.35

F.....

NA... 100.

SiO2.

59.

HE....

Fe(TOT).

NB...

SO4..

94.

CA.... 3.0

HCO3.... 102.

CL.... 23.

CO....

K..... 4.1

OTHER ANALYTICAL DATA... CO2 = 1.0

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00096

GEOTHERM FILE 101 0002908

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS

WATERING NUMBER..... 20

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

02N 005W 28

SE OF SE NW

COORDINATES

LAT/LONG... 45-53.78 N 112-14.57 W

STATE..... MONTANA

COUNTY..... JEFFERSON

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... DRY MOUNTAIN 1:24000

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1974/08/18

POINT OF COLLECTION.. AT PIPE

TEMPERATURE (C)..... 57.0

DISCHARGE..... 300. L/MIN

PERTINENT LITHOLOGY..... ALLUVIUM OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. INACTIVE RESORT. ISSUES FROM 2-INCH PIPE ON WEST SIDE OF CREEK UNDER ARTESIAN PRESSURE.
WATER ANALYSIS

P..... 8.7
SPECIFIC CONDUCTANCE..... 459.
ALKALINITY..... 108. AS HCO₃
TOTAL DISSOLVED SOLIDS... 396.
CHARGE IMBALANCE (% DIFF)... 2.6

ANALYSIS IN MG/L

AG....		CO ₃		LI...	0.09	S....	
AL....	0.015	CH....		MG...	L 0.1	SB...	
AS....		CS....		MN...	L 0.02		
H....	0.28	F....	5.3	NA...	98.	SI02.	66.
HE....		FE(TOT)...		NH...		SO ₄ ..	94.
CA....	2.0	HCO ₃ ...	108.				
CO....		H ₂ S....	2.3				
CL....	20.						
CO....		K.....	1.9	NB...	0.02	ZN...	L 0.01

ISOTHERMS (0/001)

DEL D OF WATER..... -144.3
DEL D(18) OF WATER... -18.28

OTHER ANALYTICAL DATA... NH₃ AS N = L 0.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR
COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00097

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027038

NAME OF SAMPLE SOURCE... RENOVA HOT SPRINGS

WELL/SPRING NUMBER..... 01N-04W-32-DBC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 01N 004W 32 SW OF NW SE

LAT/LONG... 45-47.50 N 112-07.58 W

STATE..... MONTANA

COUNTY..... JEFFERSON

GEOLOGIC PROVINCE... 21

MAP REFERENCE..... VENDOME, MONTANA 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/08/13 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 50.

DISCHARGE..... 151. L/MIN

WATER ANALYSIS

P..... 7.5
SPECIFIC CONDUCTANCE..... 1100.
ALKALINITY..... 254. AS CaCO₃
TOTAL DISSOLVED SOLIDS... 655.
CHARGE IMBALANCE (% DIFF)... 1.4

ANALYSIS IN MG/L

AG....		CO ₃ .... N		LI...	0.13		
AL....		CH....		MG...	13.		
AS....	0.019	CS....		MN...	0.03		
AU....		CU.... N		MO...	N	SE... N	
H....	0.48	F....	3.0	NA...	150.	SI02.	37.
HE....	N	FE(TOT)...	0.08	NB...		SO ₄ ..	200.
HI....		GA....		NH ₄ ..		SR...	0.85
HR....		GE....		NI...	0.004		
CA....	51.	HCO ₃ ...	310.				
CA+MO.		H ₂ S.... N		PH...	0.006		
CO....	N			PO ₄ ..		V....	0.0003

ISOTHERMS (0/001)

CL.... 34.
 CO.... K..... 13.
 OTHER ANALYTICAL DATA... CO2 = 14.1 NU2 PLUS NO3 = .011 P = .031 GROSS ALPHA = 8 PICOCURIES/L AND GROSS BETA = 10
 PICOCURIES/L.SAH = 4.9
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00098

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027039

NAME OF SAMPLE SOURCE... RENOVA HOT SPRINGS

WELL/SPRING NUMBER..... 01N-04W-32-DHC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 01N 004W 32 SW OF NW SE

LAT/LONG... 45-47.50 N 112-07.58 W

STATE..... MONTANA

COUNTY..... JEFFERSON

MAP REFERENCE... VENDOME, MONTANA 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/06/21 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 48.9

DISCHARGE..... 151. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 995.

ANALYSIS IN MG/L

ISOTOPES (0/001)

CL.... 34.

GAS ANALYSIS

DATE/ANALYST..... 1976/08/13 (COLLECTION DATE)

ANALYSIS IN VOLUME %

ISOTOPES (00/01)

AR... 1.3

CH4... 1.7

C2H6...

NZ... 93.4

CO2... 0.5

O2... 3.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00099

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027110

NAME OF SAMPLE SOURCE... WALLS HOT SPRING

WELL/SPRING NUMBER..... 08N-03W-16-ACA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08N 003W 16 NE OF SW NE

LAT/LONG... 46-26.88 N 111-58.83 W

STATE..... MONTANA

COUNTY..... JEFFERSON

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... CLANCY 1162500

OTHER LOCALITY INFORMATION: ALHAMBRA HOT SPRINGS AREA

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/04/29 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 55.6

DISCHARGE..... 110. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 1170.
 ALKALINITY..... 401. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 651.
 CHARGE IMBALANCE (% DIFF)... 1.3
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO ₃	LI...	0.37		
AL....	CR.....	MG...	3.5		
B.... 0.24	F..... 6.9	NA...	210.	SI02.	60.
BE....	FE(TOT).. 0.15	NB...		SO4..	88.
BI....	GA.....	NH4...		SR...	1.3
CA.... 18.	HCO ₃ .... 489.	NO ₃ .. N			
CL.... 11.					
CO....	K..... 10.				

GAS ANALYSIS

DATE/ANALYST..... 1976/09/00
 ANALYSIS IN VOLUME %

ISOTOPES (00/01)

CH₄.. L 0.1
 C₂H₆..
 CH₂..

N₂... 89.2
 O₂... 2.3

OTHER ANALYTICAL DATA... P = NI SAMPLE DATED 6-29-76 YIELDED GROSS ALPHA = 97 PICOCURIES/L AND GROSS BETA = 48 PICOCURIES/L.

QUALIFICATION FIELD.... U2 = U2 + AR.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00100

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046084

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL
 WELL/SPRING NUMBER..... 22H-23W-29-BA00

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES	22N 023W 29	SE OF SE NE NW	LAT/LONG... 47-38.53 N 114-34.28 W
STATE..... MONTANA			
COUNTY..... LAKE			
GEOLOGIC PROVINCE.. 21			
MAP REFERENCE..... HOT SPRINGS NE 1124000			

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1980/12/16 DUNOVAN, JOSEPH J.
 SAMPLE NUMBER..... 8002825
 POINT OF COLLECTION.. BESIDE DRILL RIG AT "T"
 TEMPERATURE (C)..... 44.9
 AMBIENT TEMP (C)..... 7.5
 DISCHARGE..... 1300. L/MIN

PERTINENT LITHOLOGY..... PRICHARD FORMATION, WATER FROM 406-409 FEET.

OTHER SAMPLE INFORMATION.. SAMPLES 0046080 THRU 0046084 COLLECTED DURING DRILLING OPERATION.

WATER ANALYSIS

DATE/ANALYST..... 1981/01/20 ABERCROMBIE, FRANK N.
 PH..... 8.26
 SPECIFIC CONDUCTANCE..... 657.
 ALKALINITY..... 282. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 396.
 CHARGE IMBALANCE (% DIFF)... 4.5

ISOTOPES (0/001)

ANALYSIS IN MG/L
 AG.... L 0.002 CO₃.... LI... 0.059

AL.... L 0.03	CR.... L 0.002	MG... 2.4		
AS.... L 0.0001	CS.....	MN... 0.019		
AU....	CU..... L 0.002	MO... L 0.02		
H.... 0.59	F..... 4.6	NA... 130.	SI02.. 38.	
HE....	FE(TOT).. 0.25	NB...	SO4... 0.1	
HI....	GA.....	NH4...	SR... 0.25	
HR....	GE.....	NI... L 0.01		
CA.... 13.	HCO3... 344.	NO3... 0.29	TI... L 0.001	
CA+MG.	HS.....	PB... L 0.04		
CO.... 0.004	H2S.....	PO4...	V.... L 0.001	
CL.... 36.				
CO....	K..... 3.2			
		ZN... 0.007		

OTHER ANALYTICAL DATA... FIELD PH, SP. COND., ALKALINITY ARE 7.96, 667., 310.4 LAB ZR = L 0.004 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00101

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046083

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL

WELL/SPRING NUMBER..... 22N-23W-29-HADD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 22N 023W 29 SE OF SE NE NW LAT/LONG... 47-38.53 N 114-34.28 W
 STATE..... MONTANA
 COUNTY..... LAKE
 MAP REFERENCE..... HOT SPRINGS NE 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1980/12/16 DONOVAN, JOSEPH J.

SAMPLE NUMBER..... 8002826

POINT OF COLLECTION.. BESIDE DRILL RIG AT "T"

TEMPERATURE (C)..... 47.2

AMBIENT TEMP (C)..... 7.5

WELL DEPTH (M)..... 110.

DISCHARGE..... 380. L/MIN

PERTINENT LITHOLOGY..... PRICHARD FORMATION (BELL QUARTZITE).

WATER ANALYSIS

DATE/ANALYST..... 1981/01/20 ABERCROMBIE, FRANK N.

PH..... 8.21

SPECIFIC CONDUCTANCE..... 651.5

ALKALINITY..... 283. AS CAC03

TOTAL DISSOLVED SOLIDS... 399.

CHARGE IMBALANCE (% DIFF)... 4.0

ANALYSIS IN MG/L

AG.... L 0.002	CO3.....	LI... 0.059		
AL.... L 0.03	CR.... L 0.002	MG... 2.4		
AS.... L 0.0001	CS.....	MN... 0.044		
AU....	CU..... 0.003	MO... 0.02		
H.... 0.57	F..... 4.5	NA... 132.	SI02.. 39.	
HE....	FE(TOT).. 0.081	Nd...	SO4... 0.1	
HI....	GA.....	NH4...	SR... 0.23	
HR....	GE.....	NI... L 0.01		
CA.... 12.	HCO3... 345.	NO3... 0.44	TI... 0.003	
CA+MG.	HS.....	PB... L 0.04		
CO.... L 0.002	H2S.....	PO4...	V.... L 0.001	

ISOLOPES 10/001

CL.... 36.
CO.... K..... 3.4 ZN... L 0.003
OTHER ANALYTICAL DATA... FIELD PH, SP. COND. ARE 7.74 AND 644. LOW PH MAY BE DUE TO LACK OF EQUILIBRIUM BETWEEN METER AND AIR TEMP.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... *SONDEREGGER, JOHN L., MBMG

RECORD 00102

GEOThERM SAMPLE FILE

GEOThERM FILE 101 0046081

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL
WELL/SPRING NUMBER..... 22N-23W-29-HADD
LOCATION
COUNTRY..... UNITED STATES 22N 023W 29 SE OF SE NE NW COORDINATES
STATE..... MONTANA LAT/LONG... 47-38.53 N 114-34.28 W
COUNTY..... LAKE
MAP REFERENCE..... HOT SPRINGS NE 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1980/12/11 UONOVAN, JOSEPH J.
SAMPLE NUMBER..... 0002813
POINT OF COLLECTION.. BESIDE DRILL HIG AT "T"
TEMPERATURE (C)..... 49.3
AMBIENT TEMP (C)..... 7.5
WELL DEPTH (M)..... 81.
DISCHARGE..... RSU. L/MIN

WATER ANALYSIS

DATE/ANALYST..... 1981/01/14 ABERCROMBIE, FRANK N.
PH..... 8.72
SPECIFIC CONDUCTANCE..... 694.
ALKALINITY..... 297. AS CaCO3
TOTAL DISSOLVED SOLIDS... 432.
CHARGE IMBALANCE (% DIFF)... 0.4

ANALYSIS IN MG/L

AG.... L 0.002	CO3.... 10.	LI... 0.083	
AL.... 0.01	CR..... L 0.002	MG... 0.3	
AS.... 0.0005	CS.....	MN... 0.022	
AU....	CU..... L 0.002	MO... L 0.02	
H.... 0.04	F..... 5.2	NA... 159.	SI02. 46.
HE....	FE(TOT). 0.23	NB... 0.4	S04.. 0.4
HI....	GA.....	NH4.. 0.064	SR... 0.064
HW.... N	GE.....	NI... L 0.01	
CA.... 3.4	HCO3.... 341.	NO3.. 1.2	TI... 0.004
CA-MG.	HG.....	PH... L 0.02	
CD.... L 0.002	H2S.....	PO4..	V.... 0.003
CL.... 36.			

ISOTOPES (0/001)

CO.... K..... 3.2 ZN... 0.009
OTHER ANALYTICAL DATA... LAB ZN = 0.009 MG/L. NO FIELD MEASUREMENTS. DEGASSES RAPIDLY (CLOUDY), H2S UDDH AND TASTE.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... *SONDEREGGER, JOHN L., MBMG

RECORD 00103

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046082

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL

WELL/SPRING NUMBER..... 22N-23W-29-HADD

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

22N 023W 29

SE OF SE NE NW

COORDINATES

LAT/LONG... 47-38.53 N 114-34.28 W

STATE..... MONTANA

COUNTY..... LAKE

MAP REFERENCE..... HOT SPRINGS NE 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1980/12/15 DONOVAN, JOSEPH J.

SAMPLE NUMBER..... 8002827

POINT OF COLLECTION.. BESIDE DRILL RIG AT "T"

TEMPERATURE (C)..... 47.2

AMBIENT TEMP (C)..... 7.5

WELL DEPTH (M)..... 99.

DISCHARGE..... 45. L/MIN

PERTINENT LITHOLOGY..... PRICHARD FORMATION. BELIEVE BEDROCK RECEIVES WATER FROM GRAVEL ZONE VIA FRACTURES.

WATER ANALYSIS

DATE/ANALYST..... 1981/01/21 ABENCHROMBIE, FRANK N.

PH..... 8.18

SPECIFIC CONDUCTANCE..... 656.6

ALKALITY..... 285. AS CaCO3

TOTAL DISSOLVED SOLIDS... 406.

ANALYSIS IN MG/L

AG.... L 0.002 CO3.... LI... 0.050

AL.... L 0.003 CR.... L 0.002 MG... 2.1

AS.... L 0.0001 CS.... MN... 0.027

AU.... CU.... L 0.002 MU... L 0.02

H.... 0.03 F.... 4.6 NA... 139. S102. 39.

HE.... FE (TOT) 0.22 NB... S04.. L 0.1

HI.... GA.... NH4.. 0.17

IR.... GE.... NI... L 0.01

CA.... 11. HCO3... 348. NO3.. L 0.53

CA-MG. MG.... L 0.04

CO.... L 0.002 H2S.... PO4..

CL.... 30.

CO.... K..... 2.9

ZN... 0.006

OTHER ANALYTICAL DATA... FIELD PH, SP. COND., ALKALINITY ARE 17.82, 653., 327.6 LAB ZN LESS THAN 0.004 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... SOMMEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SOMMEREGGER, JOHN L., MRMG

RECORD 00104

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046080

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL

WELL/SPRING NUMBER..... 22N-23W-29-HADD

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

22N 023W 29

SE OF SE NE NW

COORDINATES

LAT/LONG... 47-38.53 N 114-34.28 W

STATE..... MONTANA

COUNTY..... LAKE

MAP REFERENCE..... HOT SPRINGS NE 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1980/12/11 DUNOVAN, JOSEPH J.

SAMPLE NUMBER..... 8002812

POINT OF COLLECTION.. BESIDE DRILL RIG AT "T"

TEMPERATURE (C)..... 49.2

AMBIENT TEMP (C)..... 7.5

WELL DEPTH (M)..... 77.

DISCHARGE..... 450. L/MIN

DEPOSITS OR ALTERATION.... CHALCEDONY(?), CALCITE

PERTINENT LITHOLOGY..... PLEISTOCENE GRAVEL ABOUT 25 FEET THICK.

OTHER SAMPLE INFORMATION.. FILTERED IN LAB. SEDIMENT CONTAMINATION (AL VALUE). ZR LESS THAN 0.004 MG/L. NO FIELD MEASUREMENTS.

WATER ANALYSIS

DATE/ANALYST..... 1981/01/14 ABENCROMBIE, FRANK N.

PH..... 6.71

SPECIFIC CONDUCTANCE..... 693.2

ALKALINITY..... 296. AS CaCO3

TOTAL DISSOLVED SOLIDS... 437.

ANALYSIS IN MG/L

AG....	L 0.002	CO3....	11.	LI....	0.085		
AL....	1.0	CR....	L 0.002	MG....	1.2		
AS....	0.0008	CS....		MN....	0.070		
AU....		CU....	L 0.002	MO....	L 0.02		
B....	0.66	F....	5.2	NA....	156.	SI02.	51.
RE....		FE(TOT)..	1.7	NB....		SO4..	0.1
HI....		GA....		NH4..		SR...	0.1
HR....	N	GE....		NI....	L 0.01		
CA....	4.2	HCO3....	339.	NO3..	2.5	TI...	0.011
CA+MG.		HG....		PH....	0.04		
CI....		H2S....		PO4..		V....	L 0.001
CO....		K....	3.4			ZN...	0.015

ISOTOPES (0/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONDEREGGER, JOHN L., MBMG

RECORD 00105

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... BROADWATER HOT PIT 2

WELL/SPRING NUMBER..... 10N-004W-28 -A

LOCATION

COUNTRY..... UNITED STATES 10N 004W 28 NE

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/09/08 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 67.0 AT (M).. 3.6

WATER ANALYSIS

PH..... 7.8

SPECIFIC CONDUCTANCE..... 863.

ALKALINITY..... 154. AS CaCO3

TOTAL DISSOLVED SOLIDS... 619.

CHARGE BALANCE (% DIFF)... 4.0

GEOTHERM FILE 101 0027130

COORDINATES

LAT/LONG... 46-35.44 N 112-06.42 W

ANALYSIS IN MG/L

AG....		CO3.... N	LI...	0.59	S....	
AL....		CR....	MG...	0.8	SB....	
AS....		CS....	MN...	0.04		
B....	0.18	F....	NA...	180.	SI02.	98.
HE....		FE(TOT).	NB...		SO4...	180.
HI....		GA....	NH4...		SR...	0.14
CA....	9.4	HCO3....				
CO....		M2S....	PU4..	0.31		
CL....	34.					
CO....		K.....				

ISOTOPES (0/001)

DEL D OF WATER..... -18.35
 DEL O(18) OF WATER... Q -18.35

OTHER ANALYTICAL DATA... CO2 FOR WATER = 4.8 MG/L; NO2 + NO3 = 1.6 MG/L; P = .1 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00106

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027127

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRING

WELL/SPRING NUMBER..... 10N-004W-28 -A

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10N 004W 28 NE

LAT/LONG... 46-35.73 N 112-06.7 W

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG

POINT OF COLLECTION.. AT MANHOLE

TEMPERATURE (C)..... 65.0

DISCHARGE..... 57. L/MIN

OTHER SAMPLE INFORMATION.. ISOTOPIC SAMPLE B-24-74 FROM MARINER AND OTHERS, 1976B

WATER ANALYSIS

ALKALINITY..... 246. AS CaCO3

TOTAL DISSOLVED SOLIDS... 673.

CHARGE IMBALANCE (% DIFF)... 6.9

ANALYSIS IN MG/L

AG....		CO3....	LI...	0.55	S....	
AL....		CR....	MG...	0.8	SB....	
B....	0.82	F....	NA...	190.	SI02.	97.
HE....		FE(TOT).	NB...		SO4...	190.
CA....	12.	HCO3....				
CL....	22.					
CO....		K.....				

ISOTOPES (0/001)

DEL D OF WATER..... -147.6
 DEL O(18) OF WATER... -18.56

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00107

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027076

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRING

WELL/SPRING NUMBER..... 10N-004W-28 -A

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
 STATE..... MONTANA   10N 004W 28 NE
 COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500

COORDINATES
 LAT/LONG... 46-35.73 N 112-06.7 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1976/01/30 U.S. GEOLOGICAL SURVEY
 SAMPLE NUMBER..... 2
 POINT OF COLLECTION.. AT MANHOLE
 TEMPERATURE (C)..... 66.4

WATER ANALYSIS
 PH..... 8.2
 SPECIFIC CONDUCTANCE..... 872.
 ALKALINITY..... 158. AS CAC03
 ANALYSIS IN MG/L
 CA..... 11.

ISOTOPIES 10/001

REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00108

GEOTHERM SAMPLE FILE
 NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
 WELL/SPRING NUMBER..... 10N-004W-28-A

GEOTHERM FILE 101 0027122

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
 STATE..... MONTANA   10N 004W 28 NE
 COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500

COORDINATES
 LAT/LONG... 46-35.73 N 112-06.55 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1976/04/27 U.S. GEOLOGICAL SURVEY
 SAMPLE NUMBER..... 1
 POINT OF COLLECTION.. AT OUTLET
 TEMPERATURE (C)..... 59.0
 DISCHARGE..... 783. L/MIN
 OTHER SAMPLE INFORMATION.. ISOTOPIC SAMPLE DATE: 3-25-76

WATER ANALYSIS
 SPECIFIC CONDUCTANCE..... 940.
 ALKALINITY..... 157. AS CAC03
 TOTAL DISSOLVED SOLIDS... 580.
 TOTAL SUSPENDED SOLIDS... 650.
 CHARGE IMBALANCE (% DIFF)... 3.3

ISOTOPIES 10/001

ANALYSIS IN MG/L					
AG.....	CO3.....	LI...	0.53	S....	
AL.....	CR.....	MG...	1.0	SB...	
H..... 0.75	F..... 7.9	NA...	170.	SI02..	84.
HE.....	FE(TOT).. 0.03	NH...		SO4...	170.
HI.....	GA.....	NH4...		SR...	0.33
CA..... 12.	HCO3.... 192.	NO3.. N			
CL..... 33.					
CO.....	K..... 5.7				

DEL D OF WATER..... -18.20
 DEL O(18) OF WATER... u -18.20

OTHER ANALYTICAL DATA... NO2 + NO3 = .001 P = .011 DISSOLVED GROSS ALPHA AS U-NAT. = .00771 DISSOLVED GROSS BETA AS

CS-137 = 0.3 PICOCURIES/L; DISSOLVED GROSS BETA AS SR-90/Y90 = 6.7 PICOCURIES/L.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00109

GEOHERM SAMPLE FILE

GEOHERM FILE 101 0027128

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
 WELL/SPRING NUMBER..... 10N-004W-2H -A

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   10N 004W 28   NE   LAT/LONG... 46-35.73 N 112-06.7 W

COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500
 OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/01/30 U.S. GEOLOGICAL SURVEY
 SAMPLE NUMBER..... 1
 POINT OF COLLECTION.. AT MANHOLE
 TEMPERATURE (C)..... 66.4

WATER ANALYSIS

PH..... 8.2
 SPECIFIC CONDUCTANCE..... 872.
 ALKALINITY..... 125.   AS CaCO3
 TOTAL DISSOLVED SOLIDS... 581.
 CHARGE IMBALANCE (% DIFF)... 6.3

ANALYSIS IN MG/L

AG.....	CO3.....	LI.....	0.57		
AL.....	CR.....	MG.....	0.8		
AS..... 0.02	CS.....	MN.....	0.05		
AU.....	CU..... 0.006	MO.....	0.023	SE... N	
B..... 0.8	F..... 9.6	NA.....	170.	SI02..	93.
BR..... 0.01	FE(TOT).. 0.13	NB.....		SO4..	180.
HI.....	GA.....	NH4..		SR...	0.29
HR.....	GE.....	NI... N			
CA..... 10.	HCO3..... 152.				
CA+MG.	HG..... 0.0002	PB... 0.004		V....	0.0004
CO..... 0.001	H2S.....	PU4..			
CL..... 34.					
CO.....	K..... 6.3	ZN... 0.01			

ISOTOPIES 10/001

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.5 MG/L.1 NO2 + NO3 AS N = .001 P = .03

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00110

GEOHERM SAMPLE FILE

GEOHERM FILE 101 0027126

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
 WELL/SPRING NUMBER..... 10N-004W-2H -A

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   10N 004W   NE   LAT/LONG... 46-35.73 N 112-06.7 W

COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500
 OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

STATE..... MONTANA
 COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500
 OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1973/09/21 KAZMAKER
 POINT OF COLLECTION.. AT MANHOLE
 TEMPERATURE (C)..... 63.0
 DISCHARGE..... 113. L/MIN

WATER ANALYSIS

PH..... 7.0

ANALYSIS IN MG/L

AL....	CH.....	MG...	0.7		
NA....	F.....	NA...	150.	SI02.	60.
CA.... 12.					
CL.... 35.					
CO....	K..... 4.7				

ISOTOPES (0/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00111

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027125

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS

WELL/SPRING NUMBER..... 10N-004W-2B -A

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10N 004E 2B NE

LAT/LONG... 46-35.73 N 112-06.7 W

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 MONTANA BUREAU OF MINES AND GEOLOGY

POINT OF COLLECTION.. AT MANHOLE

TEMPERATURE (C)..... 65.0

WATER ANALYSIS

PH..... 6.4
 ALKALINITY..... 162. AS CaCO3

TOTAL DISSOLVED SOLIDS... 600.

CHARGE BALANCE (% DIFF)... 1.0

ANALYSIS IN MG/L

AG....	CO3..... 4.	LI...	0.55		
AL....	CH.....	MG...	0.4		
NA.... 0.08	F.....	NA...	170.	SI02.	92.
HF....	FE(TOT).	NB...		S04..	180.
CA.... 9.6	HCO3.... 190.				
CL.... 40.					
CO....	K..... 8.7				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.3 MG/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00112

GEOTHERM FILE 101 0027124

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS

WELL/SPRING NUMBER... 10N-004W-28 -A

LOCATION

COUNTRY... UNITED STATES TOWNSHIP-RANGE 10N 004W 28 NE

STATE... MONTANA

COUNTY... LEWIS AND CLARK

MAP REFERENCE... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR... 1964/09/17 MONTANA STATE BOARD OF HEALTH

POINT OF COLLECTION.. AT MANHOLE

TEMPERATURE (C)... 59.0

DISCHARGE... 284. L/MIN

WATER ANALYSIS

ALKALINITY... 156. AS CaCO3

ANALYSIS IN MG/L

AG....	CO3....	N			
AL....	CH....		MG...	2.	
N....	F....	9.6			
NA....	FE+3....		NA+K...	180.	
HE....	FE(TOT)..	N	NB...		
CA....	HCO3....	190.	NO3..	N	
CL....					

ISOTOPES 10/001

OTHER ANALYTICAL DATA... DISSOLVED NITRATE AS N = .00

REFERENCE AND IDENTIFICATION

COMPILED BY... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00113

GEOTHERM FILE 101 0027123

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS

WELL/SPRING NUMBER... 10N-004W-28 -A

LOCATION

COUNTRY... UNITED STATES TOWNSHIP-RANGE 10N 004W 28 NE

STATE... MONTANA

COUNTY... LEWIS AND CLARK

MAP REFERENCE... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR... 1976/11/24 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER... 1

POINT OF COLLECTION.. AT BREAK

TEMPERATURE (C)... 60.0

DISCHARGE... 476. L/MIN

WATER ANALYSIS

PH... 8.2

SPECIFIC CONDUCTANCE... 929.

ALKALINITY... 154. AS CaCO3

CHARGE IMBALANCE (A DIFF)... 2.1

ANALYSIS IN MG/L

COORDINATES

LAT/LONG... 46-35.73 N 112-06.63 W

ISOTOPES 10/001

AL....	CH.....	MU...	0.9		
H.....	F.....	NA...	170.		
HF.....	FE(10T)...	NH...		S04..	190.
CA.... 11.	HCO3.... 188.				
CL.... 34.					
CU....	K..... 5.8				

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.9 MG/LI

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00114

GEOTERM SAMPLE FILE

GEOTERM FILE IDI 0027121

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS

LOCATION..... TOWNSHIP=RANGE

COORDINATES

LAT/LONG... 46-35.73 N 112-06.55 W

COUNTRY..... UNITED STATES 10N 004W 28 NE

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/01/30 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER..... 2

POINT OF COLLECTION.. AT OUTLET

TEMPERATURE (C)..... 65.2

DISCHARGE..... 782. L/MIN

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN COVERED PITS; FLOW REPORTED VERY SLOW (LESS THAN 50 L/MIN. IN 1976);

RESORT CLOSED.

WATER ANALYSIS

PH..... 8.3

SPECIFIC CONDUCTANCE..... 906.

ALKALINITY..... 150. AS CaCO3

ANALYSIS IN MG/L

H.....

F.....

NA...

S102.

82.

HI.....

CA.....

NH4...

SR...

0.27

CA.... 12.

ISOTOPE (D/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00115

GEOTERM SAMPLE FILE

GEOTERM FILE IDI 0027120

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS

WELL/SPRING NUMBER..... 10N-044-28-A

LOCATION..... TOWNSHIP=RANGE

COORDINATES

LAT/LONG... 46-35.73 N 112-06.55 W

COUNTRY..... UNITED STATES 10N 004W 28 NE

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... HELENA 1162500

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/01/30 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER..... 1
 POINT OF COLLECTION.. AT OUTLET
 TEMPERATURE (C)..... 62.2
 DISCHARGE..... 783. L/MIN

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN COVERED PITS; VERY LOW FLOW RATE (LESS THAN 50 L/MIN. IN 1976); RESORT
 ...CLOSED.

WATER ANALYSIS

PI..... 8.3
 SPECIFIC CONDUCTANCE..... 906.
 ALKALINITY..... 146. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 582.
 CHARGE IMBALANCE (% DIFF)... 166.7

ANALYSIS IN MG/L

AG....	CU3.... N	LI...	570.	S....	
AL....	CR....	MG...	0.9	SB...	
AS.... 0.022	CS....	MN...	0.030		
AI....	CU.... 0.009	MO...	0.026	SE... N	
H.... 780.	F.... 11.	NA...	170.	SI02.	82.
HE.... H	FE(TOT)... 0.06	NB...		S04...	170.
HI....	GA....	NH4...		SR...	0.29
HN....	GE....	NI...	0.002		
CA.... 11.	HCO3.... 178.	PU...	0.003		
CA+MG.	Hg.... N	PU4...			
CI.... N	H2S....			V....	0.0002
CL.... 41.					
CO....	K..... 6.1			ZN...	0.01

ISOLAPES 10/001

DEL D OF WATER..... -147.6
 DEL O(18) OF WATER... -18.56

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.4; NO2 + NO3 = .001 P = .03

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN J.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00116

GEOOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... BROADWATER NORTHWEST COLD PIT
 LOCATION
 COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500

GEOOTHERM FILE 101 0027129

COORDINATES

LAT/LONG... 46-35.73 N 112-06.7 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/09/08 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 21.0 AT (M)... 3.6

WATER ANALYSIS

PI..... 8.0
 SPECIFIC CONDUCTANCE..... 1065.
 ALKALINITY..... 174. AS CaCO3
 TOTAL SUSPENDED SOLIDS... 701.
 CHARGE IMBALANCE (% DIFF)... 0.4

ANALYSIS IN MG/L

AG....	CU3.... N	LI...	0.6		
AL....	CR....	MG...	1.4		
AS....	CS....	MN...	0.01		
H.... 0.78	F.... 9.7	NA...	190.	SI02.	100.

ISOLAPES 10/001

HF....		FE(TOT)..	0.12	ND...		S04..	220.
HI....		GA.....		NH4..		SR...	0.55
CA....	20.	HCO3....	212.				
CI....		H2S.....		PO4..	0.37		
CL....	39.						
CO....		K.....	9.1				

OTHER ANALYTICAL DATA... CO2 FOR WATER = 3.4 MG/L. NO2 + NO3 = 1.1 MG/L. P = .12 MG/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1970; MARINER AND OTHERS, 1976B

RECORD 00117

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027132

NAME OF SAMPLE SOURCE... BROADWATER WELL - 3

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T10N 004W 28 NE
 STATE..... MONTANA
 COUNTY..... LEWIS AND CLARK
 MAP REFERENCE..... HELENA 1162500

LAT/LONG... 46-35.73 N 112-06.7 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/06/07 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 65.5
 DISCHARGE..... 136. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 874.

ANALYSIS IN MG/L

ISOTOPES 10/001

AG....	CO3....	LI...	0.6
AL....	CH....	MG...	0.8
H....	F.....	NA...	180.
CA....	13.		
CO....		K.....	6.2

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1970.

RECORD 00118

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027131

NAME OF SAMPLE SOURCE... BROADWATER WELL - 3

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES T10N 004W 28 NE
 STATE..... MONTANA
 COUNTY..... LEWIS AND CLARK
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... HELENA 1162500

LAT/LONG... 46-35.73 N 112-06.7 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/10/06 U.S. GEOLOGICAL SURVEY
 SAMPLE NUMBER..... 1
 TEMPERATURE (C)..... 65.5
 DISCHARGE..... 227. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 874.
 ALKALINITY..... 158. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 598.
 CHARGE IMBALANCE (% DIFF)... 3.9
 ANALYSIS IN MG/L

AG....	CO ₃ ..... N	LI....	0.6	S....	
AL....	CR.....	MG....	0.8	SB....	
AS....	CS.....	MN....	0.02		
H..... 0.81	F..... 11.	NA....	180.	SI02.	93.
HE....	FE(TOT). 0.11	NB....		S04..	180.
HI....	GA.....	NH4..		SR...	0.31
CA.... 13.	HCO ₃ .... 193.				
CL.... 34.					
CU....	K..... 5.9				

ISOLUPES (0/001)

DEL D OF WATER..... -149.8
 DEL O(18) OF WATER... -18.75

GAS ANALYSIS

DATE/ANALYST..... 1976/12/16 (COLLECTION DATE)
 ANALYSIS IN VOLUME %

CH ₄ .. 0.1		N ₂ ...	94.7
C ₂ H ₆ . L 0.1		O ₂ ...	0 1.8
CO ₂ .. 0.9			

ISOLUPES (00/01)

OTHER ANALYTICAL DATA... CO₂ FOR WATER = 11. MG/L. NO₂ + NO₃ = .00. AR + O₂ = 1.8% FOR GAS. GROSS ALPHA = 12
 PICO CURIES/L GROSS BETA = 13 PICO CURIES/L. FOR SAMPLE DATED OF 10/06/76. GROSS ALPHA = 4 PICO CURIES/L, GROSS BETA =
 8 PICO CURIES/L FOR SAMPLE DATED 12/06/76.

QUALIFICATION FIELD... O₂ = O₂ + AR.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00119

GEO THERM SAMPLE FILE

GEO THERM FILE 101 0027133

NAME OF SAMPLE SOURCE... GLOUCE WELL
 WELL/SPRING NUMBER..... 10N-04W -28-ADD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10N 04W 28 SE OF SE NE
 STATE..... MONTANA
 COUNTY..... LEWIS AND CLARK
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... HELENA 1162500

LAT/LONG... 46-35.75 N 112-06.25 W

OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/01/29 U.S. GEOLOGICAL SURVEY
 SAMPLE NUMBER..... 1

TEMPERATURE (C)..... 19.4 AT 1M... 84.
 DISCHARGE..... 49. L/MIN

WATER ANALYSIS

P..... 7.4
 SPECIFIC CONDUCTANCE..... 720.
 ALKALINITY..... 237. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 403.
 CHARGE IMBALANCE (% DIFF)... 1.0
 ANALYSIS IN MG/L

AG....	CO ₃ ..... H	LI....	0.08
AL....	CR.....	MG....	16.
AS.... 0.015	CS.....	MN....	0.03

ISOLUPES (0/001)

Al....		CO.....	0.005	MO...	0.043	SE...	0.002
H.....	0.17	F.....	0.7	NA...	38.	SiO2..	28.
HE....	N	FE(101)..	0.02	NU...		SO4...	84.
HI....		GA.....		NH4...		SR...	0.56
HR....		GE.....		NI...	0.002		
CA....	78.	HCO3.....	289.				
Ca+Mg..		Hg.....	N	Pb...	0.003		
CO....	N	H2S.....		PU4..		V....	0.0041
CL....	12.						
CO....		K.....	3.4			ZN...	0.03

OTHER ANALYTICAL DATA... CO2 FOR WATER = 16. MG/L. NO2 + NO3 = .17 MG/L. P = .03 MG/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00120

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027134

NAME OF SAMPLE SOURCE... GLOEGE WELL

WELL/SPRING NUMBER..... 10N-04W -2H-ADD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10N 04W 28 SE OF SE NE

LAT/LONG... 46-35.75 N 112-06.25 W

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... MELENA 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/01/29 U.S. GEOLOGICAL SURVEY

SAMPLE NUMBER..... 2

TEMPERATURE (C)..... 19.4 AT (M)..... 84.

DISCHARGE..... 49. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 728.

ALKALINITY..... 233. AS CaCO3

ANALYSIS IN MG/L

Al....

CA.....

NH4..

SR... 0.55

ISOTOPES (D/D01)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00121

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027136

NAME OF SAMPLE SOURCE... MARYSVILLE DEEP WELL

WELL/SPRING NUMBER..... 12N-006W-32-AD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 12N 006W 32 SE OF NE

LAT/LONG... 46-45.23 N 112-22.55 W

STATE..... MONTANA

COUNTY..... LEWIS AND CLARK

MAP REFERENCE..... GRANITE BUTTE 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/08/29 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 39.0 AT (M)..... 1374.

WATER ANALYSIS

PH..... 7.8
 SPECIFIC CONDUCTANCE..... 960.
 ALKALINITY..... 195.
 TOTAL DISSOLVED SOLIDS... 655.

AS CaCO₃

ANALYSIS IN MG/L

AG.....	CO ₃	LI...	6.5		
AL.....	CR.....	MG...	0.6		
AS.....	CS.....	MN...	0.03		
H..... 0.82	F..... 19.	NA...	200.	SI02.	83.
HE.....	FE(TOT)..... 0.25	NH...		SO ₄ ..	160.
HI.....	GA.....	NH ₄ ..		SR...	0.23
CA..... 1.8	HCO ₃ ..... 238.				
CL..... 47.					

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... CO₂ = 6.01 NO₂ PLUS NO₃ AS N = .08
 REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00122

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046046

NAME OF SAMPLE SOURCE... MARYSVILLE TEST WELL

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 12N 06W 32 SE OF NE
 STATE..... MONTANA
 COUNTY..... LEWIS AND CLARK
 GEOLOGIC PROVINCE..

LAT/LONG... 46-45.23 N 112-22.55 W
 UTM ZONE... 12
 NORTHING... 5178510.
 394919.

MAP REFERENCE..... GRANITE BUTTE 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/08/29
 TEMPERATURE (C)..... 0 96.5 AT (M).. 1753.
 AMBIENT TEMP (C)..... 4.3
 WELL DEPTH (M)..... 1753.
 GRADIENT (C/M)..... 0

WATER ANALYSIS

PH..... 7.9
 SPECIFIC CONDUCTANCE..... 950.
 TOTAL DISSOLVED SOLIDS... 675.
 CHARGE IMBALANCE (% DIFF)... 3.8

ANALYSIS IN MG/L

AG.....	CO ₃	LI...	2.		
AL.....	CR.....	MG...	0.5		
H..... 0.1	F..... 20.	NA...	210.	SI02.	69.
HE.....	FE(TOT)..... 0.02	NH...		SO ₄ ..	160.
HI.....	GA.....	NH ₄ ..		SR...	0.07
CA..... 7.7	HCO ₃ ..... 260.	NO ₃ ..	1.0		
CL..... 51.					
CO.....	K..... 10.				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... TWO OTHER TEMPERATURES (SAME DATE): 42. C AT 1601.8M AND 39. C AT 1374 M.
 QUALIFICATION FIELD..... GRADIENT CALCULATION IS MISLEADING, CONTACT U.S. GEOLOGICAL SURVEY DISTRICT OFFICE (MT.
 HENNA) FOR PUBLIC DATA.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00123

GEOOTHERM SAMPLE FILE

GEOOTHERM FILE ID: 0046065

NAME OF SAMPLE SOURCE... SUN RIVER SPRINGS

WATERING NUMBER..... 6

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 22N 010W 26 NW OF NE SW

LAT/LONG... 47-37.92 N 112-51.28 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... LEWIS AND CLARK

NORTHING... 5276848.

GEOLOGIC PROVINCE..

360667.

MAP REFERENCE..... ARSENIC PEAK 1124000

OTHER LOCALITY INFORMATION: ELEVATION 4800 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/15

TEMPERATURE (C)..... 30.4

AMBIENT TEMP (C)..... 4.2

DISCHARGE..... 2691. L/MIN

PERTINENT LITHOLOGY..... FIVE SPRINGS ALONG UPPER CONTACT OF KOOTENAI FORMATION IN CAVERNOUS AND FOSSILIFEROUS LIMESTONE.

WATER ANALYSIS

PH..... 7.2

SPECIFIC CONDUCTANCE..... 1190.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGEN, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDEREGGEN AND OTHERS, 1977; MUDGE AND OTHERS, 1977

RECORD 00124

GEOOTHERM SAMPLE FILE

GEOOTHERM FILE ID: 0046010

NAME OF SAMPLE SOURCE... BEAVERHEAD ROCK

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 05S 007W 22 SE OF NW NE

LAT/LONG... 45-23.38 N 112-27.07 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... MADISON

NORTHING... 5027046.

GEOLOGIC PROVINCE..

386401.

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

OTHER LOCALITY INFORMATION: ELEVATION 4810 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1966/08/21

POINT OF COLLECTION.. SAMPLED IN SLOUGH.

TEMPERATURE (C)..... 27.

AMBIENT TEMP (C)..... 6.2

DISCHARGE..... 0 379. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTS OVER MADISON GROUP.

WATER ANALYSIS

PH..... 7.2

OTHER ANALYTICAL DATA... MILLER, M.R., 1966: DISS. OXYGEN = 0.75 MG/L HARDNESS = 346 MG/L

QUALIFICATION FIELD..... DISCHARGE VALUE IS CRUDE

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGEN, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDEREGGEN AND OTHERS, 1977

RECORD 00125

GEOTHERM FILE ID: 0027101

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... ENNIS HOT SPRINGS (TMCXTON)

WELL/SPRING NUMBER..... 055-001W-28-UCA

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

055 001W 28 NE OF SW SE

COORDINATES

LAT/LONG... 45-22.03 N 111-44.85 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... ENNIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1969/02/06 MONTANA STATE BOARD OF HEALTH

DISCHARGE..... 57. L/MIN

WATER ANALYSIS

ALKALINITY..... 205. AS CaCO3

ANALYSIS IN MG/L

AL.... CR..... MG... 20.

H.... F..... 0.3

HA.... FE+3.... NA+K... 55.

HE.... FE(TOT)... NH... 504.. 30.

CA.... 32. MC03.... 250. NO3.. N

CL.... 72.

ISOTOPES (0/00)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00126

GEOTHERM FILE ID: 0046026

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... ENNIS HOT SPRINGS (TMCXTON).

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

055 001W 28 NE OF SW SE

COORDINATES

LAT/LONG... 45-22.03 N 111-44.85 W

STATE..... MONTANA

COUNTY..... MADISON

GEOLOGIC PROVINCE..

MAP REFERENCE..... ENNIS 1162500

OTHER LOCALITY INFORMATION: ELEVATION 4920 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/04/01 USGS

TEMPERATURE (C)..... 63.2

AMBIENT TEMP (C)..... 5.9

DISCHARGE..... L 75. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTS OVER PRE-MELT

OTHER SAMPLE INFORMATION.. SEE USGS OPEN-FILE REPORT 80-1182 FOR WATER CHEMISTRY AND TEMPERATURE DATA FROM

SURROUNDING WELLS.

WATER ANALYSIS

PI..... 7.7

SPECIFIC CONDUCTANCE..... 1510.

ALKALINITY..... 303. AS CaCO3

TOTAL DISSOLVED SOLIDS... 1030.

CHARGE IMBALANCE (% DIFF)... 1.3

ANALYSIS IN MG/L

AG.... CO3.... N LI... 0.26

AL.... CR..... MG... 0.6

ISOTOPES (0/00)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... LEONARD AND OTHERS, 1978; SONDEREGGER AND OTHERS, 1977

GEOHERM_SAMPLE_EILE

GEOTHERM FILE 101 0027103

..NAME OF SAMPLE SOURCE... HOT SPRINGS CREEK AT MURRIS

LOCATION _____ TOWNSHIP=RANGE _____

COORDINATES

COUNTRY..... UNITED STATES 035 001W 14 NW OF SW SE LAT/LONG... 45-34.22 N 111-41.35 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... NORRIS 116250U

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/09 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C) 17.5

MAFPA ANALYSIS

SPECIFIC CONDUCTANCE..... 294.

ALKALINITY..... 86. AS CaCO3

CHARGE	IMBALANCE (% DIFF)	21.0

ANALYSIS IN MG/L

ISOLOPES (0/00)

AG....		CO3....		LI...	0.01		
AL....		CR....		MG...	8.1		
B....		F....		NA...	15.		
HE....		FE(TOT).		NH...		S04..	18.
CA....	32.	HCO3....	105.				
CL....	6.5						
CO....			2.9				

OTHER ANALYTICAL DATA... GROSS ALPHA=0.0 PICOCURIES/L. AND GROSS BETA=10 PICOCURIES/L.

REFERENCE AND IMPLICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978.

GÉOTHERM_SAMPLE_FILE

GEOTHEM FILE ID: 0027100

NAME OF SAMPLE SOURCE... NELSON - R. LEE WELL

LOCATION TOWNSHIP=RANGE

COUNTRY..... UNITED STATES   055 001W 28   NW OF NW SE

CONCLUSIONS

LAT/LONG... 45-22.02 N 111-43.77 W

STATE..... MONTANA
 COUNTY..... MADISON
 MAP REFERENCE..... ENNIS 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1977/09/17 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 16.0 AT (M)..... 45.
 DISCHARGE..... 23. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 410.
 ALKALINITY..... 160. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 284.
 CHARGE IMBALANCE (% DIFF)... 0.4

ANALYSIS IN MG/L

AG....	CO ₃	LI...	0.03		
AL....	CR....	MG...	14.		
AS....	CS....	MN...	0.03		
H.... 0.03	F.... 0.4	NA...	22.	SiO ₂ .	41.
HE....	FE(TOT) 1.4	NH...		SO ₄ ..	33.
HI....	GA....	NH ₄ ..		SR...	0.41
CA.... 47.	HCO ₃ .... 200.				
CL.... 21.					
CO....	K..... 5.1				

ISQUIPES 10/001

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00129

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027019

NAME OF SAMPLE SOURCE... NEW BILTMORE HOT SPRINGS (ZIEGLER)

WELL/SPRING NUMBER..... 045-U/W-28-BCA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 007W 28 NE OF SW NW LAT/LONG... 45-27.72 N 112-28.50 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

OTHER SAMPLE INFORMATION.. ISSUES INTO CONCRETE TANKS; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

PH..... 7.9
 ALKALINITY..... 123. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 1810.
 CHARGE IMBALANCE (% DIFF)... 2.7

ANALYSIS IN MG/L

AG....	CO ₃ .... N	LI...	0.21		
AL....	CR....	MG...	71.		
H.... 1.0	F....	NA...	160.	SiO ₂ .	42.
HE....	FE(TOT)	NH...		SO ₄ ..	1100.
CA.... 280.	HCO ₃ .... 150.				
CL.... 50.					
CO....	K..... 27.				

ISQUIPES 10/001

OTHER ANALYTICAL DATA... CO₂ = 3.0 MG/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00130

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027021

NAME OF SAMPLE SOURCE... NEW BILTMORE HOT SPRINGS (ZIEGLER)
WELL/SPRING NUMBER..... 04S-07W-28-HCA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 007W 28 NE OF SW NW

LAT/LONG... 45-27.72 N 112-28.50 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/21 ROBERTSON, FOURNIER, STRONG

TEMPERATURE (C)..... 54.

DISCHARGE..... 117. L/MIN

OTHER SAMPLE INFORMATION.. ISSUE INTO CONCRETE TANKS; WATER USED IN SWIMMING POOL

WATER ANALYSIS

ALKALINITY..... 212. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 1890.

CHARGE IMBALANCE (% DIFF)... 18.8

ANALYSIS IN MG/L

AG....	CO ₃	LI...	0.21	S....	
AL....	CH....	MG...	69.	SB...	
H.... 0.88	F.... 1.8	NA...	110.	SI02.	45.
HE....	FE(TOT)...	NH...		SO4..	1180.
CA.... 280.	HCO ₃ .... 258.				
CL.... 52.					
CO....	K..... 27.				

ISOTOPES (D/001)

DEL D OF WATER..... Q -149.0

DEL O(18) OF WATER... Q -19.30

QUALIFICATION FIELD..... SAMPLE ISOTOPE DATA DATED 8/17/74, FROM MARINER AND OTHERS, 1976.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00131

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027020

NAME OF SAMPLE SOURCE... NEW BILTMORE HOT SPRINGS (ZIEGLER)
WELL/SPRING NUMBER..... 04S-07W-28-HCA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04S 007W 28 NE OF SW NW

LAT/LONG... 45-27.72 N 112-28.50 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/07/10 MONTANA BUREAU OF MINES AND GEOLOGY

DISCHARGE..... 398. L/MIN

OTHER SAMPLE INFORMATION.. ISSUE INTO CONCRETE TANKS; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

P.H..... 7.3

SPECIFIC CONDUCTANCE..... 2140.

ALKALINITY..... 40. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 1810.

CHARGE IMBALANCE (% DIFF)... 4.9

ANALYSIS IN MG/L

AG....	CO3.... N	LI...	0.21		
AL....	CR....	MG...	72.		
AS....	CS....	MN...	N		
H....	F.... 4.6	NA...	170.	SI02.	SS.
HE....	FE(TOT). N	NB...		S04..	1100.
CA.... 250.	HCO3.... 49.	NO3.. N			
CL.... 45.					
CO....	K..... 26.				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... OM = 0.01 CO2 = 3.91 N = 0.0

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00132

GEOCHEM. SAMPLE FILE

GEOCHEM FILE 101 0046050

NAME OF SAMPLE SOURCE... NEW MILTHUPE HOT SPRINGS (ZIEGLER)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES   04S 007W 28   NE OF SW NW
 STATE..... MONTANA
 COUNTY..... MADISON
 GEOLOGIC PROVINCE.. 21

LAT/LONG... 45-27.72 N 112-28.50 W
 UTM ZONE... +12
 NORTHING... 5035039.
 384811.

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/17 MARINER
 TEMPERATURE (C)..... 53.0
 AMBIENT TEMP (C)..... 6.2
 DISCHARGE..... 2HU. L/MIN

OTHER SAMPLE INFORMATION.. ISSUE INTO COVERED CONCRETE TANKS; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

PH..... 6.8
 SPECIFIC CONDUCTANCE.... 2160.
 ALKALINITY..... 226.   AS HCO3
 TOTAL DISSOLVED SOLIDS... 1969.
 CHARGE IMBALANCE (% DIFF)... 0.2

ANALYSIS IN MG/L

AG....	CO3.... L 1.	LI...	0.18	S....	
AL.... 0.002	CR....	MG...	73.	SB...	
AS....	CS.... L 0.1	MN...	0.03		
AU....	CU.... L 0.01				
H.... 0.92	F.... 3.3	NA...	160.	SI02.	46.
HE....	FE(TOT). 0.1	NB...		S04..	1100.
HI....	GA....	NH4..	0.2		
HR....	GE....	NI...	0.02		
CA.... 250.	HCO3.... 230.				
CA+45.	HG.... L 0.0001	PB... L 0.1			
CD.... L 0.01	H2S.... 1.1				
CL.... 45.					
CO.... L 0.05	K..... 24.	Rb...	0.08	ZN...	0.08

ISOTOPES (0/001)

DEL D OF WATER..... -149.0
 DEL O(18) OF WATER... -19.30

OTHER ANALYTICAL DATA... COP FOR WATER = 58.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976d

RECORD 00133

GEOTHERM FILE ID: 0027022

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NEW HILTMORE HOT SPRINGS (ZIEGLER)

LOCATION

TOWNSHIP=RANGE

COORDINATES

LAT/LONG... 45-27.72 N 112-28.47 W

COUNTRY..... UNITED STATES 04S 007W 28 NE OF SW NW

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/12/16 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 53.9 AT (M)..... 9.7

DISCHARGE..... 276 L/MIN

OTHER SAMPLE INFORMATION.. ISSUE INTO CONCRETE TANKS; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

PH..... 6.8

SPECIFIC CONDUCTANCE..... 2240.

ALKALINITY..... 188.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 1970

CHARGE IMBALANCE (% DIFF)... 5.3

ANALYSIS IN MG/L

AG.... CO3..... N LI.... 0.21

AL.... CR..... MG.... 72.

AS.... CS..... MN.... 0.03

H.... 0.87 F..... 3.6 NA.... 160.

HE.... FE(TQT). N S102. 44.

HI.... GA..... NH4.. SR... 4.

CA.... 300. HCO3.... 229.

CL.... 45.

CO.... K..... 26.

OTHER ANALYTICAL DATA... CO2 = 58. MG/L; N = 0.01 GROSS ALPHA = 49 PICOCURIES/L, GROSS BETA = 43 PICOCURIES /L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00134

GEOTHERM FILE ID: 0027018

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NEW HILTMORE HOT SPRINGS (ZIEGLER)

WELL/SPRING NUMBER..... 04S-07W-28-BCA

LOCATION

TOWNSHIP=RANGE

COORDINATES

LAT/LONG... 45-27.72 N 112-28.50 W

COUNTRY..... UNITED STATES 04S 007W 28 NE OF SW NW

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... BEAVERHEAD ROCK 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/08/06 MONTANA STATE BOARD OF HEALTH

TEMPERATURE (C)..... 52.

DISCHARGE..... 379 L/MIN

OTHER SAMPLE INFORMATION.. ISSUE INTO CONCRETE TANKS; WATER USED IN SWIMMING POOL

WATER ANALYSIS

ALKALINITY..... 189.

AS CaCO3

ANALYSIS IN MG/L

AG.... CO3..... N

ISOTOPES (0/00)

AL....	CH.....	MG...	70.		
H.....	F.....	NA...	190.		
HE.....	FE(TOT)...	NB...		504..	1200.
CA.....	HC03....	NU3..	N		
CL.....					

OTHER ANALYTICAL DATA... N = 0.0

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00135

GEOTHERM FILE IDI 0027058

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NORRIS HOT SPRING (HAPGOOD, BEARTRAP)

COORDINATES

LAT/LONG... 45-34.50 N 111-41.00 W

LOCATION

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... NORRIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/11/24 MONTANA STATE BOARD OF HEALTH

PERTINENT LITHOLOGY..... PRECAMBRIAN GNEISS.

OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUE INTO SWIMMING POOL; ALMOST CONSTANT GAS DISCHARGE.

WATER ANALYSIS

ALKALINITY..... 320. AS CaCO3

ISOTOPES (0/001)

ANALYSIS IN MG/L

AG....	CO3.....	N	MG...	10.	
AL....	CH.....				
H.....	F.....	8.5	NA+K...	180.	
HA.....	FE+3....		NB...		504.. 130.
HE.....	FE(TOT)...	N	NU3..	N	
CA.....	HC03....	390.			
CL.....					

OTHER ANALYTICAL DATA... NO2 = .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00136

GEOTHERM FILE IDI 0027059

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)

COORDINATES

LAT/LONG... 45-34.50 N 111-41.00 W

LOCATION

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... NORRIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/27 ROBERTSON, FOURNIER AND STRONG

TEMPERATURE (C)..... 45.

DISCHARGE..... 114. L/MIN

PERTINENT LITHOLOGY..... PRECAMBRIAN GNEISS

OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUE INTO SWIMMING POOL; ALMOST CONSTANT GAS DISCHARGE.

WATER ANALYSIS

ALKALINITY..... 328. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 708.
 CHARGE IMBALANCE (% DIFF)... 0.8
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO ₃		LI...	0.1		
AL....		CR....		MG...	2.6		
H....	0.2	F....	4.4	NA...	210.	SI02.	87.
HE....		FE(TOT)...		NB...		S04..	150.
CA....	19.	HCO ₃	400.				
CL....	27.						
CO....		K.....	11.				

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00137

GEOTHERM FILE 101 0027057

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
 LOCATION... TOWNSHIP-RANGE 03S 001W 14 NW OF NE SE

COORDINATES

LAT/LONG... 45-34.50 N 111-41.00 W

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... MADISON
 MAP REFERENCE..... NORRIS 1162506

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/29 FOURNIER AND ROBERTSON
 TEMPERATURE (C)..... 41.
 PERTINENT LITHOLOGY..... PRECAMBRIAN GNEISS

OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUE INTO SWIMMING POOL; ALMOST CONSTANT GAS DISCHARGE

WATER ANALYSIS

PH..... 8.5
 ALKALINITY..... 286. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 642.
 CHARGE IMBALANCE (% DIFF)... 3.1
 ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO ₃	9.	LI...	0.11		
AL....		CR....		MG...	3.0		
H....	0.37	F....		NA...	200.	SI02.	79.
HE....		FE(TOT)...		NB...		S04..	150.
CA....	8.1	HCO ₃	330.				
CL....	18.						
CO....		K.....	11.				

GAS ANALYSIS

ANALYSIS IN VOLUME %
 OTHER ANALYTICAL DATA... CO₂ = 1.8 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00138

GEOTHERM FILE 101 0027060

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
 LOCATION... TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES   UJS 001W 14   NW OF NE SE   LAT/LONG... 45-34.50 N 111-41.00 W
STATE..... MONTANA
COUNTY..... MADISON
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... MORRIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/03/29 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 50.

DISCHARGE..... 424. L/MIN

PERTINENT LITHOLOGY..... PRECAMBRIAN GNEISS

OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUES INTO SWIMMING POOL; ALMOST CONSTANT GAS DISCHARGE

WATER ANALYSIS

PH.....	7.8	
SPECIFIC CONDUCTANCE.....	970.	
ALKALINITY.....	914.	AS CaCO3
TOTAL DISSOLVED SOLIDS.....	651.	
CHANGE (IMBALANCE (% DIFF))...	2.6	

ANALYSIS IN M07L

AG....		COJ....	N	LI....	0.1	S....	
AL....		CH....		MG....	3.2	SB....	
AS....	0.002	CS....		MN....	0.02		
AU....		CU....	N	MU....	0.005	SE....	N
H....	0.12	F....	0.1	NA....	190.	SI02..	78.
HE....	0.01	FE(1QT)..	0.12	NB....		S04..	130.
HI....		GA....		NH4..		SR....	0.32
HR....		GE....		NI....	0.006		
CA....	19.	HCO3....	383.				
CA+MG.		HG....	N	PB....	N		
CD....	N	H2S....		P04..		V....	0.0007
CL....	22.						
CO....			11.			ZN....	N

ISOIOPES 10/001

DEL D OF WATER.....	-149.2
DEL O(18) OF WATER...	-18.75

OTHER ANALYTICAL DATA... CO2 = 9.71 NU2 PLUS NO3 = .001 P = .021 SECONU SAMPLE 76-03-29 CONTAINED CA = 18, SIU2 = 73, S4 = .31 SAMPLE DATED 7-09-76 SHOWS GROSS ALPHA = 01 GROSS BETA = 10 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00139

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
WELL/SPRING NUMBER..... 03S-001W-14-DAB

WELL/SPRING NUMBER..... 03S-001N-14-UAB

LOCATION

COUNTRY..... UNITED STATES 03S 001W 14 NW OF NE SE

CORRIGENDUMS

LAT/LONG... 45-34.50 N 111-41.00 W

STATF..... MONTAIIA

COUNTY..... MADISON

MAP REFERENCE..... NORRIS 1162506

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/GB/21 MANINER

TEMPERATURE (C)..... 52.5

DISCHARGE..... 400. L/MIN

PERTINENT LITHOLOGY..... PRECAMBRIAN GNEISS.

OTHER SAMPLE INFORMATION. NUMEROUS SPRINGS AND SEEPS ISSUING IN PLANK-LINED SWIMMING POOL AT CAMPGROUND. ALMOST CONSTANT GAS DISCHARGE.

WATER ANALYSIS

PH..... 7.6
 SPECIFIC CONDUCTANCE..... 903.
 ALKALINITY..... 380.
 TOTAL DISSOLVED SOLIDS... 839.
 CHARGE IMBALANCE (% DIFF)... 7.9

AS HCO3

ANALYSIS IN MG/L

AG....	CO3.....	LI...	0.09	S....	
AL..... L 0.001	CR.....	MG...	3.2	SB...	
AS....	CS.....	MN...	0.02		
H..... 0.1	F..... 7.4	NA...	180.	SI02.	88.
HE....	FE(TOT)...	NH...		SO4..	130.
CA..... 17.	HCO3..... 380.				
CO....	H2S..... L 1.0				
CL.... 23.					
CO....	K..... 10.	RB...	0.08	ZN...	0.04

ISOLOPES 10/001

DEL O OF WATER..... -148.4
 DEL O(18) OF WATER... -19.11

GAS ANALYSIS

ANALYSIS IN VOLUME %

CH4.. 0.2		N2...	95.
C2H6.		O2...	0 2.9
CO2.. 2.8			

ISOLOPES 100/01

OTHER ANALYTICAL DATA... NH3 AS N = L 0.1

QUALIFICATION FIELD... O2 PLUS AR = 2.9

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 COMPILER CROSS INDEX... NEM-457
 REFERENCE..... MARINEK AND OTHERS, 1976B

RECORD 00140

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027104

NAME OF SAMPLE SOURCE... NORRIS WARM WELL - 2 (MAGGOOD, BEARTRAP)

WELL/SPRING NUMBER..... 03S-01W-14-DAB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 001W 14 NW OF NE SE

LAT/LONG... 45-34.32 N 111-41.08 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... NORRIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/08/14 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 21. AT (M)... 45.

DISCHARGE..... 38. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 730.

ALKALINITY..... 254. AS CaCO3

ANALYSIS IN MG/L

AG....	CO3.....	LI...	0.08		
AL.....	CR.....	MG...	5.4		
AS....	CS.....	MN...	0.01		
H..... 0.08	F..... 5.4	NA...		SI02.	56.
HE....	FE(TOT)...	NH...		SO4..	110.
HI.....	GA.....	NH4..		SR...	0.41
CA.... 22.	HCO3..... 310.				
CO....	H2S.....	PO4..	0.15		
CL.... 16.					
CO....	K..... 8.4				

ISOLOPES 10/001

OTHER ANALYTICAL DATA... NO2 PLUS NO3 = .011 P = .05

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00141

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027095

NAME OF SAMPLE SOURCE... POTUSI DRAIN NORTH

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

LAT/LONG... 45-35.40 N 111-53.90 W

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/12 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. DRAIN

TEMPERATURE (C)..... 25.0

DISCHARGE..... 276. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS

WATER ANALYSIS

PH..... 8.3

SPECIFIC CONDUCTANCE..... 420.

ALKALINITY..... 53.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 258.

CHANGE IMBALANCE (% DIFF)... 0.7

ANALYSIS IN MG/L

ISOTOPES (0/00)

AG....		CO3..... N		LI....	0.05		
AL....		CR.....		MG....	0.1		
B....	0.03	F.....	5.0	NA....	67.	SI02..	39.
BE....		FE(TOT)..	0.06	NB....		SO4..	98.
BI....		GA.....		NH4..		SR....	0.46
CA....	9.8	HCO3.....	65.				
CL....	4.5						
CO....		K.....	1.6				

OTHER ANALYTICAL DATA... CO2 = .51 NO2 PLUS NO3 = .001 P = .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00142

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027056

NAME OF SAMPLE SOURCE... POTUSI DRAIN SOUTH

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

LAT/LONG... 45-35.32 N 111-53.88 W

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/01/15 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. DRAIN

TEMPERATURE (C)..... 17.

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS.

WATER ANALYSIS

ANALYSIS IN MG/L

AL....	CR.....	MG...	0.3
H.....	F.....	NA...	82.
CA.... 11.			
CO....	K..... 1.6		

ISOTOPES (0/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00143

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027055

NAME OF SAMPLE SOURCE... POTOSI DRAIN SOUTH

LOCATION

TOWNSHIP=RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

LAT/LONG... 45-35.32 N 111-53.88 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1965/05/12 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. DRAIN

TEMPERATURE (C)..... 23.

DISCHARGE..... 326. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS

WATER ANALYSIS

PH.....	8.1	
SPECIFIC CONDUCTANCE.....	240.	
ALKALINITY.....	44.	AS CaCO3
TOTAL DISSOLVED SOLIDS.....	166.	
CHARGE IMBALANCE (% DIFF)...	3.8	

ANALYSIS IN MG/L

AG....	CO3....	LI...	0.02	
AL....	CR.....	MG...	0.6	
H..... 0.03	F..... 3.7	NA...	39.	5102. 31.
HE....	FE(TOT) 0.13	NH...		504.. 53.
HI....	GA.....	NH4..		SR... 0.3
CA.... 7.8	HCO3.... 54.			
CL.... 2.7				
CO....	K..... 1.2			

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... CO2 = .61 NO2 PLUS NO3 = .011 P = .01

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00144

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027089

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS

LOCATION

TOWNSHIP=RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

LAT/LONG... 45-35.35 N 111-53.92 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/12 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 50.0

DISCHARGE..... 38. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS.

WATER ANALYSIS

PH..... 8.5

SPECIFIC CONDUCTANCE..... 500.

ALKALINITY..... 54. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 318.

CHARGE IMBALANCE (Σ DIFF)... 0.1

ANALYSIS IN MG/L

AG....		CO ₃		LI....	0.06	S....	
AL....		CH....		MG....	N	SB....	
H....	0.02	F....	6.6	NA....	86.	SI02.	44.
HE....		FE(TOT).	0.01	NH....		SO4..	130.
HI....		GA....		NH4..		SR...	0.51
CA....	10.	HCO ₃	66.				
CL....	5.8						
CO....		K.....	1.7				

ISOTOPES (0/001)

DEL D OF WATER..... -150.0

DEL O(18) OF WATER... -19.60

OTHER ANALYTICAL DATA... CO₂ = 0.31 NO₂ PLUS NO₃ = .07; P = .01

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976H

RECORD 00145

GEOTERM SAMPLE FILE

NAME OF SAMPLE SOURCE... POTOMI HOT SPRINGS

LOCATION

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/01/15 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 51.0

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 482.

ANALYSIS IN MG/L

AG....		CO ₃		LI....	0.06		
AL....		CH....		MG....	0.1		
H....		F....		NA....	88.	SI02.	45.
HE....		FE(TOT).		NH....		SO4..	140.
CA....	11.						
CL....	6.9						
CO....		K.....	1.7				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... GROSS ALPHA = 2 PICOCURIES/L, GROSS BETA = 8 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976H

GEOTERM FILE ID: 0027090

COORDINATES

LAT/LONG... 45-35.35 N 111-53.92 W

RECORD 00146

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027088

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

LAT/LONG... 45-35.35 N 111-53.92 W

COUNTRY..... UNITED STATES 035 002N 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/27 MARINER, PRESSER AND EVANS

POINT OF COLLECTION.. STREAM ISSUING FROM RUBBLE PILE

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS

WATER ANALYSIS

ALKALINITY..... 72. AS CaCO3

TOTAL DISSOLVED SOLIDS... 365.

CHARGE IMBALANCE (% DIFF)... 89.6

ANALYSIS IN MG/L

ISOIOPES (0/001)

AG....	CO3....	2.	LI....	60.		
AL....	CH....		MG....	N		
H.... L 0.1	F....	3.6	NA....	94.	SI02.	47.
HE....	FE(101).		NH....		S04..	160.
CA.... 11.	HCO3....	64.				
CL.... 4.4						
CO....	K....	1.9				

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00147

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027087

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

LAT/LONG... 45-35.35 N 111-53.92 W

COUNTRY..... UNITED STATES 035 002N 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

TEMPERATURE (C)..... 51.

DISCHARGE..... 200. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS.

OTHER SAMPLE INFORMATION.. FLOW REPORTED AT LEAST SEVERAL HUNDRED LITERS PER MINUTE ON 8-21-74

WATER ANALYSIS

PH..... 8.0

ALKALINITY..... 58. AS CaCO3

TOTAL DISSOLVED SOLIDS... 319.

ANALYSIS IN MG/L

ISOIOPES (0/001)

AG....	CO3....	2.	LI....	0.08		
AL....	CH....		MG....	N		
H.... 0.25	F....		NA....	88.	SI02.	41.
HE....	FE(101).		NH....		S04..	140.
CA.... 11.	HCO3....	67.				

CL.... H
 CO..... K..... 3.6
 OTHER ANALYTICAL DATA... CO2 = 1.1
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976H

RECORD 00148

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027086

NAME OF SAMPLE SOURCE... POTASI HOT SPRINGS
 LOCATION
 COUNTRY..... UNITED STATES TOWNSHIP-RANGE COORDINATES
 STATE..... MONTANA 035 002W 07 LAT/LONG... 45-35.35 N 111-53.92 W
 COUNTY..... MADISON
 MAP REFERENCE..... HARRISON 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1964/11/24 MONTANA STATE BOARD OF HEALTH
 TEMPERATURE (C)..... 38.
 PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS
 OTHER SAMPLE INFORMATION.. FLOW REPORTED AT LEAST SEVERAL HUNDRED LITERS PER MINUTE ON 8-21-1974.

WATER ANALYSIS

ALKALINITY..... 65. AS CaCO3
 ANALYSIS IN MG/L
 AL.... CR.... MG... 1.0
 H.... F..... 5.8
 HA.... FE+3... NA+K... 93.
 HE.... FE(TOT). N NB... 504.. 53.
 CA.... 12. HCO3.... 79. NO3.. N
 CL.... H2O

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... N = .00
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976H

RECORD 00149

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046055

NAME OF SAMPLE SOURCE... POTASI HOT SPRINGS (CLARK)
 LOCATION
 COUNTRY..... UNITED STATES TOWNSHIP-RANGE COORDINATES
 STATE..... MONTANA 035 002W 07 NW OF NE SW LAT/LONG... 45-35.35 N 111-53.92 W
 COUNTY..... MADISON UTM ZONE... +12
 GEOLOGIC PROVINCE.. 21 NORTHING... 5048578.
 MAP REFERENCE..... HARRISON 1162500 429899.
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1974/08/21
 POINT OF COLLECTION.. STREAM ISSUING FROM RUBBLE PILE.
 TEMPERATURE (C)..... 49.5
 AMBIENT TEMP (C)..... 4.1
 DISCHARGE..... 197. L/MIN
 PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS.
 OTHER SAMPLE INFORMATION.. ORIGINAL SPRINGS DYNAMITED.
 WATER ANALYSIS

PH..... 8.6
 SPECIFIC CONDUCTANCE..... 471.
 ALKALINITY..... 55.
 TOTAL DISSOLVED SOLIDS... 333.
 CHARGE IMBALANCE (% DIFF)... 0.0

AS CaCO3

ANALYSIS IN MG/L

AG....	CO3.... 2.	LI.... 0.05	S....
AL.... 0.006	CR....	MG.... L 0.1	SB....
AS....	CS.... L 0.1	MN.... L 0.02	
AU....	CU.... L 0.01		
H.... L 0.02	F.... 6.2	NA.... 91.	SI02.. 46.
HE....	FE(TOT). L 0.02	NH....	S04.. 140.
HR....	GE....	NI.... 0.02	
CA.... 10.	HCO3.... 63.		
CA+MG.	MG.... L 0.0001	PU.... 0.1	
CO.... L 0.01	H2S.... L 0.5		
CL.... 5.9			
CO.... L 0.05	K.... 1.6	RU.... L 0.02	ZN.... 0.01

ISOTOPES 10/001

DEL D OF WATER..... -149.0
 DEL O(18) OF WATER... -19.81

OTHER ANALYTICAL DATA... SAMPLE DATED 1978/05/24, WITH TEMPERATURE: 35.0 C; SPECIFIC CONDUCTANCE = 464.1 PH = 8.45. CO2

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUMDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00150

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027091

NAME OF SAMPLE SOURCE... PUTOSI HOT SPRINGS VENT 17

LOCATION

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

COORDINATES

LAT/LONG... 45-35.35 N 111-53.92 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS

WATER ANALYSIS

PH..... 7.6

ALKALINITY..... 60.

CHARGE IMBALANCE (% DIFF)... 7.9

AS CaCO3

ANALYSIS IN MG/L

AG....	CO3.... 2.	LI.... 0.06
AL....	CR....	MG.... 0.2
H.... 0.3	F....	NA.... 87.
HE....	FE(TOT).	NH....
CA.... 13.	HCO3.... 69.	S04.. 140.
CL.... 2.5		
CO....	K.... 2.8	

ISOTOPES 10/001

OTHER ANALYTICAL DATA... CO2 = 2.9

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00151

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027092

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS VENT 17

LOCATION

TOWNSHIP-RANGE

COORDINATES

LAT/LONG... 45-35.35 N 111-53.92 W

COUNTRY..... UNITED STATES

03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/12 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 49.

DISCHARGE..... 70. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS.

WATER ANALYSIS

PH..... 8.4

SPECIFIC CONDUCTANCE..... 507.

ALKALINITY..... 51.

AS CaCO3

TOTAL DISSOLVED SOLIDS..... 296.

CHARGE IMBALANCE (% DIFF)..... 0.4

ANALYSIS IN MG/L

AG....		CO3....	N	LI....	0.06	S....	
AL....		CR....		MG....		SB....	
H....	0.02	F....	5.9	NA....	79.	SI02..	43.
HE....		FE(TOT)...	0.04	NH....		S04....	120.
HI....		GA....		NH4....		SR....	0.49
CA....	10.	HCO3....	62.				
CL....	5.6						
CO....		K....	1.8				

ISOTOPES (0/00)

DEL D OF WATER..... -148.0
 DEL O(18) OF WATER... -19.50

OTHER ANALYTICAL DATA... CO2 = .41 NO2 PLUS NO3 = .001 P = .01

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976H

RECORD 00152

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027085

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS VENT 37

LOCATION

TOWNSHIP-RANGE

COORDINATES

LAT/LONG... 45-35.33 N 111-53.87 W

COUNTRY..... UNITED STATES

03W 002W 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/01/15 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 52.

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS.

WATER ANALYSIS

ANALYSIS IN MG/L

AL....		CH....		MG....	0.1
H....		F....		NA....	89.
CA....	12.				
CO....		K....	1.7		

ISOTOPES (0/00)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00153

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027093

NAME OF SAMPLE SOURCE... PUTOSI WARM SPRINGS VENT 15
 LOCATION

COORDINATES

LAT/LONG... 45-35.37 N 111-53.93 W

COUNTRY..... UNITED STATES 03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/12 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 24.

DISCHARGE..... 3.8 L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANICS

WATER ANALYSIS

PH..... 7.0

SPECIFIC CONDUCTANCE..... 184.

ALKALINITY..... 40.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 149.

CHARGE IMBALANCE (% DIFF)... 2.4

ANALYSIS IN MG/L

AG....		CO3....	N	LI....	0.03	S....	
AL....		CR....		MG....	0.1	SB....	
H....	0.02	F....	2.4	NA....	36.	SI02.	30.
HE....		FE(TOT).	0.2	NB....		S04..	46.
HI....		GA....		NH4..		SR....	0.29
CA....	5.9	HCO3....	49.				
CL....	2.4						
CO....		K.....	1.1				

ISOTOPES (0/00)

DEL D OF WATER..... -144.5
 DEL O(18) OF WATER... -18.65

OTHER ANALYTICAL DATA... CO2 = 7.81 NO2 PLUS NO3 = .00; P = .01

REFERENCE AND VERIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00154

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027094

NAME OF SAMPLE SOURCE... PUTOSI WARM SPRINGS VENT 15

LOCATION

TOWNSHIP-RANGE

COORDINATES

LAT/LONG... 45-35.37 N 111-53.93 W

COUNTRY..... UNITED STATES 03S 002W 07

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/01/15 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 39.0

PERTINENT LITHOLOGY..... GRANITE BEDROCK AND TERTIARY VOLCANIC ROCKS.

WATER ANALYSIS

ANALYSIS IN MG/L

AG....		CO3....		LI....	0.06
AL....		CR....		MG....	0.4

ISOTOPES (0/00)

GEUTHERM FILE ID: 0027030

NAME OF SAMPLE SOURCE... PULLER HOT SPRINGS

WELL/SPRING NUMBER..... OBS-0054-01-ABD

TOWNSHIP=RANGE

COUNTRY..... UNITED STATES   URS 005W 01   SW OF NW NE

COORDINATES

LAT/LONG... 45-10.30 N 112-09.12 W

STATE..... MONTANA

COUNTY..... MAULSON

GEOLOGIC PROVINCE. 21

MAP REFERENCE..... ME

AMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1976/05/

TEMPERATURE (C) 44.4

DISCHARGE..... 189.

AFR. ANALYSIS

P.1.....
P.2.....

SPECIFIC CONDUCTANCE..... 168

AI KAI INITY..... 419. AS CAC03

TOTAL DISSOLVED SOLIDS.....	1160.
CHLORINE BALANCE AT DISCHARGE.....	1160.

CHARGE IMBALANCE (% DIFF)... 5.5

ANALYSIS IN MG/L
AL

AG... COS... N
Al... Cl...

AL. . . . . CA. . . . .
AS. . . . . 0 116 CS. . . . .

44-38861-1000
 ALL INFORMATION CONTAINED
 HEREIN IS UNCLASSIFIED
 DATE 06-03-2003 BY 60322 UCBAW

0.04

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11.0000

UR..... GE.....

CA... 56. HC03...

CA-MG. HG. . . . . N

CO... H   H2S....

CL... 91.

CO. . . . . R. . . . .

AS ANALYSIS

DATE/TIME:

ANALYSIS IN VOLUME 2

CH4... 0.1

C246.
C247

002.. 2.5
THEIR POLITICAL

TECHNICAL ANALYTICAL DATA... CO₂ = 16 MG/L NO₂ + NO₃ = 0.01 P = 0.01 IN GAS ANALYSIS O₂ + AR = 7.75AR = 9.7

DECLASSIFIED AND IDENTIFICATION
COMPLETED BY: [redacted]

COMPILER AFFILIATION: U.S. ECOLOGICAL SERVICE

REFERENCE: U.S. GEOLOGICAL SURVEY
LEONARD AND OTHERS, 19

REFERENCE..... LEONARD AND OTHERS 1978

RECORD 00156

GEOTHERM FILE ID: 0027029

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... PULLER WARM SPRINGS

WELL/SPRING NUMBER..... 085-005W-01-ABD

LOCATION

COUNTRY..... UNITED STATES 085 005W 01 SE OF NW NE

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... NETZEL RANCH, MONTANA 1:24000

COORDINATES

LAT/LONG... 45-10.28 N 112-09.12 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/14 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 41.

DISCHARGE..... 5.7 L/MIN

WATER ANALYSIS

PH..... 7.3

SPECIFIC CONDUCTANCE..... 1680.

ALKALINITY..... 440.

AS CaCO3

TOTAL DISSOLVED SOLIDS... 1200.

CHARGE IMBALANCE (% DIFF)... 3.5

ANALYSIS IN MG/L

AG....

CO3.... N

LI....

0.2

AL....

CR....

MG....

20.

H.... 0.09

F....

2.1

NA....

330.

SiO2..

32.

HE....

FE(TOT)...

0.06

NB....

S04..

370.

HI....

GA....

NH4..

SR....

1.1

CA.... 64.

HCO3....

537.

CL.... 91.

K....

24.

CO....

K....

24.

GAS ANALYSIS

DATE/ANALYST..... 1976/05/14 (COLLECTION DATE)

ANALYSIS IN VOLUME %

CH4.. 0.1

C2H6..

N2... 91.8

CO2.. 2.0

O2... 0 5.6

OTHER ANALYTICAL DATA... CO2 = 43.1 NO2 PLUS NO3 = .06; P = .005AR = 9.2

QUALIFICATION FIELD..... O2 PLUS AR = 5.6

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

ISOTOPES (0/001)

ISOTOPES (00/01)

RECORD 00157

GEOTHERM FILE ID: 0027028

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... PULLER WARM SPRINGS

WELL/SPRING NUMBER..... 085-005W-01-ABD

LOCATION

COUNTRY..... UNITED STATES 085 005W 01 SE OF NW NE

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... NETZEL RANCH, MONTANA 1:24000

COORDINATES

LAT/LONG... 45-10.28 N 112-09.12 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/07/21 KACZMAREK (1974), TABLE 3

TEMPERATURE (C)..... 43.0

DISCHARGE..... 5.7 L/MIN.

WATER ANALYSIS

P.H..... 7.0

ANALYSIS IN MG/L

AL....	CR....	MG...	19.		
H....	F.....	NA...	250.	SI02.	20.
CA.... 58.					
CL.... 91.					
CO....	K.....		20.		

ISOTOPES (0/00)

OTHER ANALYTICAL DATA... SAR = 7.3

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00158

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027032

NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 006W 01 NE OF NW SW LAT/LONG... 45-41.12 N 112-17.70 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... TWIN BRIDGES 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/06/21 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. AT GRATE

TEMPERATURE (C)..... 72.7

DISCHARGE..... 144. L/MIN

PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE INTO ROCK-LINED TANKS; SPORADIC GAS DISCHARGE; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 918.

ANALYSIS IN MG/L

H....	F.....	NA...	SI02.	110.
CL.... 32.				

ISOTOPES (0/00)

GAS ANALYSIS

ANALYSIS

C2H6. N2... 96.

ISOTOPES (00/01)

QUALIFICATION FIELD..... 02 = 02 + AR.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... MARINER AND OTHERS, 1976B; LEONARD AND OTHERS, 1978

RECORD 00159

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027036

NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS

WELL/SPRING NUMBER..... 02S-006W-01-CB A

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 006W 01 NE OF SW SW LAT/LONG... 45-41.12 N 112-17.70 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... TWIN BRIDGES 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG
 TEMPERATURE (C)..... 71.0
 DISCHARGE..... 17. L/MIN
 PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE
 OTHER SAMPLE INFORMATION.. SPRINGS ISSUE INTO ROCK-LINED TANKS; SPORADIC GAS DISCHARGE; WATER USED IN SWIMMING POOL.
 WATER ANALYSIS
 ALKALINITY..... 156. AS CAC03
 ANALYSIS IN MG/L
 AG.... CO3.... 190. LI... 0.32
 AL.... CR.... MG... 0.5
 H.... 0.45 F.... 5.4 NA... 170. SI02. 110.
 HE.... FE(TOT). NB... S04.. 190.
 CA.... 9.6
 CO.... K.... 6.9
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00160

 GEOTHERM SAMPLE FILE
 NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS
 GEOTHERM FILE ID: 0027033

LOCATION
 COUNTRY..... UNITED STATES TOWNSHIP-RANGE COORDINATES
 STATE..... MONTANA 02S 06W 01 NE OF NW SW LAT/LONG... 45-41.12 N 112-17.70 W
 COUNTY..... MADISON
 MAP REFERENCE..... TWIN BRIDGES 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1964/08/05 MONTANA STATE BOARD OF HEALTH
 TEMPERATURE (C)..... 69.
 PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE.
 OTHER SAMPLE INFORMATION.. SPRINGS ISSUE INTO ROCK-LINED TANKS; SPORADIC GAS DISCHARGE; WATER USED IN SWIMMING POOL.
 WATER ANALYSIS
 ALKALINITY..... 140. AS CAC03
 ANALYSIS IN MG/L
 AG.... CO3.... N
 AL.... CR.... MG... 3.
 H.... F.... 8.0
 NA.... FE+3. NA+K. 170.
 HE.... FE(TOT). NB... S04.. 200.
 CA.... 8.0 MC03.... 180. NO3.. N
 CL.... 34.
 OTHER ANALYTICAL DATA... N = .00
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00161

 GEOTHERM SAMPLE FILE
 NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS
 GEOTHERM FILE ID: 0027031
 LOCATION
 COUNTRY..... UNITED STATES TOWNSHIP-RANGE COORDINATES
 STATE..... MONTANA 02S 06W 01 NE OF NW SW LAT/LONG... 45-41.12 N 112-17.70 W

COUNTY..... MADISON
 MAP REFERENCE..... TWIN BRIDGES 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1976/12/15 U.S. GEOLOGICAL SURVEY
 POINT OF COLLECTION.. AT GRATE
 TEMPERATURE (C)..... 72.2
 DISCHARGE..... 144. L/MIN
 PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE.
 ..OTHER SAMPLE INFORMATION.. SPRINGS ISSUE INTO ROCK-LINED TANKS; SPORADIC GAS DISCHARGE; WATER USED IN SWIMMING POOL

WATER ANALYSIS

PH..... 7.6
 SPECIFIC CONDUCTANCE..... 917.
 ALKALINITY..... 144. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 612.
 CHARGE IMBALANCE (% DIFF)... 0.1

ANALYSIS IN MG/L

ISOTOPIES 10/001

AG....	CO3.... N	LI...	0.38		
AL....	CR....	MG...	0.3		
AS....	CS....	MN...	0.04		
B.... 0.26	F.... 8.9	NA...	170.	SI02.	110.
HE....	FE(TOT)...	NB...		SO4..	190.
HI....	GA....	NH4..		SR...	0.51
CA.... 9.5	HCO3.... 176.				
CL.... 29.					
CO....	K..... 6.7				

OTHER ANALYTICAL DATA... CO2 = 7.1 MG/L; NO2 PLUS NO3 = .01; ANOTHER SAMPLE DATED 7/15/76 INDICATED GROSS ALPHA = 1
 PICOCURIES/L AND GROSS BETA = 4 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILED AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00162

GEOHEM SAMPLE FILE

GEOHEM FILE ID: 0027035

NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS

WELL/SPRING NUMBER..... 025-06W-01-CB A

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 025 06W 01 NE OF NW SW

LAT/LONG... 45-41.12 N 112-17.70 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... TWIN BRIDGES 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/07/10 MONTANA BUREAU OF MINES AND GEOLOGY

DISCHARGE..... 568. L/MIN

PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE.

..OTHER SAMPLE INFORMATION.. SPRINGS ISSUE INTO ROCK-LINED TANKS; SPORADIC GAS DISCHARGE; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

PH..... 8.4
 SPECIFIC CONDUCTANCE..... 847.
 ALKALINITY..... 120. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 712.
 CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

ISOTOPIES 10/001

AG....	CO3.... N	LI...	0.38
AL....	CH.....	MG...	2.2

AS....		CS....		MN....	0.02		
H....		F....	9.2	NA....	170.	SI02.	120.
HE....		FE(TOT). N		NB....		SI04..	230.
CA....	9.1	MC03....	140.	NU3..	0.4		
CL....	22.						
CO....		K.....	6.4				

OTHER ANALYTICAL DATA... OH = .001 CO2 = .91 N = .09

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00163

GEOHEM SAMPLE FILE

GEOHEM FILE ID: 0027034

NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS

WELL/SPRING NUMBER..... 02S-06W-01-CB A

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 06W 01 NE OF NW SW

LAT/LONG... 45-41.12 N 112-17.70 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... TWIN BRIDGE 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 FOURNIER AND ROBERTSON

TEMPERATURE (C)..... 67.0

PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE INTO ROCK-LINED TANKS; SPORADIC GAS DISCHARGE; WATER USED IN SWIMMING POOL.

WATER ANALYSIS

PH..... 8.3

ALKALINITY..... 173. AS CaCO3

TOTAL DISSOLVED SOLIDS... 624.

CHARGE IMBALANCE (% DIFF)... 4.4

ANALYSIS IN MG/L

ISOTOPES (0/00)

AG.... CO3.... N LI... 0.36

AL.... CR.... MG... 0.3

H.... 0.32 F.... NA... 170. SI02. 140.

HE.... FE(TOT). NB... SI04.. 200.

CA.... 9.7 MC03.... 210.

CL.... 31.

CO.... K..... 6.8

OTHER ANALYTICAL DATA... CO2 = 1.7 MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00164

GEOHEM SAMPLE FILE

GEOHEM FILE ID: 0046060

NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS (HARKELLS)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 02S 06W 01 NE OF NW SW

LAT/LONG... 45-41.12 N 112-17.70 W

STATE..... MONTANA

COUNTY..... MADISON

GEOLOGIC PROVINCE..

UTM ZONE... 12

NORTHING... 5059685.

MAP REFERENCE..... TWIN BRIDGES 1162500

399155.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/18

TEMPERATURE (C)..... 71.5

AMBIENT TEMP (C)..... 6.1

DISCHARGE..... 150. L/MIN

PERTINENT LITHOLOGY..... TERTIARY LAKE SEDIMENTS OVERLYING GRANITE.

OTHER SAMPLE INFORMATION.. SPRINGS USED FOR SWIMMING POOL AND ISSUE IN ROCK-LINED TANKS. SPORADIC GAS DISCHARGE.

SPRINGS MAY BE SILED UP. LEASE FOR GREENHOUSES BEING NEGOTIATED.

WATER ANALYSIS

PH..... 8.2

SPECIFIC CONDUCTANCE..... 808.

ALKALINITY..... 170.

TOTAL DISSOLVED SOLIDS... 698.

CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

AG....	COJ....	2.	LI...	0.34	S....	
AL.... 0.907	CH....		MG...	0.3	SB...	
AS....	CS....		MN...	0.02		
B.... 0.25	F....	8.7	NA...	170.	SI02..	110.
BE....	FE(TOT). L	0.02	Nd...		S04..	190.
CA.... 9.3	MCU3....	170.				
CA-MG.	MG....		PB... L	0.1		
CD....	H2S....	1.6				
CL.... 31.						
CU....	K.....	6.4	RB...	0.05	ZN... L	0.01

AS HCO3

ISOTOPES (0/001)

DEL D OF WATER..... -145.4

DEL O(18) OF WATER... -18.48

GAS ANALYSIS

DATE/ANALYST..... 1974/08/18 (COLLECTION DATE)

ANALYSIS IN VOLUME %

CH4.. L 0.1

C2H6.

CO2.. 1.2

N2... 96.

O2... 0 2.7

OTHER ANALYTICAL DATA... NH4 AS N = L 0.1 FLOW 114. L/MIN, 1978/04/13

QUALIFICATION FIELD.... 02 PLUS AR = 2.7

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

COMPILER CROSS INDEX... NEM-458

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00165

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046063

NAME OF SAMPLE SOURCE... SLOAN COW CAMP

LOCATION

TOWNSHIP-RANGE

COUNTRY..... UNITED STATES 125 001W 19 NE OF SE SW

STATE..... MONTANA

COUNTY..... MADISON

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... CLIFF LAKE 1:62500

OTHER LOCALITY INFORMATION: ELEVATION 6560 FEET

COORDINATES

LAT/LONG... 44-46.13 N 111-38.92 W

UTM ZONE... 12

NORTHING... 4957259.

448668.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/09/29

SAMPLE NUMBER..... LAB NO. /BMU397

TEMPERATURE (C)..... 29.8

AMBIENT TEMP (C)..... 4.1

DISCHARGE..... 1306. L/MIN

PERTINENT LITHOLOGY..... SPRING ISSUES FROM ALLUVIUM UNDERLAIN BY PLEISTOCENE(?) RHYOLITE TUFF.
 OTHER SAMPLE INFORMATION.. PH IS LAB VALUE, FIELD PH IS 10.05. LAB REPORT NOT AVAILABLE! CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 9.75
 SPECIFIC CONDUCTANCE..... 396.
 TOTAL DISSOLVED SOLIDS.... 262.
 CHANGE IMBALANCE (% DIFF).... 1.6

ANALYSIS IN MG/L

AG....		CO3.....	74.4	LI... L	0.01		
AL....	0.086	CR.....		MG...	0.1		
AS....	L 0.002						
H....	0.10	F.....	3.1	NA...	88.	SI02.	50.9
HE....		FE(TOT)...	0.17	NH...		S04..	3.7
HI....		GA.....		NH4..		SR...	0.01
HR....	0.1						
CA....	0.9	HCO3....	64.	NO3..	0.2		
CA+MG.		MG.....		PB...		U....	0.0003
CO....		H2S.....	0.94				
CL....	7.65						
CO....		K.....	1.1				

ISOTOPES (0/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SUNDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00166

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027102

NAME OF SAMPLE SOURCE... THEXTON HOT WELL

WELL/SPRING NUMBER..... 055-01W-28-DBU

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY.....	UNITED STATES	055 001W 28	SE OF NW SE	LAT/LONG...	45-22.12 N 111-43.62 W
STATE.....	MONTANA				
COUNTY.....	MADISON				

MAP REFERENCE..... ENNIS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/04/01

TEMPERATURE (C)..... 72.2

DISCHARGE..... 0.76 L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 1540.
 ALKALINITY..... 358. AS CACO3
 TOTAL DISSOLVED SOLIDS.... 1040.
 CHANGE IMBALANCE (% DIFF).... 5.7

ANALYSIS IN MG/L

AL....		CR.....		MG...	0.9		
H....	0.61	F.....	11.	NA...	330.	SI02.	98.
HE....		FE(TOT)...	1.7	NH...		S04..	250.
CA....	5.8	HCO3....	437.				
CL....	110.						
CO....		K.....	17.				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... NO2 + NO3 AS N = .001 P = .031 SECOND SAMPLE SI02 = 95.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00167

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046068

NAME OF SAMPLE SOURCE... TRUDAU HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 075 004W 07 NE OF SW SE

LAT/LONG... 45-14.18 N 112-08.07 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... MADISON

NORTHING... 5009613.

GEOLOGIC PROVINCE..

410950.

MAP REFERENCE..... METZEL RANCH 1124000

OTHER LOCALITY INFORMATION: ELEVATION 5675 FEET

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/05/24

SAMPLE NUMBER..... LAB NO. 78M0908

TEMPERATURE (C)..... 22.7

AMBIENT TEMP (C)..... 5.1

DISCHARGE..... 662. L/MIN

DEPOSITS OR ALTERATION.... TRAVERTINE DEPOSITS FORM CLIFFS.

PERTINENT LITHOLOGY..... PRE-HELT AND PALEOZOIC

OTHER SAMPLE INFORMATION.. PH AND CONDUCTANCE FROM FIELD DATA. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 8.4

SPECIFIC CONDUCTANCE..... 874.

CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

ISOTOPE (0/001)

AG.....

CO3..... N

AL..... 0.09

CR.....

MG... 30.

B.....

F..... 0.8

NA... 70.

S102.

19.0

HE.....

FE(TOT) L 0.01

NH... 102.

S04..

CA..... 78.

HCO3... 425.

NO3.. 0.77

CL..... 18.2

CO.....

K..... 11.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONVEHEGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONVEHEGGER, JOHN L., M.B.M.G.

RECORD 00168

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046069

NAME OF SAMPLE SOURCE... VIGILANTE HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 095 003W 22 SE OF SE NW

LAT/LONG... 45-02.27 N 111-57.13 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... MADISON

NORTHING... 4987377.

GEOLOGIC PROVINCE..

425002.

MAP REFERENCE..... VANNEY 1162500

OTHER LOCALITY INFORMATION: ELEVATION 6200 FEET

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/05/24

SAMPLE NUMBER..... LAB NO. 78M0907

TEMPERATURE (C)..... 23.5

AMBIENT TEMP (C)..... 4.5

DISCHARGE..... 8328. L/MIN.

PERTINENT LITHOLOGY..... SPRING ISSUES FROM MADISON-KOOTENAI CONTACT.

OTHER SAMPLE INFORMATION.. PH AND SP. COND. FROM FIELD DATA. CHEMISTRY NOT VERIFIED.

WATER ANALYSIS

PH..... 7.5
SPECIFIC CONDUCTANCE..... 619.
CHARGE IMBALANCE (% DIFF)... 1.9

ANALYSIS IN MG/L

AG....		CO3....	181.8				
AL....	0.08	CH....		MG...	27.		
N....		F....	0.9	NA...	6.7	SI02..	15.5
HE....		FE(TOT)..	0.01	NB...		SO4..	174.
CA....	85.	HCO3....	182.	NO3..	0.67		
CL....	1.9						
CU....		K.....	3.1				

ISOTOPE 10/001

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... *SONDEREGGER, JOHN L., M.B.M.G.

RECORD 00169

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0046087

NAME OF SAMPLE SOURCE... WALL CANYON WARM SPRING

WELL/SPRING NUMBER..... 10S-01E-07-CAB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10S 001E 07 NW OF NE SW

LAT/LONG... 44-58.57 N 111-39.08 W

STATE..... MONTANA

COUNTY..... MADISON

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... CLIFF LAKE 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTION..... 1977/09/13 WEINHEIMER, GERALD J.

SAMPLE NUMBER..... 7800293

TEMPERATURE (C)..... 24.

DISCHARGE..... 0.8 L/MIN

PERTINENT LITHOLOGY..... PRECAMBRIAN GNEISS- DISCHARGES INTO ALLUVIUM.

OTHER SAMPLE INFORMATION.. FLOW ESTIMATED IN PIT.

WATER ANALYSIS

DATE/ANALYST..... 1977/11/30 LABLANC, GAYLE

PH..... 8.06

SPECIFIC CONDUCTANCE..... 1097.

ALKALINITY..... 404. AS CaCO3

TOTAL DISSOLVED SOLIDS... 703.

CHARGE IMBALANCE (% DIFF)... 0.4

ANALYSIS IN MG/L

AL....	0.036	CH....		MG...	1.7		
AS....		CS....		MN...	0.02		
N....		F....	14.4	NA...	260.	SI02..	41.7
HE....		FE(TOT)..	0.08	NB...		SO4..	80.8
CA....	6.0	HCO3....	493.	NO3..	0.22		
CL....	49.2						
CU....		K.....	6.0				

ISOTOPE 10/001

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00170

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046072

NAME OF SAMPLE SOURCE... WEST FORK SWIMMING HOLE

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 12S 001E 18 SE OF SW
 STATE..... MONTANA
 COUNTY..... MADISON
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... CLIFF LAKE 1162500

LAT/LONG... 44-47.12 N 111-38.92 W
 UTM ZONE... +12
 NORTHING... 4959092.
 448683.

OTHER LOCALITY INFORMATION: ELEVATION ABOUT 6540 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/09/29
 SAMPLE NUMBER..... LAB NO. 78M0395
 TEMPERATURE (C)..... 25.5
 AMBIENT TEMP (C)..... 3.9
 DISCHARGE..... 1893. L/MIN

PERTINENT LITHOLOGY..... ALLUVIUM PLIESTOCENE (?) VOLCANICS

OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 7.88
 SPECIFIC CONDUCTANCE..... 321.
 TOTAL DISSOLVED SOLIDS... 179.
 CHARGE IMBALANCE (% DIFF)... 1.8

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3.... N	LI... L 0.01		
AL.... 0.023		CR.....	MG... 29.		
AS.... 0.0028					
H.... 0.02		F..... 0.4	NA... 4.8	SI02.. 13.7	
HE....		FE(TOT). L 0.01	NB... 11.8	SO4.. 11.8	
HI....		GA.....	NH4... 0.12	SR... 0.12	
CA.... 19.		HCO3.... 194.	NO3.. 0.44	U.... 0.0010	
CA+MG.		HG.....			
CO....		H2S..... 0.17			
CL.... 2.75					
CO....		K..... 1.9			

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00171

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046074

NAME OF SAMPLE SOURCE... WOLF CREEK HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10S 001E 09 NW OF NW NW
 STATE..... MONTANA
 COUNTY..... MADISON
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... CLIFF LAKE 1162500

LAT/LONG... 44-59.03 N 111-36.78 W
 UTM ZONE... +12
 NORTHING... 4981120.
 451671.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/13 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 68.0
 AMBIENT TEMP (C)..... 4.6

DISCHARGE..... 201. L/MIN

OTHER SAMPLE INFORMATION.. ADDITIONAL ANALYSES SHOW EFFECT OF DILUTION CAUSED BY USE OF BACKHUE *MBMG LAB. NO.

7BM0425 AND 79M3773.

WATER ANALYSIS

PH..... 8.6
 SPECIFIC CONDUCTANCE..... 659.
 TOTAL DISSOLVED SOLIDS... 363.
 CHARGE IMBALANCE (% DIFF)... 4.0

ANALYSIS IN MG/L

AG....		CO3....	9.	LI...	0.08	S....	
AL....	0.039	CR.....		MG...	0.8	SB...	
AS....	0.007						
H....	0.04	F.....	18.	NA...	120.	SI02.	55.
HE....		FE(TOT). N		NH...		SO4..	53.
HI....		GA.....		NH4..		SR...	0.07
HR....	0.1						
CA....	0.2	HCO3....	157.	NO3..	0.28		
CA+MG.		MG.....		PH...	0.003	U....	0.0006
CL....	23.	I.....	0.01				
CU....		K.....	1.9			ZN...	N

ISOTOPES (0/001)

DEL D OF WATER..... -153.1
 DEL O(18) OF WATER... -20.35

GAS ANALYSIS

DATE/ANALYST..... 1976/05/13 (COLLECTION DATE)

ANALYSIS

CH4.. 0.4
 C2H6..
 CO2.. 0.2
 N2... 93.8
 O2... 0 5.1

ISOTOPES (00/01)

OTHER ANALYTICAL DATA... OTHER GAS SAMPLE (SAME DATE) N2 = 93.2, 93.1 CH4 = 0.4, 0.4 CO2 = 0.2, 0.2

QUALIFICATION FIELD..... O2 PLUS AR = 5.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUMNEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00172

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027098

NAME OF SAMPLE SOURCE... WOLF CREEK HOT SPRINGS

WELL/SPRING NUMBER..... 105-01E-09-BBB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 105 001E 09 NW OF NW NW
 STATE..... MONTANA
 COUNTY..... MADISON

LAT/LONG... 44-59.03 N 111-36.78 W

MAP REFERENCE..... CLIFF LAKE 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/08/13 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 67.0

DISCHARGE..... 189. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 679.

ANALYSIS IN MG/L

H.... F..... 18.
 HE.... FE(TOT). NO... SO4.. 50.
 CL.... 22.

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... GROSS ALPHA = 2 PICOCURIES/L., GROSS BETA = 2 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00173

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027097

NAME OF SAMPLE SOURCE... WOLF CREEK WARM SPRING - 2
LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 105 001E 09 NW OF NW NW

STATE..... MONTANA

LAT/LONG... 44-58.55 N 111-39.03 W

COUNTY..... MADISON

MAP REFERENCE..... CLIFF LAKE 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/13 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 25.5

DISCHARGE..... 78. L/MIN

WATER ANALYSIS

PH..... 7.8

SPECIFIC CONDUCTANCE..... 1200.

ALKALINITY..... 403. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 715.

CHARGE IMBALANCE (% DIFF)... 1.6

ANALYSIS

ISOTOPES (0/00)

AG.... CO₃.... N LI... 0.12

AL.... CR.... MG... 1.8

H.... 0.19 F.... 21. NA... 270. SI02. 38.

HE.... FE(TOT). 0.01 NB... 80.

HI.... GA.... NH4... SR... 0.13

CA.... 6.5 HCO₃.... 491.

CL.... 49.

CO.... K.... 6.5

OTHER ANALYTICAL DATA... CO₂ = 12.1 NO₂ PLUS NO₃ = .02 AS NI P = .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00174

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027099

NAME OF SAMPLE SOURCE... WOLF CREEK WARM SPRING 1

WELL/SPRING NUMBER..... 105-01E-09-HBB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 105 001E 09 NW OF NW NW

STATE..... MONTANA

LAT/LONG... 44-59.13 N 111-36.78 W

COUNTY..... MADISON

MAP REFERENCE..... CLIFF LAKE 1162500

OTHER LOCALITY INFORMATION: MHWG LOCATION IS T.10S., R.1E., SEC. 4CCCU (JUST ACROSS SECTION LINE FENCE, NORTH OF THE W. C. HOT SPRING); 44-59.1330N, 111-36.800W.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/13 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 23.

DISCHARGE..... 133. L/MIN

WATER ANALYSIS

PH..... 8.3

SPECIFIC CONDUCTANCE..... 333.

ALKALINITY..... 119. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 206.
 CHARGE IMBALANCE (% DIFF)... 0.1
 ANALYSIS IN MG/L

AG....	CO ₃	N	LI...	0.04	S....	
AL....	CR....		MG...	3.5	SB...	
H.... 0.04	F....	6.5	NA...	49.	SI02.	24.
HE....	FE(TOT)...	0.14	NB...		S04...	22.
HI....	GA....		NH4...		SR...	0.15
CA.... 19.	HC03....	145.				
CL.... 8.5						
CO....	K....	1.6				

ISOTOPES 10/001

DEL D OF WATER..... -140.7
 DEL 0(18) OF WATER... -18.95

OTHER ANALYTICAL DATA... CO₂ = 1.2, NO₂ PLUS NO₃ = .00, P = .02
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00175

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046045

NAME OF SAMPLE SOURCE... LUCAS FLOWING WELL

LOCATIONTOWNSHIP-RANGECOORDINATES

COUNTRY..... UNITED STATES 07N 008E 24 SW OF SE SW

LAT/LONG... 46-21.50 N 110-40.68 W

STATE..... MONTANA

COUNTY..... MEAGHER

MAP REFERENCE..... HAMEN, MONT. 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/26 USGS

TEMPERATURE (C)..... 42.2

DISCHARGE..... 375. L/MIN

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 3300.

ALKALINITY..... 94.

AS CaCO₃

TOTAL DISSOLVED SOLIDS... 3150.

CHARGE IMBALANCE (% DIFF)... 3.3

ANALYSIS IN MG/L

AG....	CO ₃		LI...	0.1	
AL....	CR....		MG...	140.	
H.... 0.18	F....	2.8	NA...	32.	SI02. 25.
HE....	FE(TOT)...	1.6	NB...		S04.. 2200.
HI....	GA....		NH4...		SR... 12.
CA.... 660.	HC03....	115.			
CL.... 6.0					
CO....	K....	13.			

ISOTOPES 10/001OTHER ANALYTICAL DATA... NO₂ PLUS NO₃ = .00, P = .00REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEMEGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00176

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046058

NAME OF SAMPLE SOURCE... RINGLING FLOWING WELL

LOCATIONTOWNSHIP-RANGECOORDINATES

COUNTRY..... UNITED STATES 07N 007E 25 SW OF SE NE
 STATE..... MONTANA
 COUNTY..... MEAGHER
 GEOLOGIC PROVINCE..

LAT/LONG... 46-20.37 N 110-47.18 W
 UTM ZONE... +12
 NORTHING... 5131573.
 516444.

MAP REFERENCE..... RINGLING 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/26
 TEMPERATURE (C)..... 48.0
 AMBIENT TEMP (C)..... 4.2
 DISCHARGE..... 3028. L/MIN

WATER ANALYSIS

PH..... 6.8
 SPECIFIC CONDUCTANCE..... 135.
 ALKALINITY..... AS CaCO3
 TOTAL DISSOLVED SOLIDS... 1360.
 CHARGE IMBALANCE (% DIFF)... 1.2

ANALYSIS IN MG/L

AG....	CO3..... N	LI....	0.06		
AL....	CR.....	MG....	66.		
AS.... 0.001	CS.....	MN.... N		SC....	0.003
AU....	CU..... N	MO....	0.0001		
H.... 0.00	F..... 2.7	NA....	8.8	SI02..	25.
HE.... N	FE(TOT).. 0.1	NB....		SO4....	860.
HI....	GA.....	NH4....		SR....	4.3
HR....	GE.....	NI....	0.004		
CA.... 300.	HCO3..... 164.	NO3... Q			
CA.MG.	HG..... N	PB....	0.004		
CD.... N	H2S.....	PO4....		V....	0.0021
CL.... 2.1				ZN....	0.02
CO....	K..... 6.5				

ISOTOPES (0/00)

OTHER ANALYTICAL DATA... CO2 FOR WATER = 42., P = .00

QUALIFICATION FIELD..... NO2 + NO3 = 0.02 MG/L AS N.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00177

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027137

NAME OF SAMPLE SOURCE... WHITE SULPHUR (BREWERS) SPRINGS

WELL/SPRING NUMBER..... 09N-007E-18-HBB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 09N 007E 18 NW OF NW NW
 STATE..... MONTANA
 COUNTY..... MEAGHER
 MAP REFERENCE..... WHITE SULPHUR SPRINGS 1124000

LAT/LONG... 46-32.35 N 110-53.75 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1961/09/01 MONTANA STATE BOARD OF HEALTH
 DISCHARGE..... 1893. L/MIN

PERTINENT LITHOLOGY..... TERTIARY LAKE DEPOSITS OVERLYING BELT SUPERGROUP.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN CONCRETE TANKS; SPORADIC GAS; SULFUR FILM ON WATER; MOTEL POOL USE

WATER ANALYSIS

ALKALINITY..... 639. AS CaCO3
 ANALYSIS IN MG/L
 AG.... CO3..... 24.

ISOTOPES (0/00)

AL....	CR.....	MG...	33.		
H.....	F.....	1.8			
HA.....	FE+3....		NA+K.	450.	
HE.....	FE(TOT)..	0.1	NB...		504.. 320.
CA.... 42.	HCO3....	730.	NU3..	2.0	
CL.... 170.					

OTHER ANALYTICAL DATA... OM = 0.01 DISSOLVED NO3 AS N = .45

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00178

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027138

NAME OF SAMPLE SOURCE... WHITE SULPHUR (BREWERS) SPRINGS

WELL/SPRING NUMBER..... 09N-007E-18-BBB

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 09N 007E 18 NW OF NW NW

LAT/LONG... 46-32.35 N 110-53.75 W

STATE..... MONTANA

COUNTY..... MEAGHER

MAP REFERENCE..... WHITE SULPHUR SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/11 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 45.5

DISCHARGE..... 6 606. L/MIN

PERTINENT LITHOLOGY..... TERTIARY LAKE DEPOSITS OVERLYING BELT SUPERGROUP.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN CONCRETE TANKS; SPORADIC GAS; SULFUR FILM ON WATER; MOTEL POOL USE.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 2380.

ALKALINITY..... 591. AS CaCO3

ANALYSIS IN MG/L

H.....	F.....	6.5	NA...	5102.	44.
HE.....	FE(TOT)..		NB...	504..	320.
CA....	HCO3....	721.			

ISOTOPES (0/001)

CL.... 170.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00179

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046073

NAME OF SAMPLE SOURCE... WHITE SULPHUR (BREWERS) SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 09N 007E 18 NW OF NW NW

LAT/LONG... 46-32.35 N 110-53.75 W

STATE..... MONTANA

COUNTY..... MEAGHER

GEOLOGIC PROVINCE..

MAP REFERENCE..... WHITE SULPHUR SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 74/08 MARINER

TEMPERATURE (C)..... 46.0

AMBIENT TEMP (C)..... 4.5

DISCHARGE..... 6 1514. L/MIN

UTM ZONE... +12

NORTHING... 5153742.

507987.

PERTINENT LITHOLOGY..... TERTIARY LAKE DEPOSITS.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN CONCRETE TANKS FOR MOTEL SWIMMING POOL. SPORADIC GAS. SULFUR FILM ON WATER SURFACE.

WATER ANALYSIS

P.H..... 6.5
 SPECIFIC CONDUCTANCE..... 2220.
 ALKALINITY..... 681. AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 1530.
 CHARGE IMBALANCE (% DIFF)... 3.1
 ANALYSIS IN MG/L

AG....	CO ₃ .... L 1.0	LI... 1.3	S....		
AL.... 0.006	CR.....	MG... 12.	SB...		
AS....	CS..... 0.1	MN... 0.15			
AU....	CU..... L 0.01				
H.... 9.1	F..... 7.4	NA... 480.	SI02..	51.	
HE....	FE(TOT).. 0.11	NB...	SO ₄ ..	310.	
HR....	GE.....	NI... L 0.02			
CA.... 44.	HCO ₃ .... 830.	PB... L 0.1			
CA+MG.	HG.....				
CD.... L 0.1	H ₂ S..... 0.7				
CL.... 180.					
CO.... L 0.05	K..... 20.	KB... 0.09	ZN...	0.02	

ISOTOPES 10/001

DEL D OF WATER..... -148.6
 DEL O(18) OF WATER... -18.91

OTHER ANALYTICAL DATA... CO₂ = 420., NH₃ AS N = 2.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... LEONARD AND OTHERS, 1976; MARINER AND OTHERS, 1976

RECORD 00180

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046031

NAME OF SAMPLE SOURCE... GRANITE HOT SPRINGS

LOCATION

COUNTRY..... UNITED STATES TOWNSHIP-RANGE 11N 02W 07 SE OF NW NE
 STATE..... MONTANA
 COUNTY..... MISSOULA
 GEOLOGIC PROVINCE..

COORDINATES

LAT/LONG... 46-43.82 N 114-32.05 W
 UTM ZONE... +11
 NORTHING... 5177932.
 688410.

MAP REFERENCE..... LOLO HOT SPRINGS 1124000

OTHER LOCALITY INFORMATION: 4180 FEET ELEVATION

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/19
 TEMPERATURE (C)..... 50.6
 AMBIENT TEMP (C)..... 6.3
 DISCHARGE..... 179. L/MIN

PERTINENT LITHOLOGY..... SOURCE OF WATER- WALLACEI IDAHO BATHOLITH

WATER ANALYSIS

P.H..... 9.3
 SPECIFIC CONDUCTANCE..... 280.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00181

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0046900

NAME OF SAMPLE SOURCE... LOLO HOT SPRINGS
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   11N 023W 07   SW OF SE NE   LAT/LONG... 46-43.56 N 114-31.97 W
 COUNTY..... MISSOULA
 MAP REFERENCE..... LOLO HOT SPRINGS 1124000
 OTHER LOCALITY INFORMATION: 4155 FEET ELEVATION
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1978/06/19
 TEMPERATURE (C)..... 46.4
 DISCHARGE..... 681. L/MIN
 PERTINENT LITHOLOGY..... THREE SPRINGS ISSUE FROM SERIES OF FRACTURES IN LIMESTONE NEAR PRECAMBRIAN
 LIMESTONE-GRANITE CONTACT. WALLACE-IDAHO BATHOLITH.
 WATER ANALYSIS
 P..... 9.6
 SPECIFIC CONDUCTANCE..... 307.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00182

 GEOTHERM SAMPLE FILE   GEOTHERM FILE ID: 0027006

NAME OF SAMPLE SOURCE... LOLO HOT SPRINGS
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   11N 023W 07   SW OF SE NE   LAT/LONG... 46-43.56 N 114-31.97 W
 COUNTY..... MISSOULA
 MAP REFERENCE..... LOLO HOT SPRINGS 1124000
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1964/08/04 MONTANA STATE BOARD OF HEALTH
 POINT OF COLLECTION.. SPRINGS ISSUE IN CONCRETE TANKS
 TEMPERATURE (C)..... 46.
 PERTINENT LITHOLOGY..... GRANITE BEDROCK
 OTHER SAMPLE INFORMATION.. NO GAS; SWIMMING POOL AND CAMPING FACILITY.
 WATER ANALYSIS
 ALKALINITY..... 75.   AS CaCO3
 ANALYSIS IN MG/L
 AG.... CO3..... 30.
 AL.... CH.....   MU... N
 H.... F..... 8.3
 NA.... FE+3.....   NA+K.   50.
 RE.... FE(TOT).. 0.34   NH...   S04..   18.
 CA.... 4.   MCO3... 31.   NO3.. N
 CL.... 8.0
 OTHER ANALYTICAL DATA... N NOT DETECTED.
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

ISOTOPES (02/00)

RECORD 00183

 GEOTHERM SAMPLE FILE   GEOTHERM FILE ID: 0027007

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   11N 023W 07   SW OF SE NE   LAT/LONG... 46-43.56 N 114-31.97 W
 COUNTY..... MISSOULA

MAP REFERENCE..... LOLO HOT SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/09 MONTANA BUREAU OF MINES AND GEOLOGY
 POINT OF COLLECTION.. SPRINGS ISSUE INTO CONCRETE TANKS

DISCHARGE..... 189. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK

OTHER SAMPLE INFORMATION.. NO GAS; SWIMMING POOL AND CAMPING FACILITY.

WATER ANALYSIS

PH..... 7.9

SPECIFIC CONDUCTANCE..... 234.

ALKALINITY..... 72. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 245.

CHARGE IMBALANCE (% DIFF)... 0.9

ANALYSIS IN MG/L

AG....	CO ₃	LI....	0.040		
AL....	CR....	MG....	0.2		
AS....	CS....	MN....	N		
M....	F....	NA....	50.	SI02.	71.
HE....	FE(TOT)...	NH....		SO4..	20.
CA....	6.4	NO ₃ ..	0.3		
CL....	FE(TOT)...				
CO....	0.03				
	HCO ₃				
	68.				
	K.....				
	1.2				

ISOTOPES 10/001

OTHER ANALYTICAL DATA... OH NOT DETECTED; CARBON DIOXIDE = 1.8; N = .07

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00184

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0046043

NAME OF SAMPLE SOURCE... LOLO HOT SPRINGS (GRANITE)

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   11N 023W 07   SW OF SE NE   LAT/LONG... 46-45.13 N 114-31.97 W
 COUNTY..... MISSOULA

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... LOLO HOT SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/17 MAKINER

TEMPERATURE (C)..... 44.0

Ambient Temp (C)..... 6.3

DISCHARGE..... 100. L/MIN

PERTINENT LITHOLOGY..... SPRINGS EMIT FROM SERIES OF FRACTURES IN LIMESTONE NEAR PRECAMBRIAN LIMESTONE-GRANITE CONTACT. GRANITE BEDROCK.

OTHER SAMPLE INFORMATION.. SWIMMING AND CAMPING FACILITY WITH SPRINGS ISSUING IN CONCRETE TANKS. NO GAS.

WATER ANALYSIS

PH..... 9.3

SPECIFIC CONDUCTANCE..... 225.

ALKALINITY..... 86. AS HCO₃

TOTAL DISSOLVED SOLIDS... 224.

CHARGE IMBALANCE (% DIFF)... 3.0

ANALYSIS IN MG/L

AG....		CO3....	8.	LI...	0.03	S....	
AL....	0.010	CH....		MG...	L 0.1	SB....	
AS....		CS....		MN...	L 0.02		
H....	0.11	F....	6.4	NA...	52.	SI02.	72.
HE....		FE(TOT) L	0.02	NB...		SO4..	18.
HI....		GA....		NH4..	L 0.13		
CA....	1.8	HCO3....	70.	PH...	L 0.1		
CA+MG.		MG....					
CU....		H2S....	L 0.5				
CL....	6.1						
CO....		K.....	1.2	RB...	L 0.02	ZN...	0.01

OTHER ANALYTICAL DATA... AMMONIA AS N = L 0.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00185

GEOCHEM. SAMPLE FILE

GEOCHEM FILE ID: 0046007

NAME OF SAMPLE SOURCE... BEAR CREEK SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 09S 009E 19 NW OF SE
 STATE..... MONTANA
 COUNTY..... PARK
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... GARDNER 1162500

LAT/LONG... 45-02.12 N 110-39.92 W

OTHER LOCALITY INFORMATION: ELEVATION 5600 FEET. LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/05/23 SONDEREGGER, J.L.
 TEMPERATURE (C)..... 21.5
 AMBIENT TEMP (C)..... 5.1
 DISCHARGE..... 38. L/MIN

PERTINENT LITHOLOGY..... TERTIARY VOLCANICS; PRECAMBRIAN.

WATER ANALYSIS

PH..... 9.5
 SPECIFIC CONDUCTANCE..... 2700.
 QUALIFICATION FIELD..... SEEPAGE AREA TEMPERATURE RANGE = 21-27 C.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00186

GEOCHEM. SAMPLE FILE

GEOCHEM FILE ID: 0046085

NAME OF SAMPLE SOURCE... CARTER'S BRIDGE WARM SPRINGS

WELL/SPRING NUMBER..... 03S-009E-01-BDWA

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 009E 01.02NW OF SE NW
 STATE..... MONTANA
 COUNTY..... PARK
 MAP REFERENCE..... BRISIN 1124000

LAT/LONG... 45-36.53 N 110-33.70 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/12/22 SONDEREGGER, JOHN L.

SAMPLE NUMBER..... 79M2191
 POINT OF COLLECTION.. 0.95 MILES NNW OF BRIGDE
 TEMPERATURE (C)..... 28.
 AMBIENT TEMP (C)..... 4.2
 DISCHARGE..... 6 4000. L/MIN
 PERTINENT LITHOLOGY..... SPRINGS OCCUR FROM TOP OF MADISON GROUP TO UPPER PORTION OF JEFFERSON FORMATION (APPROX.
 THREE FORKS NOT NOTED)

OTHER SAMPLE INFORMATION.. DISCHARGE VALUE ACCOUNTS FOR DILUTION IN SPRINGS COOLER THAN 28 DEGREES.

WATER ANALYSIS

DATE/ANALYST..... 1979/03/30 ABERCROMBIE, FRANK N.

PH..... 7.78

SPECIFIC CONDUCTANCE..... 846.6

ALKALINITY..... 153. AS CaCO3

TOTAL DISSOLVED SOLIDS... 599.

CHARGE IMBALANCE (% DIFF)... 1.3

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.03		
AL....	0.05	CR.....		MG...	35.		
AS....	0.0011	CS.....		MN...	0.01		
H....	0.11	F.....	1.3	NA...	7.3	SI02.	19.
HE....		FE(TOT) L	0.01	NB...		S04..	307.
CA....	129.	HC03....	187.	NO3...	0.57		
CL....	3.2						

ISOTOPES (0/00)

CO.... K..... 4.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONDEREGGER, JOHN L., MBMG

RECORD 00187

GEO THERM SAMPLE FILE

NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)

WELL/SPRING NUMBER..... 06S-08E-01-CUC

LOCATION

COUNTRY..... UNITED STATES

STATE..... MONTANA

COUNTY..... PARK

MAP REFERENCE..... EMIGRANT 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/09 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 45.0

DISCHARGE..... 424. L/MIN

PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN ROCKS.

OTHER SAMPLE INFORMATION.. SEVERAL COVERED SPRINGS; WATER USED IN RESORT SWIMMING POOL.

WATER ANALYSIS

PH..... 7.8

SPECIFIC CONDUCTANCE..... 490.

ALKALINITY..... 80. AS CaCO3

TOTAL DISSOLVED SOLIDS... 110.

ANALYSIS IN MG/L

AG....		CO3.....	N				
H....		F.....	0.8	NA...		SI02.	31.
HE....		FE(TOT).		NB...		S04..	53.
CL....	11.						

ISOTOPES (0/00)

REFERENCE AND IDENTIFICATION

GEO THERM FILE ID: 0027144

COORDINATES

LAT/LONG... 45-20.22 N 110-41.48 W

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... MARINER AND OTHERS, 1976B; LEONARD AND OTHERS, 1978

RECORD 00188

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046022

NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 06S 008E 01 SW OF SE SW
 STATE..... MONTANA
 COUNTY..... PARK
 GEOLOGIC PROVINCE.. 21
 MAP REFERENCE..... EMIGRANT 1162500

LAT/LONG... 45-20.22 N 110-41.48 W
 UTM ZONE... 12
 NORTHING... 5020217.
 524225.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/25 MARINER

TEMPERATURE (C)..... 42.0

AMBIENT TEMP (C)..... 5.2

DISCHARGE..... 500. L/MIN

PERTINENT LITHOLOGY..... SOURCE-MADISON GROUP? FRACTURED LIMESTONE OUTCROP 0.25 MILES S. BEDROCK DEPTH 240 FT.
 OVERLAIN BY LAKE SEDIMENT.

OTHER SAMPLE INFORMATION.. SEVERAL COVERED SPRINGS. WATER FOR RESORT SWIMMING POOL.

WATER ANALYSIS

PH..... 7.4
 SPECIFIC CONDUCTANCE..... 379.
 ALKALINITY..... 13.
 TOTAL DISSOLVED SOLIDS... 342.
 CHARGE IMBALANCE (% DIFF)... 5.0

AS HCO3

ANALYSIS IN MG/L

AG....	CO3.... L 1.	LI... 0.03	S....
AL....	CR.....	MG... 8.8	SB....
AS....	CS.....	MN... L 0.02	
H.... 0.06	F.... 0.9	NA... 35.	SI02. 34.
HE....	FE(TOT). 0.02	NB...	SO4.. 41.
CA.... 35.	HCO3.... 170.		
CA-MG.	HG.....	PB... L 0.1	
CL.... 10.	H2S..... 0.6		
CO....	K..... 6.8	RH... L 0.02	ZN... 0.01

ISOTOPES (0/00)

DEL D OF WATER..... -150.2
 DEL O(18) OF WATER... -17.70

OTHER ANALYTICAL DATA... AMMONIA AS N = L 0.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONNENEGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00189

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0027145

NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)

WELL/SPRING NUMBER..... 06S-008E-01-CDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 06S 008E 01 SW OF SE SW
 STATE..... MONTANA
 COUNTY..... PARK
 MAP REFERENCE..... EMIGRANT 1162500

LAT/LONG... 45-20.22 N 110-41.48 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1977/04/05 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 43.5
 DISCHARGE..... 492. L/MIN
 PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN ROCKS.
 OTHER SAMPLE INFORMATION.. SEVERAL COVERED SPRINGS; WATER USED IN RESORT SWIMMING POOL.

WATER ANALYSIS

PH..... 7.3
 SPECIFIC CONDUCTANCE..... 438.
 ALKALINITY..... 140. AS CaCO_3
 TOTAL DISSOLVED SOLIDS... 263.
 CHARGE IMBALANCE (% DIFF)... 1.0

ANALYSIS IN MG/L

AG....		CO3.... N	LI....	0.03		
AL....		CR....	MG....	8.4		
AS....	0.017	CS....	MN....	0.01		
AU....		CU.... N	MO....	N	SE... N	
B....	0.00	F....	NA....	34.	SI02..	34.
BE....		FE(TOT)..	NH....		S04..	47.
BI....		GA....	NH4..		SR... 0.36	
BR....		GE....	NI....	0.006		
CA....	36.	HCO3....	PB... N			
CA+MG..		HG.... N	PO4..		V....	0.0037
CD.... N		H2S....				
CL....	10.					
CO....		K....				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... CO_2 FOR WATER = 14.01 $\text{NO}_2 + \text{NO}_3 = 0.211$ P = 0.00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00190

GEOCHEM SAMPLE FILE

GEOCHEM FILE 101 0027143

NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)

WELL/SPRING NUMBER..... 06S-08E-01-CDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 06S 08E 01 SW OF SE SW LAT/LONG... 45-20.22 N 110-41.48 W

STATE..... MONTANA

COUNTY..... PARK

MAP REFERENCE..... EMIGRANT 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/27 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 45.0

PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN ROCKS.

OTHER SAMPLE INFORMATION.. SEVERAL COVERED SPRINGS; WATER USED IN RESORT SWIMMING POOL.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 507.
 ALKALINITY..... 141. AS CaCO_3

ANALYSIS IN MG/L

B....		F....	0.9	NA...	SI02..	33.
BE....		FE(TOT)..		NH...	S04..	53.
CA....		HCO3....	172.			
CL....	11.					

ISOTOPES (0/001)

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00191

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027142

NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)

WELL/SPRING NUMBER..... 06S-008E-01-CDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 06S 008E 01 SW OF SE SW

LAT/LONG... 45-20.22 N 110-41.48 W

STATE..... MONTANA

COUNTY..... PARK

MAP REFERENCE..... EMIGRANT 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/11/24 MONTANA STATE BOARD OF HEALTH

TEMPERATURE (C)..... 48.5

PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN ROCKS.

OTHER SAMPLE INFORMATION.. SEVERAL COVERED SPRINGS, USED AS RESORT SWIMMING POOL.

WATER ANALYSIS

ALKALINITY..... 139. AS CaCO3

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3.....	N			
AL....	CR.....		MG...	2.0	
H....	F.....	0.8			
HA....	FE+3.....		NA+K...	41.	
HE....	FE(TOT)...	N	NB...		
CA....	HC03.....	170.	S04...	41.	
CL....			N03..	N	

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00192

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027141

NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS - WEST VENT

WELL/SPRING NUMBER..... 06S-008E-01-CDC

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 06S 008E 01 SW OF SE SW

LAT/LONG... 45-20.22 N 110-41.48 W

STATE..... MONTANA

COUNTY..... PARK

MAP REFERENCE..... EMIGRANT 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/10/28 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 42.5

DISCHARGE..... 791. L/MIN

PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN ROCKS.

OTHER SAMPLE INFORMATION.. SEVERAL COVERED SPRINGS, USED IN RESORT SWIMMING POOL.

WATER ANALYSIS

PH.....	7.3	
SPECIFIC CONDUCTANCE.....	518.	
ALKALINITY.....	141.	AS CaCO3
TOTAL DISSOLVED SOLIDS...	255.	
CHARGE IMBALANCE (% DIFF)...	1.1	

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....		CO3.... N		LI... 0.03			
AL....		CR....		MG... 8.0			
AS....		CS....		MN... N			
H.... 0.05		F.... 0.9		NA... 31.	SI02.	31.	
HF....		FE(10T) 0.09		NH...	SO4..	42.	
HI....		GA....		NH4..	SR...	0.38	
CA.... 37.		HCO3.... 172.					
CL.... 12.							
CO....		K..... 6.6					

OTHER ANALYTICAL DATA... CO2 FOR WATER = 14.0; NO2 + NO3 AS N = 0.26;

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00193

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0027149

NAME OF SAMPLE SOURCE... HUNTERS HUT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 01S 012E 09 SE OF SW SW

LAT/LONG... 45-45.43 N 110-15.43 W

STATE..... MONTANA

COUNTY..... PARK

MAP REFERENCE..... HUNTERS HUT SPRINGS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/07/29 KACZMAREK

TEMPERATURE (C)..... 60.0

DISCHARGE..... 5678. L/MIN.

PERTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.

OTHER SAMPLE INFORMATION.. THREE MAJOR SPRINGS WITHIN 150. METERS OF EACH OTHER; SPORADIC GAS DISCHARGE; SPRINGS

ISSUE INTO CONCRETE TANKS AT INACTIVE RESORT.

WATER ANALYSIS

PH..... 7.6

SPECIFIC CONDUCTANCE..... 337.

ANALYSIS IN MG/L

B.....

F.....

NA...

60.

SI02.

50.

ISOTOPES (0/00)

CA.... 3.6

CL.... 14.

CO....

K.....

0.6

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00194

GEOTERM SAMPLE FILE

GEOTERM FILE ID: 0002920

NAME OF SAMPLE SOURCE... HUNTERS HUT SPRINGS (B)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 01S 012E 09 SE OF SW SW

LAT/LONG... 45-45.43 N 110-15.43 W

STATE..... MONTANA

COUNTY..... PARK

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/02

POINT OF COLLECTION.. MINOLE SPRING.

TEMPERATURE (C)..... 57.0

DISCHARGE..... 5000. L/MIN
 PERTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.
 OTHER SAMPLE INFORMATION.. THREE SPRINGS 150 M. APART. SPORADIC GAS DISCHARGE. SPRINGS ISSUE INTO CONCRETE TANKS AT
 INACTIVE RESORT.

WATER ANALYSIS

PH..... 8.8
 SPECIFIC CONDUCTANCE..... 357.
 ALKALINITY..... 194. AS HCO₃
 TOTAL DISSOLVED SOLIDS... 380.
 CHARGE IMBALANCE (% DIFF)... 11.6

ANALYSIS IN MU/L

AG....	CO ₃	LI...	0.03		
AL....	CR....	MG...	L 0.1		
AS....	CS....	MN...	L 0.02		
H.... 0.73	F..... 5.6	NA...	85.	SI02.	64.
HE....	FE(TOT)...	NB...		SO4..	10.
CA.... 0.8	HCO ₃ .... 194.				
CL.... 19.					
CO....	K..... 0.6	RB...	L 0.02	ZN...	0.05

ISOTOPE (10/001)

GAS ANALYSIS

ANALYSIS IN VOLUME %

CH₄.. 62.
 C₂H₆..
 CO₂.. L 0.1
 N₂... 38.

ISOTOPE (100/01)

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 COMPILER CROSS INDEX... NEM-461
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00195

GEOtherm SAMPLE FILE

GEOTHERM FILE ID: 0046035

NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (A)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES	15 012E 09	SE OF SW SW	LAT/LONG... 45-45.43 N 110-15.43 W
STATE..... MONTANA			UTM ZONE... +12
COUNTY..... PARK			NORTHING... 5067118.
GEOLOGIC PROVINCE.. 21			557772.

MAP REFERENCE..... HUNTERS HOT SPRING 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/02
 TEMPERATURE (C)..... 60.0
 AMBIENT TEMP (C)..... 6.1
 DISCHARGE..... 5000. L/MIN
 PERTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.
 OTHER SAMPLE INFORMATION.. MARINER

WATER ANALYSIS

PH..... 9.1
 SPECIFIC CONDUCTANCE..... 354.
 ALKALINITY..... 197. AS HCO₃
 TOTAL DISSOLVED SOLIDS... 384.
 CHARGE IMBALANCE (% DIFF)... 23.4

ANALYSIS IN MU/L

AG....	CO ₃ .... 15.	LI...	0.03	S....
AL.... 0.040	CR.....	MG...	L 0.1	SB...

ISOTOPE (10/001)

DEL D OF WATER..... -138.9
 DEL O(18) OF WATER... -18.52

AS.....		CS.....		MN... L 0.02	
H..... 0.67		F..... 5.6		NA... 85.	SI02. 65.
HE.....		FE(TOT). L 0.02		NB... 504..	11.
CA..... 0.9		HCO3..... 197.			
CO.....		H2S..... 5.3			
CL..... 18.					
CO.....		K..... 0.6		RB... L 0.02	ZN... L 0.01

GAS ANALYSIS

DATE/ANALYST..... 1975/07/02 (COLLECTION DATE)

ANALYSIS IN VOLUME %

CH4.. 64.

C2H6..

CO2.. L 0.1

N2... 36.

OTHER ANALYTICAL DATA... O2 PLUS AR = 1.3

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... MARINER AND OTHERS, 1976B

ISOTOPES 100/01

RECORD 00196

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0002921

NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (C)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES VIS 012E 09 SE OF TS95W

LAT/LONG... 45-45.43 N 110-15.43 W

STATE..... MONTANA

COUNTY..... PARK

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/02

TEMPERATURE (C)..... 60.0

DISCHARGE..... 5000. L/MIN

PERTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.

OTHER SAMPLE INFORMATION.. SPRINGS 150 M APART. SPORADIC GAS DISCHARGE. SPRINGS ISSUE IN CONCRETE TANKS AT

INACTIVE RESORT. NORTHERN SPRING.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 359.

ANALYSIS IN MG/L

ISOTOPES 10/001

AG..... CO3..... LI... 0.03

AL..... CR..... MG... L 0.1

H..... 0.72 F..... 5.6 NA... 88. SI02. 65.

HE..... FE(TOT). NB... 504.. 18.

CA..... 0.7

CL..... 16.

CO..... K..... 0.6 NB... L 0.02

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

COMPILER CROSS INDEX... NEM-459

REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00197

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027146

NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (COMPOSITE)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES VIS 012E 09 SE OF SW SW

LAT/LONG... 45-45.43 N 110-15.43 W

STATE..... MONTANA
 COUNTY..... PARK
 MAP REFERENCE..... HUNTERS HOT SPRINGS 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1977/04/06 U.S. GEOLOGICAL SURVEY
 TEMPERATURE (C)..... 56.5
 DISCHARGE..... 2937. L/MIN.
 PERTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.
 OTHER SAMPLE INFORMATION.. THREE MAJOR SPRINGS WITHIN 150 METERS OF EACH OTHER; SPORADIC GAS DISCHARGE; SPRINGS
 ... ISSUE INTO CONCRETE TANKS AT INACTIVE RESORT.

WATER ANALYSIS

PH..... 8.6
 SPECIFIC CONDUCTANCE..... 430.
 ALKALINITY..... 130. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 268.
 CHARGE IMBALANCE (% DIFF)... 2.5

ANALYSIS IN MG/L

AG....		CO3....	4.	LI...	0.04		
AL....		CH....		MG...	N		
AS....		CS....		MN...	N		
H....	0.72	F....	5.8	NA...	85.	SI02.	63.
HE....		FE(TOT)...	0.04	NH...		SO4..	19.
HI....		GA....		NH4..		SR...	0.01
CA....	1.0	HC03....	150.				
CL....	14.						
CO....		K.....	1.4				

ISOLUPES 10/001

OTHER ANALYTICAL DATA... FOR WATER: CO2 = .6; NO2 + NO3 = .04

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00198

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0027148

NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (COMPOSITE)
 LOCATION

COORDINATES

LAT/LONG... 45-45.43 N 110-15.43 W

COUNTRY..... UNITED STATES 01S 012E 09 SW

STATE..... MONTANA

COUNTY..... PARK

MAP REFERENCE..... HUNTERS HOT SPRINGS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/21 ROBERTSON, FOURNIER AND STRONG

TEMPERATURE (C)..... 57.

DISCHARGE..... 1590. L/MIN.

PERTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.

OTHER SAMPLE INFORMATION.. THREE MAJOR SPRINGS WITHIN 150 METERS OF EACH OTHER; SPORADIC GAS DISCHARGE; SPRINGS

... ISSUE INTO CONCRETE TANKS AT INACTIVE RESORT.

WATER ANALYSIS

ALKALINITY..... 164. AS CaCO3

TOTAL DISSOLVED SOLIDS... 298.

CHARGE IMBALANCE (% DIFF)... 16.6

ANALYSIS IN MG/L

AG....		CO3....		LI...	0.04		
AL....		CH....		MG...	N		
H....	0.7	F....	4.6	NA...	88.	SI02.	62.

ISOLUPES 10/001

GÖTTNER, SÄULE, EILE

NAME OF SAMPLE SOURCE... HUNTERS HUT SPRINGS (COMPOSITE)

LOCATION

LOWNSHIP=RANGE

COORDINATES

LAT/LONG... 45-45.43 N 110-15.43 W

COUNTRY..... UNITED STATES 01S 012E 09 SE OF SW SW

STATE..... MONTANA

COUNTY..... PARK

..MAP REFERENCE... HUNTERS HUT SPRINGS 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/10/29 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C) 53.9

DISCHARGE..... 2688. L/MIN.

CONTINENT LITHOLOGY..... CRETACEOUS TO PALEOCENE SEDIMENTARY ROCKS.

OTHER SAMPLE INFORMATION.. THREE MAJUK SPRINGS WITHIN 150 METERS OF EACH OTHER! SPORADIC GAS DISCHARGE! SPRINGS
ISSUE INTO CONCRETE TANKS AT INACTIVE RESORT.

WATER ANALYSIS

P.1..... d.2

SPECIFIC CONDUCTANCE..... 441

AI KAL INITY..... 139. AS CAC03

TOTAL DISSOLVED SOLIDS...	213.

CHARGE IMBALANCE (B DIFF)...	1.8

ANALYSIS IN MG/L

AG..... CUD..... 22.

AL... CR... 220

AS... N

ALL..... 40..... 0-021

RE.....	0.12	CH.....	0.0
H.....		F.....	5.8

FE.....	FE(TOD).....
0.0	0.0

GA.....

MR. . . . .

CA..... 1.0 HCU3..... 125

CA+MO. HG. 11

CI).... 0.005 H2S.....

Cl. .... 17.

CO.....

OTHER ANALYTICAL DATA... CO2 FOR WATE

CO₂ FOR WATER = 0.51 NO₂ + NO₃ FOR WATER = .011 P = 0.001 GROSSALPHA = 8.0 PC/L, GROSSBETA = 3.0 PC/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN L.

COMPTON AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE.....LEONARD AND DIMERS, 1978; MARINER AND OTHERS, 1976

GEOMETRIE - SÄULEN-LISTE

GEUTHERM FILE ID: 0027140

NAME OF SAMPLE SOURCE... LA DUNE (CORNIN) HOT SPRINGS

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   08S 008E 32   SE OF SW   LAT/LONG... 45-05.58 N 110-46.42 W
 COUNTY..... PARK
 MAP REFERENCE..... MINER 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1976/05/27 U.S. GEOLOGICAL SURVEY
 POINT OF COLLECTION.. CONCRETE TANK
 TEMPERATURE (C)..... 67.5
 DISCHARGE..... 833. L/MIN
 PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN.
 OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUE INTO CONCRETE TANK BESIDE ROAD; NUMEROUS SMALL SEEPS, SOME CARBONATE PRECIPITATE.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 2600.
 ALKALINITY..... 230.   AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 2290.

ANALYSIS IN MG/L

AG....	CO ₃	LI...	0.27		
AL....	CR....	MG...	61.		
H.... 0.46	F.... 3.5	NA...	240.	SI02.	45.
RE....	FE(TOT) 0.3	NH...		S04..	1400.
RI....	GA....	NH4..		SR...	3.9
CA.... 330.	HC03.... 281.				
CL.... 42.					

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... NO₂ + NO₃ = .03 AS N; P = .001 A SAMPLE DATED 1-24-77 SHOWS GROSS ALPHA = 57. PICOCURIES/L.
 AND GROSS BETA = 48. PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00201

GEOTHERM SAMPLE FILE

GEOTHERM FILE 101 0027139

NAME OF SAMPLE SOURCE... LA DUKE (COWWIN) HOT SPRINGS
 WELL/SPRING NUMBER..... 08S-008E-32-CD

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE   COORDINATES
 STATE..... MONTANA   08S 008E 32   SE OF SW   LAT/LONG... 45-05.58 N 110-46.42 W
 COUNTY..... PARK
 MAP REFERENCE..... MINER 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1972/07/26 MONTANA BUREAU OF MINES AND GEOLOGY
 POINT OF COLLECTION.. CONCRETE TANK
 TEMPERATURE (C)..... 66.
 DISCHARGE..... 1893. L/MIN
 PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN.
 OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUE INTO CONCRETE TANK BESIDE ROAD; NUMEROUS SMALL SEEPS, SOME CARBONATE PRECIPITATE.

WATER ANALYSIS

PH..... 7.6
 SPECIFIC CONDUCTANCE..... 2400.
 ALKALINITY..... 77.   AS CaCO₃
 TOTAL DISSOLVED SOLIDS... 2070.
 CHARGE IMBALANCE (% DIFF)... 2.4

ANALYSIS IN MG/L

AG....		CO3.... N	LI...	0.280		
AL....		CR.....	MG...	80.		
AS....		CS.....	MN...	0.02		
H....		F..... 3.6	NA...	230.	SI02.	52.
HE....		FE(TOT).. 0.26	NH...		S04..	1300.
CA....	2/V.	MCU3.... 94.	NO3... N			
CL....	42.					
CO....		K..... 24.				

ISOTOPES 10/001

OTHER ANALYTICAL DATA... OH = 0.0, CO2 = 3.8, DISSOLVED NO3 AS N = .00

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00202

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046037

NAME OF SAMPLE SOURCE... LA DUKE HOT SPRINGS (A)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY.....	UNITED STATES	UBS 008E 32	SE OF SW	LAT/LONG...	45-05.58 N 110-46.42 W
STATE.....	MONTANA			UTM ZONE...	12
COUNTY.....	PARK			NORTHING...	4993089.
GEOLOGIC PROVINCE...	21				517819.
MAP REFERENCE.....	MINER 1162500				

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/02

POINT OF COLLECTION.. TANK

TEMPERATURE (C)..... 65.0

AMBIENT TEMP (C)..... 5.5

DISCHARGE..... 0.500 L/MIN

DEPOSITS OR ALTERATION.... SOME CARBONATE PRECIPITATE.

PERTINENT LITHOLOGY..... TERTIARY BASALTS.

OTHER SAMPLE INFORMATION.. PRINCIPAL SPRINGS ISSUE IN CONCRETE TANKS BESIDE ROAD. NUMEROUS SMALL SEEPS.

WATER ANALYSIS

PH..... 6.5

SPECIFIC CONDUCTANCE..... 2460.

ALKALINITY..... 297.

AS MCU3

TOTAL DISSOLVED SOLIDS... 2226.

CHARGE IMBALANCE (% DIFF)... 0.2

ANALYSIS IN MG/L

AG....		CO3.... L 1.	LI...	0.24	S....	
AL....	L 0.001	CR.....	MG...	58.	SB...	
AS....		CS.....	MN...	0.02		
H....	0.40	F..... 3.6	NA...	230.	SI02.	49.
HE....		FE(TOT).. 0.16	NH...		S04..	1200.
CA....	320.	MCU3.... 297.				
CU....		M2S..... L 1.0				
CL....	45.					
CO....		K..... 23.	RH...	0.07	ZN...	L 0.01

ISOTOPES 10/001

DEL D OF WATER..... -145.8
 DEL O(18) OF WATER... -19.74

OTHER ANALYTICAL DATA... AMMONIA AS N = 0.22

QUALIFICATION FIELD..... 1976 FLOW OF H33 L/MIN MAY BE MORE ACCURATE.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SUNDEMEGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00203

GEOHEM SAMPLE FILE

GEOHEM FILE ID: 0002918

NAME OF SAMPLE SOURCE... LA DUKE HOT SPRINGS (B)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 08S 008E 32 SE OF SW

LAT/LONG... 45-05.58 N 110-46.42 W

STATE..... MONTANA

COUNTY..... PARK

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/02

POINT OF COLLECTION.. SEEP

TEMPERATURE (C)..... 65.0

DISCHARGE..... 500. L/MIN

DEPOSITS OR ALTERATION... SOME CARBONATE PRECIPITATE.

PERTINENT LITHOLOGY..... TERTIARY BASALTS OVERLYING PRECAMBRIAN ROCKS.

OTHER SAMPLE INFORMATION.. SPRINGS ISSUE IN TANK BESIDE ROAD.

WATER ANALYSIS

PH..... 6.3

SPECIFIC CONDUCTANCE..... 2420.

ALKALINITY..... 329. AS HCO3

TOTAL DISSOLVED SOLIDS... 2246.

CHARGE IMBALANCE (% DIFF)... 3.3

ANALYSIS IN MG/L

ISOTOPES (0/001)

AG....	CO3....	LI....	0.26		
AL....	CR....	MG....	57.		
AS....	CS....	MN....	L 0.02		
H....	0.49	F....	3.6	NA....	230.
HE....		FE(TOT)..		SI02..	48.
CA....	310.	HCO3....	329.	S04..	1200.
CD....		H2S....	L 1.0		
CL....	45.				
CO....		K....	23.	RB....	0.07
				ZN....	0.01

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00204

GEOHEM SAMPLE FILE

GEOHEM FILE ID: 0046038

NAME OF SAMPLE SOURCE... LANDUSKY #1

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 25N 024E 32 NW OF NE SE

LAT/LONG... 47-52.58 N 108-39.37 W

STATE..... MONTANA

COUNTY..... PHILLIPS

GEOLOGIC PROVINCE..

MAP REFERENCE..... MAYS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/08/16 GROFF, S.L.

SAMPLE NUMBER..... MBMG NO. 73 M6844

TEMPERATURE (C)..... 21.1

AMBIENT TEMP (C)..... 4.7

DISCHARGE..... 2271. L/MIN

PERTINENT LITHOLOGY..... SPRING OCCURS ALONG CONTACT OF MADISON (MISSION CANYON FMT.) WITH OVERLYING JURASSIC ELI IS FORMATION.

OTHER SAMPLE INFORMATION.. 1978/06/13 FIELD STUDY BY MBMG SUGGESTS SIGNIFICANT DEGASSING OF SAMPLE.
 WATER ANALYSIS

PH..... 8.03
 SPECIFIC CONDUCTANCE..... 801.
 ALKALINITY..... 89. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 1530.9
 CHARGE IMBALANCE (% DIFF)... 2.5

ANALYSIS IN MG/L

AG....	CO3.... N	LI...	0.09		
AL....	CH....	MG...	86.		
AS....	CS....	MN... L	0.01		
H....	F..... 1.5	NA...	39.	SI02.	18.2
HE....	FE(TOT). L	0.01	NU...	504..	982.
CA.... 266.	HCO3.... 109.	NU3..	1.1		
CL.... 18.8					
CO....	K..... 9.				

ISOLOPES (0/001)

OTHER ANALYTICAL DATA... 1978/06/13: TEMPERATURE = 24 C, FLOW = 11685 L/ MIN, SP. COND. = 1779, UMHOS/CM., PH = 6.61.
 REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEHEGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEHEGGER AND OTHERS, 1977

RECORD 00205

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046039

NAME OF SAMPLE SOURCE... LANDUSKY PLUNGE

LOCATION

COUNTRY..... UNITED STATES TOWNSHIP-RANGE
 STATE..... MONTANA 24N 024E 12 SE OF SE SW
 COUNTY..... PHILLIPS
 GEOLOGIC PROVINCE..

COORDINATES

LAT/LONG... 47-50.57 N 108-35.88 W
 UTM ZONE... +12
 NORTHING... 5301407.
 679722.

MAP REFERENCE..... MAYS SE 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/08/16 GRUFF, S.L.
 SAMPLE NUMBER..... MBMG NO. 73-843
 TEMPERATURE (C)..... 24.4
 AMBIENT TEMP (C)..... 4.8
 DISCHARGE..... 11356. L/MIN

PERTINENT LITHOLOGY..... DOMINANT SOURCE OF SPRING IS MADISON LIMESTONE (MISSION CANYON FORMATION) ALONG
 NORTH-SOUTH FAULT CUTTING MORRISON DOME.

WATER ANALYSIS

PH..... 8.09
 SPECIFIC CONDUCTANCE..... 1262.
 ALKALINITY..... 83. AS CaCO3
 TOTAL DISSOLVED SOLIDS... 1008.3
 CHARGE IMBALANCE (% DIFF)... 2.2

ANALYSIS IN MG/L

AG....	CO3.... N	LI...	0.05		
AL....	CH....	MG...	65.		
AS....	CS....	MN... L	0.01		
H....	F..... 1.6	NA...	24.	SI02.	17.8
HE....	FE(TOT). L	0.01	NU...	504..	620.
CA.... 161.	HCO3.... 101.	NU3..	1.1		
CL.... 4.5					
CO....	K..... 6.7				

ISOLOPES (0/001)

OTHER ANALYTICAL DATA... 6-13-78: TEMP.=24.5C., FLOW=11076.1 L/MIN., SP.COND. 1295.4 UMHOS/CM., PH= 6.64

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00206

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046006

NAME OF SAMPLE SOURCE... AVON WARM SPRING

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 10N 008W 24 SW OF NW NW
 STATE..... MONTANA
 COUNTY..... POWELL
 GEOLOGIC PROVINCE.. 21

LAT/LONG... 45-36.62 N 112-33.28 W
 UTM ZONE... +12
 NORTHING... 5051712.
 378773.

MAP REFERENCE..... AVON 1162500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/16 DUNOVAN, J.J.

TEMPERATURE (C)..... 25.5

AMBIENT TEMP (C)..... 6.0

DISCHARGE..... 91. L/MIN

PERTINENT LITHOLOGY..... TERTIARY SEDIMENTS OVERLYING TERTIARY VOLCANICS.

OTHER SAMPLE INFORMATION.. DATA NOT VERIFIED.

WATER ANALYSIS

PH..... 6.9
 SPECIFIC CONDUCTANCE..... 871.3

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00207

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046023

NAME OF SAMPLE SOURCE... DEER LODGE PRISON RANCH NO. 4

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 07N 010W 29 SW OF NW
 STATE..... MONTANA
 COUNTY..... POWELL
 GEOLOGIC PROVINCE.. 21

LAT/LONG... 46-20.05 N 112-53.18 W
 UTM ZONE... +12
 NORTHING... 5132688.
 354815.

MAP REFERENCE..... MT. POWELL, MONI. 1124000

OTHER LOCALITY INFORMATION: SPRING LOWEST IN GULCH.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/03/27

SAMPLE NUMBER..... NUMG NO. 7AMG627

TEMPERATURE (C)..... 26.0

AMBIENT TEMP (C)..... 4.1

DISCHARGE..... 0.57. L/MIN

OTHER SAMPLE INFORMATION.. CHEMISTRY NOT VERIFIED.

WATER ANALYSIS

PH..... 8.96
 SPECIFIC CONDUCTANCE..... 223.4
 TOTAL DISSOLVED SOLIDS... 172.
 CHARGE BALANCE (% DIFF)... 1.5

ANALYSIS IN MG/L

AG.... CO3.... 12.5 LI... 0.07
 AL.... CR..... MG... 0.1

ISOTOPES 10/001

H.....	F.....	7.5	NA...	45.8	SI02.	45.8
HE.....	FE(TOT). L	0.01	NB...		S04..	33.
CA.....	HC03....	40.9	NU3..	0.51		
CL.....						
CO.....	K.....	0.5				

QUALIFICATION FIELD..... TOTAL FROM FOUR SPRINGS: 379 L/MIN.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00208

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046029

NAME OF SAMPLE SOURCE... GARRISON WARM SPRINGS

LOCATION

LOMNSDIP=RANGE

COORDINATES

COUNTRY..... UNITED STATES 10N 009W 19 SW OF NE

STATE..... MONTANA

COUNTY..... POWELL

GEOLOGIC PROVINCE.. 21

MMP REFERENCE..... GARRISON 1162500

UTM LOCALITY INFORMATION: ELEVATION 4900 FEET

LAT/LONG... 46-36.53 N 112-46.48 W

UTM ZONE... +12

NORTHING... 5163008.

364095.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/08 MBMG

SAMPLE NUMBER..... MBMG NO. 72-768

TEMPERATURE (C)..... 25.0

AMBIENT TEMP (C)..... 4.9

DISCHARGE..... 204. L/MIN

PERTINENT LITHOLOGY..... CRETACEOUS, NEAR MADISON

WATER ANALYSIS

PH..... 7.3

SPECIFIC CONDUCTANCE..... 737.

ALKALINITY..... 48.

AS CAC03

TOTAL DISSOLVED SOLIDS... 558.

CHARGE IMBALANCE (% DIFF)... 2.3

ANALYSIS IN MG/L

AG.... CO3..... N LI.... 0.15

AL.... CR..... MG.... 35.

AS.... CS..... MN.... L 0.01

H..... F..... 1.3 NA.... 24. SI02. 18.

HE..... FE(TOT). L 0.01 NB.... S04.. 335.

CA.... 77. HC03.... 59. NU3.. 0.2

CL.... 3.4

CO.... K..... 5.2

OTHER ANALYTICAL DATA... 1978/06/17 : TEMP. = 24.9 C., FLOW = 204. L/MIN., SP. COND. = 960. UMHOS/CM., PH = 7.1

QUALIFICATION FIELD..... MBMG FIELD STUDY 78/06/17: TEMPERATURE 24.9 C; FLOW 204 L/MIN; CONDUCTANCE 960 UMHOS/CM; PH 7.10.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00209

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046012

NAME OF SAMPLE SOURCE... BLUE JOINT CREEK- HOT SPRING 1

LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
 STATE..... MONTANA   02S 023W 01   NW OF NE.
 COUNTY..... RAVALLI
 GEOLOGIC PROVINCE..
 MAP REFERENCE..... PAINTED ROCKS LAKE 1162500
 OTHER LOCALITY INFORMATION: ELEVATION 5040 FEET.
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1972/08/11 BERG, R.B.
 SAMPLE NUMBER..... MRMG NO. 73M0022
 TEMPERATURE (C)..... 28.8
 AMBIENT TEMP (C)..... 6.0
 DISCHARGE..... 379. L/MIN
 PERTINENT LITHOLOGY..... ISSUES FROM FAULT BETWEEN IDAHO BATHOLITH GRANITE AND PRECAMBRIAN RAVALLI GNEISS
 OTHER SAMPLE INFORMATION.. CHEMISTRY NOT IN REFERENCE; NOT VERIFIED.
 WATER ANALYSIS
 PH..... 8.1
 SPECIFIC CONDUCTANCE..... 162.
 TOTAL DISSOLVED SOLIDS... 157.
 CHARGE IMBALANCE (% DIFF)... 2.3
 ANALYSIS IN MU/L
 AG.... CO3..... N
 AL.... CR..... MG... 0.1
 H.... F..... 8.8   NA... 32.   S102. 45.
 HE.... FE(TOT)... N   NB... S04... 3.4
 CA.... 3.4   HCO3.... 61.   NO3... N
 CL.... 2.8
 CD.... K..... 0.25
 REFERENCE AND IDENTIFICATION
 COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

ISOTOPES (0/001)

RECORD 00210

GEOTHERM SAMPLE FILE
 NAME OF SAMPLE SOURCE... BLUE JOINT CREEK- HOT SPRING 2
 LOCATION
 COUNTRY..... UNITED STATES   TOWNSHIP-RANGE
 STATE..... MONTANA   02S 022W 06   NE OF NW
 COUNTY..... RAVALLI
 GEOLOGIC PROVINCE... 21
 MAP REFERENCE..... PAINTED ROCKS LAKE 1162500
 OTHER LOCALITY INFORMATION: ELEVATION 4940 FEET
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1972/08/11 BERG, R.B.
 SAMPLE NUMBER..... MRMG NO. 73M0021
 POINT OF COLLECTION.. DISCRETE SPRING
 TEMPERATURE (C)..... 29.4
 AMBIENT TEMP (C)..... 6.2
 DISCHARGE..... 849.4 L/MIN
 PERTINENT LITHOLOGY..... PRECAMBRIAN QUARTZITE
 OTHER SAMPLE INFORMATION.. CHEMISTRY NOT IN REFERENCE; NOT VERIFIED.
 WATER ANALYSIS
 PH..... 8.2
 SPECIFIC CONDUCTANCE..... 160.

COORDINATES
 LAT/LONG... 45-41.83 N 114-22.85 W
 UTM ZONE... +11
 NORTHING... 5063328.
 704273.

COORDINATES
 LAT/LONG... 45-41.78 N 114-21.80 W
 UTM ZONE... +11
 NORTHING... 5063547.
 705279.

GEOTHERM FILE ID: 0046013

TOTAL DISSOLVED SOLIDS... 178.7

CHARGE IMBALANCE (% DIFF)... 0.8

ANALYSIS IN MG/L

AG....		CO3....	N	MG...	0.1		
AL....		CR....		NA...	37.5	SiO2.	54.
H....		F....	9.5	NB...		SO4..	4.8
HE....		FE(TOT)..	N	NU3..	N		
CA....	2.6	MC03....	67.				
CL....	3.1						
CO....		K.....	0.34				

ISOTOPES 10/001

OTHER ANALYTICAL DATA... 1978/06/20: TEMP. = 29.5C, SP. COND. = 198., PH = 8.9, FLOW = 94.6 L/MIN.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00211

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046028

NAME OF SAMPLE SOURCE... GALLOGLY (LOST TRAIL) HOT SPRINGS

LOCATION

COUNTRY..... UNITED STATES

TOWNSHIP-RANGE

01S'019W 15 SW OF SW NW

COORDINATES

LAT/LONG... 45-44.97 N 113-56.37 W

STATE..... MONTANA

UTM ZONE... +12

COUNTY..... HAVAILI

NORTHING... 5070309.

GEOLOGIC PROVINCE.. 21

271453.

MAP REFERENCE..... LOST TRAIL PASS 1124000

OTHER LOCALITY INFORMATION: 5400 FEET ELEVATION, NEAR EAST FORK CAMP CREEK.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/10

SAMPLE NUMBER..... MBMG NO. 72M0872

TEMPERATURE (C)..... 0 48.9

AMBIENT TEMP (C)..... 5.4

DISCHARGE..... 454. L/MIN

OTHER SAMPLE INFORMATION.. LAB REPORT NOT AVAILABLE.

WATER ANALYSIS

PH..... 7.8

SPECIFIC CONDUCTANCE... 202.

TOTAL DISSOLVED SOLIDS... 189.6

CHARGE IMBALANCE (% DIFF)... 7.2

ANALYSIS IN MG/L

AG....		CO3....	N	LI...	0.1		
AL....		CR....		MG...	0.4		
H....		F....	5.8	NA...	43.6	SiO2.	40.9
HE....		FE(TOT)..	0.05	NB...		SO4..	13.6
CA....	2.5	MC03....	80.	NU3..	N		
CL....	1.8						
CO....		K.....	0.7				

ISOTOPES 10/001

QUALIFICATION FIELD.... REPORTED TEMPERATURE MAY BE TOO HIGH. FIELD STUDY 6/20/78: TEMPERATURE 29 C: FLOW 114 L/MIN: CONDUCTANCE 253 UMHO/CM. MEASURED AT POOL.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00212

GEOTHERM FILE ID: 0046048

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... MEDICINE HOT SPRINGS

LOCATION

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... HAVAILI
 GEOLOGIC PROVINCE.. 21

TOWNSHIP-RANGE

01N 02W 12 SE OF SW SW

COORDINATES

LAT/LONG... 45-50.75 N 114-02.08 W
 UTM ZONE... +11
 NORTHING... 5081032.
 730226.

MAP REFERENCE..... MEDICINE HOT SPRINGS 1124000

OTHER LOCALITY INFORMATION: SAMPLE FROM SPRING ON SOUTHWEST SIDE OF COMPLEX.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/16

TEMPERATURE (C)..... 45.0

AMBIENT TEMP (C)..... 6.7

DISCHARGE..... 400. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK.

OTHER SAMPLE INFORMATION.. USED IN SWIMMING POOL AND CAMPGROUND. NO GAS.

WATER ANALYSIS

PH..... 8.6

SPECIFIC CONDUCTANCE..... 343.

ALKALINITY..... 125.

AS HCO3

TOTAL DISSOLVED SOLIDS... 322.

CHARGE IMBALANCE (% DIFF)... 1.1

ANALYSIS IN MG/L

AG..... CO3..... 3.

AL..... 0.007 CR.....

AS..... CS.....

H..... 0.12 F..... 14.

HE..... FE(TOT) L 0.02

CA..... 1.9 HCO3..... 120.

CA+MG..... MG.....

CD..... H2S..... 0.6

CL..... 6.7

CU..... K..... 1.4

LI... 0.2

MG... L 0.1

MN... L 0.02

NA... 80.

NB... 80.

PB... L 0.1

S... 60.

SB... 33.

S102.. 60.

S04.. 33.

PH... L 0.1

RB... L 0.02

ZN... L 0.01

ISOTOPES (0/00)

DEL D OF WATER..... -165.0

DEL O(18) OF WATER... -19.62

OTHER ANALYTICAL DATA... AMMONIA AS N = L 0.1

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00213

GEOTHERM FILE ID: 0027001

GEOTHERM SAMPLE FILE

NAME OF SAMPLE SOURCE... MEDICINE HOT SPRINGS

LOCATION

COUNTRY..... UNITED STATES
 STATE..... MONTANA
 COUNTY..... HAVAILI
 MAP REFERENCE..... MEDICINE HOT SPRINGS 112500

TOWNSHIP-RANGE

01N 02W 12 SE OF SW SW

COORDINATES

LAT/LONG... 45-50.75 N 114-02.08 W

OTHER LOCALITY INFORMATION: MEDICINE HOT SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/09 MONTANA BUREAU OF MINES AND GEOLOGY

POINT OF COLLECTION.. SMALL OPEN SPRING S.W. OF COMPLEX

DISCHARGE..... 379. L/MIN
PERTINENT LITHOLOGY..... GRANITE BEDROCK
WATER ANALYSIS

PH..... 8.1
SPECIFIC CONDUCTANCE..... 377.
ALKALINITY..... 110. AS CaCO₃
TOTAL DISSOLVED SOLIDS... 328.
CHARGE IMBALANCE (% DIFF)... 159.5

ANALYSIS IN MG/L

AG....	CO ₃ .... N	LI....	210.		
AL....	CR....	MG....	0.4		
AS....	CS....	MN....	N		
H....	F.... 12.	NA....	77.	SI02.	54.
HE....	FE(TOT). 20.	NB....		SO4..	38.
CA.... 6.6	HC0 ₃ .... 130.	NU3..	N		
CL.... 7.3					
CO....	K.... 1.5				

ISOTOPES (0/001)OTHER ANALYTICAL DATA... OH = N1 CO₂ = 1.7

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00214

GEOHERM SAMPLE FILE

GEOHERM FILE ID: 0027000

NAME OF SAMPLE SOURCE... MEDICINE HOT SPRINGS

WELL/SPRING NUMBER..... 01N-20W-12-CCD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES	01N 02W 12	SE OF SW SW	LAT/LONG... 45-50.75 N 114-02.08 W

STATE..... MONTANA

COUNTY..... HAWAII

MAP REFERENCE..... MEDICINE HOT SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/08/05 MONTANA STATE BOARD OF HEALTH

POINT OF COLLECTION.. SMALL OPEN SPRING S.W. OF COMPLEX

TEMPERATURE (C)..... 49.

DISCHARGE..... 379. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK

WATER ANALYSIS

ALKALINITY..... 90. AS CaCO₃

ANALYSIS IN MG/L

AG....	CO ₃ .... N				
AL....	CR....	MG....	N		
H....	F.... 9.6				
HA....	FE+3....	NA+K.	54.		
HE....	FE(TOT). N	NU....		SO4..	22.
CA.... 6.0	HC0 ₃ .... 110.	NU3..	N		
CL.... 7.0					

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... N NOT PRESENT.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00215

GEOTERM. SAMPLE FILE

GEOTHERM FILE ID: 0027002

NAME OF SAMPLE SOURCE... MEDICINE HOT SPRINGS

WELL/SPRING NUMBER..... 01N-20W-12-CCD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 01N 020W 12 SE OF SW SW

LAT/LONG... 45-50.75 N 114-02.08 W

STATE..... MONTANA

COUNTY..... HAWAII

MAP REFERENCE..... MEDICINE HOT SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/23 UNITED STATES GEOLOGICAL SURVEY

POINT OF COLLECTION.. SMALL OPEN SPRING S.W. OF COMPLEX

TEMPERATURE (C)..... 47.2

DISCHARGE..... 322. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 526.

ANALYSIS IN MG/L

H.....	F.....	14.	NA...	S102.	51.
HE.....	FE(TOT). L	0.02	NH...	S04..	36.
CL.....	7.8				

ISOTOPES (10/001)

OTHER ANALYTICAL DATA... GROSSALPHA = 3 PICOCURIES/L; GROSSBETA = 10 PICOCURIES /L.

REFERENCE AND INVESTIGATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00216

GEOTERM. SAMPLE FILE

GEOTHERM FILE ID: 0027004

NAME OF SAMPLE SOURCE... SLEEPING CHILD HOT SPRINGS

WELL/SPRING NUMBER..... 04N-19W-07-DCD

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04N 019W 07 SE OF SW SE

LAT/LONG... 46-06.29 N 114-00.25 W

STATE..... MONTANA

COUNTY..... HAWAII

MAP REFERENCE..... DEER MOUNTAIN, MONT. 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/08/04 MONTANA STATE BOARD OF HEALTH

POINT OF COLLECTION.. SPRING UP CREEK N.E. OF POOL

TEMPERATURE (C)..... 435.

DISCHARGE..... 0 435. L/MIN

PERTINENT LITHOLOGY..... GNEISS BEDROCK

OTHER SAMPLE INFORMATION.. TAKEN FROM ONE OF TWO SPRINGS 150 M. APART.

WATER ANALYSIS

ALKALINITY..... 149. AS CaCO3

ANALYSIS IN MG/L

AG.....	CO3.....	6.	MG... N		
AL.....	CR.....				
H.....	F.....	16.	NA+K.	108.	
HA.....	FE+3.....		NH...	S04..	80.
HE.....	FE(101). N				
CA.....	HCO3.....	170.	NO3.. N		
CL.....					

ISOTOPES (10/001)

OTHER ANALYTICAL DATA... N NOT PRESENT

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
 COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
 REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00217

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027003

NAME OF SAMPLE SOURCE... SLEEPING CHILD HOT SPRINGS

WELL/SPRING NUMBER..... 04N-19W-07-DCD

LOCATION

COUNTRY..... UNITED STATES TOWNSHIP-RANGE 04N 019W 07 SE OF SW SE

STATE..... MONTANA

COUNTY..... HAVALLI

MAP REFERENCE..... DEER MOUNTAIN, MONT. 1:24000

COORDINATES

LAT/LONG... 46-06.29 N 114-00.25 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/10 MONTANA BUREAU OF MINES AND GEOLOGY

POINT OF COLLECTION.. SPRING AT BASE OF CLIFF N. OF POOL

DISCHARGE..... 435. L/MIN

PERTINENT LITHOLOGY..... GNEISS BEDROCK

OTHER SAMPLE INFORMATION.. TAKEN FROM ONE OF TWO SPRINGS 150 M. APART.

WATER ANALYSIS

PH..... 8.0

SPECIFIC CONDUCTANCE..... 568.

ALKALINITY..... 126. AS CaCO₃

TOTAL DISSOLVED SOLIDS... 479.

CHARGE IMBALANCE (% DIFF)... 1.9

ANALYSIS IN MG/L

AG.... CO₃.... N LI... 0.210

AL.... CR.... MG... 0.2

AS.... CS.... MN... 0.010

H.... F.... 14. NA... 120. SI02. 69.

HE.... FE(TOT)... 0.030 NB... 504.. 93.

CA.... 5.5 HCO₃.... 170. NO₃.. 0.2

CL.... 9.2

CO.... K..... 2.7

OTHER ANALYTICAL DATA... OH NOT PRESENT; CARBON DIOXIDE = 2.7; N = .05

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00218

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0027005

NAME OF SAMPLE SOURCE... SLEEPING CHILD HOT SPRINGS

WELL/SPRING NUMBER..... 04N-19W-07-DCD

LOCATION

COUNTRY..... UNITED STATES TOWNSHIP-RANGE 04N 019W 07 SE OF SW SE

STATE..... MONTANA

COUNTY..... HAVALLI

MAP REFERENCE..... DEER MOUNTAIN, MONT. 1:24000

COORDINATES

LAT/LONG... 46-06.29 N 114-00.25 W

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/23 U.S. GEOLOGICAL SURVEY

POINT OF COLLECTION.. SPRING UP CREEK N.E. OF POOL

TEMPERATURE (C)..... 50.
 DISCHARGE..... 102. L/MIN
 PERTINENT LITHOLOGY..... GNEISS BEDROCK.
 OTHER SAMPLE INFORMATION.. TAKEN FROM ONE OF TWO SPRINGS 150 M. APART.

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 674.

ANALYSIS IN MG/L

HE.... FE(10T). NB... S04.. 82.

ISOTOPES (0/001)

CL.... 9.7

OTHER ANALYTICAL DATA... GROSS ALPHA = 1 PICOCURIE/L., GROSS BETA = 9 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00219

GEO THERM SAMPLE FILE

GEO THERM FILE 101 0002923

NAME OF SAMPLE SOURCE... SLEEPING CHILD HOT SPRINGS-B

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 04N 019W 07 SE OF SW SE

LAT/LONG... 46-06.29 N 114-00.25 W

STATE..... MONTANA

UTM ZONE... +11

COUNTY..... HAWAII

NORTHING... 5107465.

GEOLOGIC PROVINCE.. 21

731951.

MAP REFERENCE..... DEER MOUNTAIN, MONT. 1124000

OTHER LOCALITY INFORMATION: SPRING UP CREEK NORTHEAST OF POOL.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/15 MARINER

TEMPERATURE (C)..... 43.0

DISCHARGE..... 6 2000. L/MIN

PERTINENT LITHOLOGY..... GNEISS BEDROCK.

OTHER SAMPLE INFORMATION.. TWO SPRINGS 150 M APART. USED FOR SWIMMING POOL.

WATER ANALYSIS

P..... 8.1

SPECIFIC CONDUCTANCE..... 505.

ALKALINITY..... 162.

AS HCO3

TOTAL DISSOLVED SOLIDS... 445.

CHARGE IMBALANCE (% DIFF)... 2.4

ANALYSIS IN MG/L

AG.... CO3.... LI... 0.17 S....
 AL.... CR.... MG... 0.2 SB...
 AS.... CS.... MN... L 0.02
 H.... 0.33 F.... 14. NA... 110. SI02. 60.
 HF.... FE(10T). NB... S04.. 81.
 CA.... 6.2 HCO3.... 162.
 CD.... H2S.... L 1.0
 CL.... 8.0
 CO.... K.... 2.6 RB... 0.03 ZN... L 0.01

ISOTOPES (0/001)

DEL D OF WATER..... -149.9

DEL O(18) OF WATER... -19.30

QUALIFICATION FIELD.... FLOW TOTAL FOR ALL SPRINGS

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00220

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046020

NAME OF SAMPLE SOURCE... CAMAS HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 21N 024W 03 NW OF NW

STATE..... MONTANA

COUNTY..... SANDERS

GEOLOGIC PROVINCE.. 21

MAP REFERENCE..... HOT SPRINGS 1124000

LAT/LONG... 47-36.93 N 114-39.98 W
UTM ZONE... 11
NORTHING... 5275986.
675372.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/03

TEMPERATURE (C)..... 45.0

AMBIENT TEMP (C)..... 7.5

DISCHARGE..... 0 200. L/MIN

PERTINENT LITHOLOGY..... GRANITE BEDROCK.

OTHER SAMPLE INFORMATION.. SEVERAL SPRINGS ISSUING IN LARGE CONCRETE TANKS. SPORADIC DISCHARGE OF GAS.

WATER ANALYSIS

PH..... 9.4

SPECIFIC CONDUCTANCE..... 367.

ALKALINITY..... 189.

TOTAL DISSOLVED SOLIDS... 399.

CHARGE IMBALANCE (% DIFF)... 15.4

AS HCO3

ANALYSIS IN MG/L

AG.... CO3.....

AL.... 0.021 CR.....

AS.... CS.....

H.... 0.34 F..... 5.6

HE.... FE(TOT).....

CA.... 0.9 HCO3..... 189.

CU.... H2S..... 7.4

CL.... 8.5

CO.... K..... 1.7

LI... 0.04 S....
MG... L 0.1 SB...
MN... L 0.02
NA... 85. SI02. 70.
NB... S04.. 38.

ISOTOPES (00/00)

DEL D OF WATER..... -141.3
DEL O(18) OF WATER... -18.72

GAS ANALYSIS

ANALYSIS IN VOLUME %

CH4... 0.2

C2H6.

CO2... L 0.1

N2... 90.

ISOTOPES (00/01)

OTHER ANALYTICAL DATA... 02 PLUS AR = 1.91 78/07/03 : TEMP. = 48.8 C., FLOW = 91. L/MIN; SP. COND. = 247.1 PH = 9.11

QUALIFICATION FIELD..... FLOW, TEMPERATURE, CONDUCTANCE, AND PH DATA FROM A. HOETTER. MBMG FIELD STUDY, 78/07/03;

TEMPERATURE = 48.85; FLOW = 91 L/MIN; CONDUCTANCE = 247.1 PH = 9.11.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDENEGGER, JOHN L.

COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

COMPILER CROSS INDEX... NEM-460

REFERENCE..... MARINER AND OTHERS, 1976; SONDENEGGER AND OTHERS, 1977

RECORD 00221

GEOTHERM SAMPLE FILE

GEOTHERM FILE ID: 0046032

NAME OF SAMPLE SOURCE... GREEN SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 20N 024W 33 SE OF SE NE

STATE..... MONTANA

LAT/LONG... 47-27.08 N 114-38.87 W
UTM ZONE... 11

COUNTY..... SANDERS
 GEOLOGIC PROVINCE... 21
 MAP REFERENCE..... PERMA 1162500
 SAMPLE DESCRIPTION AND CONDITIONS
 DATE/COLLECTOR..... 1945/01/05
 SAMPLE NUMBER..... MSHM NO. CW-343
 TEMPERATURE (C)..... 18.9
 AMBIENT TEMP (C)..... 7.6
 PERTINENT LITHOLOGY..... IN ALLUVIUM 2000 M. FROM CONTACT WITH PIEGAN SEDS.
 OTHER SAMPLE INFORMATION.. LAB REPORT NOT AVAILABLE.

NORTHING... 5257784,
 677315.

WATER ANALYSIS

TOTAL DISSOLVED SOLIDS... 162.

ANALYSIS IN MU/L

AG....	COJ....	12.			
H....	F....	2.2			
HA....	FE+3....		NA+K. 61.		
HE....	FE(TOT)...	0.14	NB...	504..	18.
CA....	MCUJ....	101.			
CL....	5.				

ISOTOPES (0/001)

OTHER ANALYTICAL DATA... 78/06/18: TEMP. = 26.4 C., FLOW = 303. L/MIN; SP. COND. = 372. UMHUS/CM. + PH = 9.2 , FLOW = 302.8 L/ MIN.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... *SONDEREGGER, J. L., MONTANA BUREAU OF MINES AND GEO

RECORD 00222

GEOTERM. SAMPLE FILE

GEOTERM FILE ID: 0046056

NAME OF SAMPLE SOURCE... QUINN'S HOT SPRINGS (PARADISE)

LOCATION

TOWNSHIP-RANGECOORDINATES

COUNTRY.....	UNITED STATES	18N 025W 09	NE OF SE SW	LAT/LONG...	47-19.77 N 114-47.32 W
STATE.....	MONTANA			UTM ZONE...	+11
COUNTY.....	SANDERS			NORTHING...	5243934.
GEOLOGIC PROVINCE..					667083.

MAP REFERENCE..... PLAINS 1162500

OTHER LOCALITY INFORMATION: 2560 FEET ELEVATION.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/09
 SAMPLE NUMBER..... MSHM NO. 72MB870
 TEMPERATURE (C)..... 42.8
 AMBIENT TEMP (C)..... 8.1
 DISCHARGE..... 76. L/MIN

PERTINENT LITHOLOGY..... SPRINGS NEAR CONTACT OF DIABASE DIKE WITH PRITCHARD FORMATION (PRECAMBRIAN).

OTHER SAMPLE INFORMATION.. CHEMISTRY NOT IN REFERENCE. DATA NOT VERIFIED.

WATER ANALYSIS

P.H..... 7.91
 SPECIFIC CONDUCTANCE.... 0 205.
 TOTAL DISSOLVED SOLIDS... 227.
 CHARGE IMBALANCE (B DIFF)... 1.7

ANALYSIS IN MU/L

AG....	COJ....	N	LI....	0.01	
AL....	CH....		MG....	0.2	
H....	F....	2.1	NA....	39.	5102. 77.
HE....	FE(TOT)...		NB....		504.. 24.
CA....	MCUJ....	71.	NUJ..	N	

ISOTOPES (0/001)

RECORD 00224

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046066

NAME OF SAMPLE SOURCE... SYMES HOT SPRINGS (DEVELOPED WELL)

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 21N 024W 04 SE OF NE NE
 STATE..... MONTANA
 COUNTY..... SANDERS
 GEOLOGIC PROVINCE.. 21

LAT/LONG... 47-36.98 N 114-40.58 W
 UTM ZONE... 11
 NORTHING... 5276056.
 674618.

MAP REFERENCE..... HOT SPRINGS 1124000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/08/09

SAMPLE NUMBER..... MMS NO. 72M0869

TEMPERATURE (C)..... 46.1

AMBIENT TEMP (C)..... 7.4

WELL DEPTH (M)..... 76.

DISCHARGE..... 76.

PERTINENT LITHOLOGY..... PRECAMBRIAN; WATER ENTERS WELL FROM BASE OF ALLUVIUM (217-226 FEET).

OTHER SAMPLE INFORMATION.. CHEMISTRY NOT IN REFERENCE. NOT VERIFIED.

WATER ANALYSIS

P..... 8.4

SPECIFIC CONDUCTANCE..... 394.

TOTAL DISSOLVED SOLIDS... 366.6

CHARGE IMBALANCE (% DIFF)... 2.3

ANALYSIS IN MG/L

AG.....	CO ₂	8.	LI... 0.05		
AL.....	CR.....		MG... 0.2		
H.....	F.....	5.8	NA... 90.5	SI02. 68.	
HF.....	FE(TOT).....	0.1	NU... 504..	40.	
CA..... 1.2	HCO ₃	142.	NU3.. N		
CL..... 9.3					
CO.....	K.....	1.7			

ISOTOPES (0/00)

OTHER ANALYTICAL DATA... 1978/06/18; TEMP. = 46.1; FLOW = 379 L/MIN., SP.COND = 333.7, PH = 9.79.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.

COMPILED AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00225

GEO THERM SAMPLE FILE

GEO THERM FILE ID: 0046003

NAME OF SAMPLE SOURCE... ANDERSONS HOT SPRINGS

LOCATION

TOWNSHIP-RANGE

COORDINATES

COUNTRY..... UNITED STATES 03S 013E 29 NE OF NW NE
 STATE..... MONTANA
 COUNTY..... SWEET GRASS
 GEOLOGIC PROVINCE..

LAT/LONG... 45-33.18 N 110-08.52 W
 UTM ZONE... 12
 NORTHING... 5044525.
 566972.

MAP REFERENCE..... MCLEOD BASIN 1124000

OTHER LOCALITY INFORMATION: ELEVATION 5540 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/07/25 HANSEN, M.

SAMPLE NUMBER..... MMS NO. PRINTOUT 72-861

TEMPERATURE (C)..... 25.0

AMBIENT TEMP (C)..... 4.6

DISCHARGE..... 37.8 L/MIN

PERTINENT LITHOLOGY..... AQUIFER IS PROBABLY PART OF MADISON GROUP.
 WATER ANALYSIS

PH..... 7.8
 SPECIFIC CONDUCTANCE..... 414.
 ALKALINITY..... 72.
 TOTAL DISSOLVED SOLIDS... 313.
 CHARGE IMBALANCE (% DIFF)... 0.7

AS CaCO3

ANALYSIS IN MG/L

AG....	CO3..... N	LI... L 0.01		
AL....	CR.....	MG... 23.		
AS....	CS.....	MN... L 0.01		
H.....	F..... 0.4	NA... 1.6	5102.	12.
HA....	FE+3.... L 0.01			
HE....	FE(TOT)..	NB... 504..	139.	
CA.... 47.	HCO3.... 88.	NO3.. 0.3		
CL.... 0.5				
CO....	K..... 1.3			

ISOLINES (0.001)

QUALIFICATION FIELD..... 1978/05/221 FLOW = 284 L/MIN; TEMP. = 24.6 C; SPECIFIC CONDUCTANCE = 519 UMHOS/CM; PH = 7.45.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
 COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
 REFERENCE..... SONDEREGGER AND OTHERS, 1977

APPENDIX A

Index to GEOTHERM'S sample file for the state of Montana. This computer generated appendix contains some truncated fields. The index is sorted by county and name of the source. TNS - township, RNG range, Sect. - section, I.D. - GEOTHERM record identifier, Temp. - temperature °C (see Table 1 for explanation of alphabetic qualifiers preceeding temperature.)

County	Name of Source	Latitude	Longitude	TNS	RNG	Sect.	I.D.	Temp.
BEAVERHEAD	ANDERSON'S PASTURE	44-42.15 N	111-53.30 W	13S	002W	18	0046004 R	25.7
BEAVERHEAD	APEX HOT SPRINGS (BIRCH CREEK)	45-25.20 N	112-41.50 W	05S	009W	10	0046005	25.0
BEAVERHEAD	BROWNS HOT SPRING	45-06.27 N	112-45.07 W	08S	009W	30	0046019	23.7
BEAVERHEAD	ELKHORN (POLARIS) HOT SPRINGS	45-27.47 N	113-06.52 W	04S	012W	29	0027025	49.
BEAVERHEAD	ELKHORN (POLARIS) HOT SPRINGS	45-27.47 N	113-06.52 W	04S	012W	29	0027023	46.
BEAVERHEAD	ELKHORN (POLARIS) HOT SPRINGS	45-27.47 N	113-06.52 W	04S	012W	29	0027027	47.8
BEAVERHEAD	ELKHORN (POLARIS) HOT SPRINGS	45-27.47 N	113-06.52 W	04S	012W	29	0027026	
BEAVERHEAD	ELKHORN (POLARIS) HOT SPRINGS	45-27.47 N	113-06.52 W	04S	012W	29	0027024	
BEAVERHEAD	ELKHORN HOT SPRINGS	45-27.47 N	113-06.52 W	04S	012W	29	0046025	48.5
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	45-22.07 N	113-24.18 W	05S	015W	25	0027017	58.3
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	45-22.07 N	113-24.18 W	05S	015W	25	0027015	58.3
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	45-22.07 N	113-24.18 W	05S	015W	25	0027081	58.
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	45-22.07 N	113-24.18 W	05S	015W	25	0027084	60.
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	45-22.07 N	113-24.18 W	05S	015W	25	0027083	59.
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	46-22.07 N	113-24.18 W	05S	015W	25	0027082	58.
BEAVERHEAD	JACKSON (JARDINE) HOT SPRINGS	45-22.07 N	113-24.18 W	05S	015W	25	0027080	57.
BEAVERHEAD	JACKSON (JARDINE, BIG HOLE) RANGER STATION	45-21.58 N	113-23.18 W	05S	015W	25	0027079	14.5
BEAVERHEAD	JACKSON (JARDINE, BIG HOLE) RANGER STATION	45-21.58 N	113-23.18 W	05S	015W	25	0027078	14.5
BEAVERHEAD	JACKSON HOT SPRINGS (JARDINE, BIG HOLE)	45-22.07 N	113-24.18 W	05S	015W	25	0046036	58.0
BEAVERHEAD	LOVELLS HOT SPRING	45-06.65 N	112-42.85 W	08S	009W	28	0046044	19.4
BEAVERHEAD	MC MENOMEY RANCH	45-01.72 N	112-50.73 W	09S	010W	29	0046047	19.6
BEAVERHEAD	MEDICINE LODGE (WARM SPRINGS)	44-48.56 N	112-58.95 W	12S	011W	07	0046049	11.0
BEAVERHEAD	STAUDENMEYER RANCH	44-42.05 N	111-52.68 W	13S	002W	17	0046064	28.0
BLAINE	LODGEPOLE 1	47-59.58 N	108-26.75 W	26N	025E	24	0046042	26.0
BROADWATER	BEDFORD HOT SPRINGS	46-21.27 N	111-33.90 W	07N	001E	23	0046011	23.3
BROADWATER	GREYSON WARM SPRING	46-28.47 N	111-31.30 W	06N	002E	21	0046034	17.9
BROADWATER	PLUNKET SPRING (NAVE'S, MOCKEL)	46-04.60 N	111-34.80 W	04N	001E	27	0046054 Q	16.5
BROADWATER	TOSTON HOT SPRINGS	46-07.65 N	111-23.44 W	04N	003E	06	0046067	13.9
BROADWATER	WARNER HOT SPRINGS	46-10.33 N	111-35.15 W	05N	001E	22	0046071	18.0
CASCADE	GIANT SPRINGS	47-32.05 N	111-13.73 W	21N	004E	33	0046030	12.
DEER LODGE	ANACONDA HOT SPRINGS	46-06.32 N	112-54.14 W	04N	011W	13	0046002	21.7
DEER LODGE	GREGSON HOT SPRINGS (FAIRMONT)	46-02.62 N	112-48.63 W	03N	010W	02	0002902	70.0
DEER LODGE	GREGSON HOT SPRINGS (FAIRMONT)	46-02.62 N	112-48.63 W	03N	010W	02	0027011	70.
DEER LODGE	GREGSON HOT SPRINGS (FAIRMONT)	46-02.62 N	112-48.63 W	03N	010W	02	0027008	68.
DEER LODGE	GREGSON HOT SPRINGS (FAIRMONT)	46-02.62 N	112-48.63 W	03N	010W	02	0027010	73.
DEER LODGE	GREGSON HOT SPRINGS (FAIRMONT)	46-02.62 N	112-48.63 W	03N	010W	02	0027009	71.
DEER LODGE	WARM SPRINGS (STATE HOSPITAL)	46-10.67 N	112-47.67 W	05N	010W	24	0027013	78.
DEER LODGE	WARM SPRINGS (STATE HOSPITAL)	46-10.67 N	112-47.67 W	05N	010W	24	0046070	77.0
DEER LODGE	WARM SPRINGS (STATE HOSPITAL)	46-10.67 N	112-47.67 W	05N	010W	24	0027012	71.
DEER LODGE	WARM SPRINGS (STATE HOSPITAL)	46-10.67 N	112-47.67 W	05N	010W	24	0027014	78.
DEER LODGE	WARM SPRINGS (STATE HOSPITAL)	46-10.67 N	112-47.67 W	05N	010W	24	0027075	78.
DEER LODGE	WARM SPRINGS STATE HOSPITAL WELL	46-12.33 N	112-53.00 W	05N	010W	13	0046088	67.
FERGUS	BROOKS HOT SPRINGS	43-13.02 N	109-28.27 W	17N	018E	19	0046018	19.5

FERGUS	DURFEE CREEK SPRINGS (NO. 2)	46-47.55 N 108-52.52 W 12N 023E	19	0046024	21.1
GALLATIN	BOZEMAN (FERRIS) HOT SPRINGS	45-39.63 N 111-11.17 W 02S 004E	14	0027064	51.0
GALLATIN	BOZEMAN (FERRIS) HOT SPRINGS	45-39.63 N 111-11.17 W 02S 004E	14	0027063	
GALLATIN	BOZEMAN (FERRIS) HOT SPRINGS	45-39.63 N 111-11.17 W 02S 004E	14	0027066	54.4
GALLATIN	BOZEMAN (FERRIS) HOT SPRINGS	45-39.63 N 111-11.17 W 02S 004E	14	0027065	54.6
GALLATIN	BOZEMAN HOT SPRINGS (FERRIS)	45-39.63 N 111-11.17 W 02S 004E	14	0027062	60.0
GALLATIN	BOZEMAN HOT SPRINGS WELL	45-39.62 N 111-11.17 W 05S 004E	14	0027061	48.3
GALLATIN	BOZEMAN HOT SPRINGS WELL	45-39.63 N 111-11.17 W 02S 004E	14	0046015	50.0
GALLATIN	BRIDGER CANYON WARM SPRING	45-42.44 N 110-58.53 W 01S 006E	34	0046016	21.0
GRANITE	BEARMOUTH WARM SPRINGS #1	46-43.03 N 113-19.32 W 11N 014W	11	0046008	20.2
GRANITE	BEARMOUTH WARM SPRINGS #2	46-43.08 N 113-18.33 W 11N 014W	12	0046009	15.0
GRANITE	NIMROD SPRINGS	46-42.33 N 113-27.43 W 11N 015W	14	0046051	19.0
JEFFERSON	ALHAMBRA HOT SPRINGS (NORTH)	46-26.98 N 111-58.83 W 08N 003W	16	0027114	59.4
JEFFERSON	ALHAMBRA HOT SPRINGS (NORTH)	46-26.98 N 111-58.83 W 08N 003W	16	0027113	59.0
JEFFERSON	ALHAMBRA HOT SPRINGS (NORTH)	46-26.98 N 111-58.83 W 08N 003W	16	0027112	50.0
JEFFERSON	ALHAMBRA HOT SPRINGS (NORTH)	46-26.98 N 111-58.83 W 08N 003W	16	0046000	56.5
JEFFERSON	ALHAMBRA HOT SPRINGS (NORTH)	46-26.98 N 111-58.83 W 08N 003W	16	0027111	53.0
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027105	54.4
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027069	54.0
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027067	
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027071	55.
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027070	54.0
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027074	55.0
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027073	54.4
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027072	55.5
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027106	54.4
JEFFERSON	ALHAMBRA HOT SPRINGS (SOUTH)	46-26.78 N 111-58.97 W 08N 003W	16	0027068	51.
JEFFERSON	ALHAMBRA HOT WELL (COLLECTION DATE)	46-27.01 N 111-58.83 W 08N 003W	16	0027117	54.0
JEFFERSON	ALHAMBRA HOT WELL (NORTH)	46-27.02 N 111-58.83 W 08N 003W	16	0027115	52.2
JEFFERSON	ALHAMBRA HOT WELL (NORTH)	46-27.01 N 111-58.83 W 08N 003W	16	0027118	52.2
JEFFERSON	ALHAMBRA HOT WELL (NORTH)	47-27.01 N 111-58.83 W 08N 003W	16	0027116	52.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0046014	76.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	04	0002906	62.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0027051	74.4
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0027049	76.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0027047	67.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0027048	75.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0027046	38.0
JEFFERSON	BOULDER HOT SPRINGS	46-11.88 N 112-05.62 W 05N 004W	10	0027050	76.0
JEFFERSON	BOULDER SPRING - 1	46-11.88 N 112-05.62 W 05N 004W	10	0027052	59.0
JEFFERSON	BOULDER SPRING - 2	46-11.88 N 112-05.62 W 05N 004W	10	0027053	64.0
JEFFERSON	BOULDER TUNNEL	46-11.88 N 112-05.62 W 05N 004W	10	0027054	42.0
JEFFERSON	HILLBROOK FLOWING WELL	46-26.87 N 111-59.23 W 08N 003W	16	0027107	30.
JEFFERSON	HILLBROOK FLOWING WELL	46-26.87 N 111-59.23 W 08N 003W	16	0027108	30.0
JEFFERSON	HILLBROOK FLOWING WELL	46-26.87 N 111-59.23 W 08N 003W	16	0027109	28.9
JEFFERSON	JEFFERSON RIVER AT RENOVA HOT SPRINGS	45-47.47 N 112-07.58 W 01N 004W	32	0027037	21.
JEFFERSON	PIPESTONE HOT SPRING	45-53.7 N 112-13.70 W 02N 005W	28	0027043	61.0
JEFFERSON	PIPESTONE HOT SPRING	45-53.7 N 112-13.70 W 02N 005W	28	0027045	60.
JEFFERSON	PIPESTONE HOT SPRINGS	45-53.7 N 112-13.70 W 02N 005W	28	0027044	60.0
JEFFERSON	PIPESTONE HOT SPRINGS	45-53.78 N 112-14.57 W 02N 005W	28	0027041	57.0
JEFFERSON	PIPESTONE HOT SPRINGS	45-53.7 N 112-13.70 W 02N 005W	28	0027040	38.8
JEFFERSON	PIPESTONE HOT SPRINGS	45-53.7 N 112-13.70 W 02N 005W	28	0027042	61.0
JEFFERSON	PIPESTONE HOT SPRINGS	45-53.78 N 112-14.57 W 02N 005W	28	0002908	57.0
JEFFERSON	RENOVA HOT SPRINGS	45-47.50 N 112-07.58 W 01N 004W	32	0027038	50.

JEFFERSON	RENOVA HOT SPRINGS	45-47.50 N 112-07.58 W 01N 004W	32	0027039	48.9
JEFFERSON	WALLS HOT SPRING	46-26.88 N 111-58.83 W 08N 003W	16	0027110	55.6
LAKE	CAMP AQUA AREA TEST WELL	47-38.53 N 114-34.28 W 22N 023W	29	0046084	44.9
LAKE	CAMP AQUA AREA TEST WELL	47-38.53 N 114-34.28 W 22N 023W	29	0046083	47.2
LAKE	CAMP AQUA AREA TEST WELL	47-38.53 N 114-34.28 W 22N 023W	29	0046081	49.3
LAKE	CAMP AQUA AREA TEST WELL	47-38.53 N 114-34.28 W 22N 023W	29	0046082	47.2
LAKE	CAMP AQUA AREA TEST WELL	47-38.53 N 114-34.28 W 22N 023W	29	0046080	49.2
LEWIS AND CLARK	BROADWATER HOT PIT 2	46-35.44 N 112-06.42 W 10N 004W	28	0027130	67.0
LEWIS AND CLARK	BROADWATER HOT SPRING	46-35.73 N 112-06.7 W 10N 004W	28	0027127	65.0
LEWIS AND CLARK	BROADWATER HOT SPRING	46-35.73 N 112-06.7 W 10N 004W	28	0027076	66.4
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.55 W 10N 004W	28	0027122	59.0
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.7 W 10N 004W	28	0027128	66.4
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.7 W 10N 004W		0027126	63.0
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.7 W 10N 004E	28	0027125	65.0
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.7 W 10N 004W	28	0027124	59.0
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.63 W 10N 004W	28	0027123	60.0
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.55 W 10N 004W	28	0027121	66.2
LEWIS AND CLARK	BROADWATER HOT SPRINGS	46-35.73 N 112-06.55 W 10N 004W	28	0027120	62.2
LEWIS AND CLARK	BROADWATER NORTHWEST COLD PIT	46-35.73 N 112-06.7 W 10N 004W	28	0027129	21.0
LEWIS AND CLARK	BROADWATER WELL - 3	46-35.73 N 112-06.7 W 10N 004W	28	0027132	65.5
LEWIS AND CLARK	BROADWATER WELL - 3	46-35.73 N 112-06.7 W 10N 004W	28	0027131	65.5
LEWIS AND CLARK	GLOEGE WELL	46-35.75 N 112-06.25 W 10N 004W	28	0027133	19.4
LEWIS AND CLARK	GLOEGE WELL	46-35.75 N 112-06.25 W 10N 004W	28	0027134	19.4
LEWIS AND CLARK	MARYSVILLE DEEP WELL	46-45.23 N 112-22.55 W 12N 006W	32	0027136	39.0
LEWIS AND CLARK	MARYSVILLE TEST WELL	46-45.23 N 112-22.55 W 12N 006W	32	0046046	Q 96.5
LEWIS AND CLARK	SUN RIVER SPRINGS	47-37.92 N 112-51.28 W 22N 010W	26	0046065	30.4
MADISON	BEAVERHEAD ROCK	45-23.38 N 112-27.07 W 05S 007W	22	0046010	27.
MADISON	ENNIS HOT SPRINGS (THEXTON)	45-22.03 N 111-44.85 W 05S 001W	28	0027101	
MADISON	ENNIS HOT SPRINGS (THEXTON).	45-22.03 N 111-44.85 W 05S 001W	28	0046026	83.2
MADISON	HOT SPRINGS CREEK AT NORRIS	45-34.22 N 111-41.35 W 03S 001W	14	0027103	17.5
MADISON	NELSON - R. LEE WELL	45-22.02 N 111-43.77 W 05S 001W	28	0027100	16.0
MADISON	NEW BILTMORE HOT SPRINGS (ZIEGLER)	45-27.72 N 112-28.50 W 04S 007W	28	0027019	
MADISON	NEW BILTMORE HOT SPRINGS (ZIEGLER)	45-27.72 N 112-28.50 W 04S 007W	28	0027021	54.
MADISON	NEW BILTMORE HOT SPRINGS (ZIEGLER)	45-27.72 N 112-28.50 W 04S 007W	28	0027020	
MADISON	NEW BILTMORE HOT SPRINGS (ZIEGLER)	45-27.72 N 112-28.50 W 04S 007W	28	0046050	53.0
MADISON	NEW BILTMORE HOT SPRINGS (ZIEGLER)	45-27.72 N 112-28.47 W 04S 007W	28	0027022	53.9
MADISON	NEW BILTMORE HOT SPRINGS (ZIEGLER)	45-27.72 N 112-28.50 W 04S 007W	28	0027018	52.
MADISON	NORRIS HOT SPRING (HAPGOOD, BEARTRAP)	45-34.50 N 111-41.00 W 03S 001W	14	0027058	
MADISON	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	45-34.50 N 111-41.00 W 03S 001W	14	0027059	45.
MADISON	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	45-34.50 N 111-41.00 W 03S 001W	14	0027057	41.
MADISON	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	45-34.50 N 111-41.00 W 03S 001W	14	0027060	50.
MADISON	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	45-34.50 N 111-41.00 W 03S 001W	14	0002910	52.5
MADISON	NORRIS WARM WELL - 2 (HAPGOOD, BEARTRAP)	45-34.32 N 111-41.08 W 03S 001W	14	0027104	21.
MADISON	POTOSI DRAIN NORTH	45-35.40 N 111-53.90 W 03S 002W	07	0027095	25.0
MADISON	POTOSI DRAIN SOUTH	45-35.32 N 111-53.88 W 03S 002W	07	0027056	17.
MADISON	POTOSI DRAIN SOUTH	45-35.32 N 111-53.88 W 03S 002W	07	0027055	23.
MADISON	POTOSI HOT SPRINGS	45-35.35 N 111-53.92 W 03S 002W	07	0027089	50.0
MADISON	POTOSI HOT SPRINGS	45-35.35 N 111-53.92 W 03S 002W	07	0027090	51.0
MADISON	POTOSI HOT SPRINGS	45-35.35 N 111-53.92 W 03S 002W	07	0027088	
MADISON	POTOSI HOT SPRINGS	45-35.35 N 111-53.92 W 03S 002W	07	0027087	51.
MADISON	POTOSI HOT SPRINGS	45-35.35 N 111-53.92 W 03S 002W	07	0027086	38.
MADISON	POTOSI HOT SPRINGS (CLARK)	45-35.35 N 111-53.92 W 03S 002W	07	0046055	49.5
MADISON	POTOSI HOT SPRINGS VENT 17	45-35.35 N 111-53.92 W 03S 002W	07	0027091	
MADISON	POTOSI HOT SPRINGS VENT 17	45-35.35 N 111-53.92 W 03S 002W	07	0027092	49.

MADISON	POTOSI HOT SPRINGS VENT 37	45-35.33 N 111-53.87 W 03W 002W 07	0027085	52.
MADISON	POTOSI WARM SPRINGS VENT 15	45-35.37 N 111-53.93 W 03S 002W 07	0027093	24.
MADISON	POTOSI WARM SPRINGS VENT 15	45-35.37 N 111-53.93 W 03S 002W 07	0027094	39.0
MADISON	PULLER HOT SPRINGS	45-10.30 N 112-09.12 W 08S 005W 01	0027030	44.4
MADISON	PULLER WARM SPRINGS	45-10.28 N 112-09.12 W 08S 005W 01	0027029	41.
MADISON	PULLER WARM SPRINGS	45-10.28 N 112-09.12 W 08S 005W 01	0027028	43.0
MADISON	SILVER STAR HOT SPRINGS	45-41.12 N 112-17.70 W 02S 006W 01	0027032	72.7
MADISON	SILVER STAR HOT SPRINGS	45-41.12 N 112-17.70 W 02S 006W 01	0027036	71.0
MADISON	SILVER STAR HOT SPRINGS	45-41.12 N 112-17.70 W 02S 006W 01	0027033	69.
MADISON	SILVER STAR HOT SPRINGS	45-41.12 N 112-17.70 W 02S 006W 01	0027031	72.2
MADISON	SILVER STAR HOT SPRINGS	45-41.12 N 112-17.70 W 02S 006W 01	0027035	
MADISON	SILVER STAR HOT SPRINGS	45-41.12 N 112-17.70 W 02S 006W 01	0027034	67.0
MADISON	SILVER STAR HOT SPRINGS (BARKELLS)	45-41.12 N 112-17.70 W 02S 006W 01	0046060	71.5
MADISON	SLOAN COW CAMP	44-46.13 N 111-38.92 W 12S 001W 19	0046063	29.8
MADISON	THEXTON HOT WELL	45-22.12 N 111-43.62 W 05S 001W 28	0027102	72.2
MADISON	TRUDAU HOT SPRINGS	45-14.18 N 112-08.07 W 07S 004W 07	0046068	22.7
MADISON	VIGILANTE HOT SPRINGS	45-02.27 N 111-57.13 W 09S 003W 22	0046069	23.5
MADISON	WALL CANYON WARM SPRING	44-58.57 N 111-39.08 W 10S 001E 07	0046087	24.
MADISON	WEST FORK SWIMMING HOLE	44-47.12 N 111-38.92 W 12S 001E 18	0046072	25.5
MADISON	WOLF CREEK HOT SPRINGS	44-59.03 N 111-36.78 W 10S 001E 09	0046074	68.0
MADISON	WOLF CREEK HOT SPRINGS	44-59.03 N 111-36.78 W 10S 001E 09	0027098	67.0
MADISON	WOLF CREEK WARM SPRING - 2	44-58.55 N 111-39.03 W 10S 001E 09	0027097	25.5
MADISON	WOLF CREEK WARM SPRING 1	44-59.13 N 111-36.78 W 10S 001E 09	0027099	23.
MEAGHER	LUCAS FLOWING WELL	46-21.50 N 110-40.68 W 07N 008E 24	0046045	42.2
MEAGHER	RINGLING FLOWING WELL	46-20.37 N 110-47.18 W 07N 007E 25	0046058	48.0
MEAGHER	WHITE SULPHUR (BREWERS) SPRINGS	46-32.35 N 110-53.75 W 09N 007E 18	0027137	
MEAGHER	WHITE SULPHUR (BREWERS) SPRINGS	46-32.35 N 110-53.75 W 09N 007E 18	0027138	45.5
MEAGHER	WHITE SULPHUR (BREWERS) SPRINGS	46-32.35 N 110-53.75 W 09N 007E 18	0046073	46.0
MISSOULA	GRANITE HOT SPRINGS	46-43.82 N 114-32.05 W 11N 023W 07	0046031	50.6
MISSOULA	LOLO HOT SPRINGS	46-43.56 N 114-31.97 W 11N 023W 07	0046900	46.4
MISSOULA	LOLO HOT SPRINGS	46-43.56 N 114-31.97 W 11N 023W 07	0027006	46.
MISSOULA	LOLO HOT SPRINGS	46-43.56 N 114-31.97 W 11N 023W 07	0027007	
MISSOULA	LOLO HOT SPRINGS (GRANITE)	46-45.13 N 114-31.97 W 11N 023W 07	0046043	44.0
PARK	BEAR CREEK SPRINGS	45-02.12 N 110-39.92 W 09S 009E 19	0046007	Q 21.5
PARK	CARTER'S BRIDGE WARM SPRINGS	45-36.53 N 110-33.70 W 03S 009E 01	0046085	28.
PARK	CHICO HOT SPRINGS (EMIGRANT)	45-20.22 N 110-41.48 W 06S 008E 01	0027144	46.0
PARK	CHICO HOT SPRINGS (EMIGRANT)	45-20.22 N 110-41.48 W 06S 008E 01	0046022	42.0
PARK	CHICO HOT SPRINGS (EMIGRANT)	45-20.22 N 110-41.48 W 06S 008E 01	0027145	43.5
PARK	CHICO HOT SPRINGS (EMIGRANT)	45-20.22 N 110-41.48 W 06S 008E 01	0027143	45.0
PARK	CHICO HOT SPRINGS (EMIGRANT)	45-20.22 N 110-41.48 W 06S 008E 01	0027142	48.5
PARK	CHICO HOT SPRINGS - WEST VENT	45-20.22 N 110-41.48 W 06S 008E 01	0027141	42.5
PARK	HUNTERS HOT SPRINGS	45-45.43 N 110-15.43 W 01S 012E 09	0027149	60.0
PARK	HUNTERS HOT SPRINGS (B)	45-45.43 N 110-15.43 W 01S 012E 09	0002920	57.0
PARK	HUNTERS HOT SPRINGS (A)	45-45.43 N 110-15.43 W 01S 012E 09	0046035	60.0
PARK	HUNTERS HOT SPRINGS (C)	45-45.43 N 110-15.43 W 01S 012E 09	0002921	60.0
PARK	HUNTERS HOT SPRINGS (COMPOSITE)	45-45.43 N 110-15.43 W 01S 012E 09	0027146	56.5
PARK	HUNTERS HOT SPRINGS (COMPOSITE)	45-45.43 N 110-15.43 W 01S 012E 09	0027148	57.
PARK	HUNTERS HOT SPRINGS (COMPOSITE)	45-45.43 N 110-15.43 W 01S 012E 09	0027147	53.9
PARK	LA DUKE (CORWIN) HOT SPRINGS	45-05.58 N 110-46.42 W 08S 008E 32	0027140	67.5
PARK	LA DUKE (CORWIN) HOT SPRINGS	45-05.58 N 110-46.42 W 08S 008E 32	0027139	66.
PARK	LA DUKE HOT SPRINGS (A)	45-05.58 N 110-46.42 W 08S 008E 32	0046037	65.0
PARK	LA DUKE HOT SPRINGS (B)	45-05.58 N 110-46.42 W 08S 008E 32	0002918	65.0
PHILLIPS	LANDUSKY #1	47-52.58 N 108-39.37 W 25N 024E 32	0046038	21.1
PHILLIPS	LANDUSKY PLUNGE	47-50.57 N 108-35.88 W 24N 024E 12	0046039	24.4

POWELL	AVON WARM SPRING	45-36.62 N 112-33.28 W 10N 008W	24	0046006	25.5
POWELL	DEER LODGE PRISON RANCH NO. 4	46-20.05 N 112-53.18 W 07N 010W	29	0046023	26.0
POWELL	GARRISON WARM SPRINGS	46-36.53 N 112-46.48 W 10N 009W	19	0046029	25.0
RAVALLI	BLUE JOINT CREEK- HOT SPRING 1	45-41.83 N 114-22.05 W 02S 023W	01	0046012	28.8
RAVALLI	BLUE JOINT CREEK- HOT SPRING 2	45-41.78 N 114-21.80 W 02S 022W	06	0046013	29.4
RAVALLI	GALLOGLY (LOST TRAIL) HOT SPRINGS	45-44.97 N 113-56.37 W 01S 019W	15	0046028	48.9
RAVALLI	MEDICINE HOT SPRINGS	45-50.75 N 114-02.08 W 01N 020W	12	0046048	45.0
RAVALLI	MEDICINE HOT SPRINGS	45-50.75 N 114-02.08 W 01N 020W	12	0027001	
RAVALLI	MEDICINE HOT SPRINGS	45-50.75 N 114-02.08 W 01N 020W	12	0027000	49.
RAVALLI	MEDICINE HOT SPRINGS	45-50.75 N 114-02.08 W 01N 020W	12	0027002	47.2
RAVALLI	SLEEPING CHILD HOT SPRINGS	46-06.29 N 114-00.25 W 04N 019W	07	0027004	435.
RAVALLI	SLEEPING CHILD HOT SPRINGS	46-06.29 N 114-00.25 W 04N 019W	07	0027003	
RAVALLI	SLEEPING CHILD HOT SPRINGS	46-06.29 N 114-00.25 W 04N 019W	07	0027005	50.
RAVALLI	SLEEPING CHILD HOT SPRINGS-B	46-06.29 N 114-00.25 W 04N 019W	07	0002923	43.0
SANDERS	CAMAS HOT SPRINGS	47-36.93 N 114-39.98 W 21N 024W	03	0046020	45.0
SANDERS	GREEN SPRINGS	47-27.08 N 114-38.87 W 20N 024W	33	0046032	18.9
SANDERS	QUINN'S HOT SPRINGS (PARADISE)	47-19.77 N 114-47.32 W 18N 025W	09	0046056	42.8
SANDERS	QUINN'S HOT SPRINGS WELL	47-19.80 N 114-47.23 W 18N 025W	09	0046086	46.4
SANDERS	SYMES HOT SPRINGS (DEVELOPED WELL)	47-36.98 N 114-40.58 W 21N 024W	04	0046066	46.1
SWEET GRASS	ANDERSONS HOT SPRINGS	45-33.18 N 110-08.52 W 03S 013E	29	0046003	25.0

APPENDIX 8

Index to GEOTHERM sample file for the state of Montana sorted by county, township (TNS), range (RNG), and section (Sect.) Also given are the name of source, GEOTHERM record identifier (I.D.), and temperature (Temp. °C). See Table 1 for explanation of alphabetic qualifiers proceeding temperature.

<u>County</u>	<u>TNS</u>	<u>RNG</u>	<u>Sect.</u>	<u>Name of Source</u>	<u>I.D.</u>	<u>Temp.</u>
BEAVERHEAD	04S	012W	29	ELKHORN HOT SPRINGS	0046025	48.5
BEAVERHEAD	04S	012W	29	ELKHORN (POLARIS) HOT SPRINGS	0027023	46.
BEAVERHEAD	04S	012W	29	ELKHORN (POLARIS) HOT SPRINGS	0027027	47.8
BEAVERHEAD	04S	012W	29	ELKHORN HOT SPRINGS	0046025	48.5
BEAVERHEAD	04S	012W	29	ELKHORN (POLARIS) HOT SPRINGS	0027026	
BEAVERHEAD	04S	012W	29	ELKHORN (POLARIS) HOT SPRINGS	0027024	
BEAVERHEAD	05S	009W	10	APEX HOT SPRINGS (BIRCH CREEK)	0046005	25.0
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027080	57.
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE, BIG HOLE) RANGER STATION	0027079	14.5
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027081	58.
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE, BIG HOLE) RANGER STATION	0027078	14.5
BEAVERHEAD	05S	015W	25	JACKSON HOT SPRINGS (JARDINE, BIG HOLE)	0046036	58.0
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027084	60.
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027083	59.
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027082	58.
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027017	58.3
BEAVERHEAD	05S	015W	25	JACKSON (JARDINE) HOT SPRINGS	0027015	58.3
BEAVERHEAD	08S	009W	28	LOVELLS HOT SPRING	0046044	19.4
BEAVERHEAD	08S	009W	30	BROWNS HOT SPRING	0046019	23.7
BEAVERHEAD	09S	010W	29	MC MENOMEY RANCH	0046047	19.6
BEAVERHEAD	12S	011W	07	MEDICINE LODGE (WARM SPRINGS)	0046049	11.0
BEAVERHEAD	13S	002W	17	STAUDENMEYER RANCH	0046064	28.0
BEAVERHEAD	13S	002W	18	ANDERSON'S PASTURE	0046004	R 25.7
BLAINE	26N	025E	24	LODGEPOLE 1	0046042	26.0
BROADWATER	04N	001E	27	PLUNKET SPRING (NAVE'S, MOCKEL)	0046054	Q 16.5
BROADWATER	04N	003E	06	TOSTON HOT SPRINGS	0046067	13.9
BROADWATER	05N	001E	22	WARNER HOT SPRINGS	0046071	18.0
BROADWATER	06N	002E	21	GREYSON WARM SPRING	0046034	17.9
BROADWATER	07N	001E	23	BEDFORD HOT SPRINGS	0046011	23.3
CASCADE	21N	004E	33	GIANT SPRINGS	0046030	12.
DEER LODGE	03N	010W	02	GREGSON HOT SPRINGS (FAIRMONT)	0002902	70.0
DEER LODGE	03N	010W	02	GREGSON HOT SPRINGS (FAIRMONT)	0027011	70.
DEER LODGE	03N	010W	02	GREGSON HOT SPRINGS (FAIRMONT)	0027008	68.
DEER LODGE	03N	010W	02	GREGSON HOT SPRINGS (FAIRMONT)	0027010	73.
DEER LODGE	03N	010W	02	GREGSON HOT SPRINGS (FAIRMONT)	0027009	71.
DEER LODGE	04N	011W	13	ANACONDA HOT SPRINGS	0046002	21.7
DEER LODGE	05N	010W	13	WARM SPRINGS STATE HOSPITAL WELL	0046088	67.
DEER LODGE	05N	010W	24	WARM SPRINGS (STATE HOSPITAL)	0046070	77.0
DEER LODGE	05N	010W	24	WARM SPRINGS (STATE HOSPITAL)	0027013	78.
DEER LODGE	05N	010W	24	WARM SPRINGS (STATE HOSPITAL)	0027075	78.
DEER LODGE	05N	010W	24	WARM SPRINGS (STATE HOSPITAL)	0027012	71.
DEER LODGE	05N	010W	24	WARM SPRINGS (STATE HOSPITAL)	0027014	78.

FERGUS	12N 023E	19	DURFEE CREEK SPRINGS (NO. 2)	0046024	21.1
FERGUS	17N 018E	19	BROOKS HOT SPRINGS	0046018	19.5
GALLATIN	01S 006E	34	BRIDGER CANYON WARM SPRING	0046016	21.0
GALLATIN	02S 004E	14	BOZEMAN (FERRIS) HOT SPRINGS	0027065	54.6
GALLATIN	02S 004E	14	BOZEMAN (FERRIS) HOT SPRINGS	0027064	51.0
GALLATIN	02S 004E	14	BOZEMAN (FERRIS) HOT SPRINGS	0027063	
GALLATIN	02S 004E	14	BOZEMAN HOT SPRINGS (FERRIS)	0027062	60.0
GALLATIN	02S 004E	14	BOZEMAN (FERRIS) HOT SPRINGS	0027066	54.4
GALLATIN	02S 004E	14	BOZEMAN HOT SPRINGS WELL	0046015	50.0
GALLATIN	05S 004E	14	BOZEMAN HOT SPRINGS WELL	0027061	48.3
GRANITE	11N 014W	11	BEARMOUTH WARM SPRINGS #1	0046008	20.2
GRANITE	11N 014W	12	BEARMOUTH WARM SPRINGS #2	0046009	15.0
GRANITE	11N 015W	14	NIMROD SPRINGS	0046051	19.0
JEFFERSON	01N 004W	32	RENOVA HOT SPRINGS	0027039	48.9
JEFFERSON	01N 004W	32	RENOVA HOT SPRINGS	0027038	50.
JEFFERSON	01N 004W	32	JEFFERSON RIVER AT RENOVA HOT SPRINGS	0027037	21.
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRINGS	0027042	61.0
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRING	0027043	61.0
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRINGS	0002908	57.0
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRINGS	0027040	38.8
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRING	0027045	60.
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRINGS	0027044	60.0
JEFFERSON	02N 005W	28	PIPESTONE HOT SPRINGS	0027041	57.0
JEFFERSON	05N 004W	04	BOULDER HOT SPRINGS	0002906	62.0
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0046014	76.0
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0027047	67.0
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0027051	74.4
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0027049	76.0
JEFFERSON	05N 004W	10	BOULDER TUNNEL	0027054	42.0
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0027046	38.0
JEFFERSON	05N 004W	10	BOULDER SPRING - 2	0027053	64.0
JEFFERSON	05N 004W	10	BOULDER SPRING - 1	0027052	59.0
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0027048	75.0
JEFFERSON	05N 004W	10	BOULDER HOT SPRINGS	0027050	76.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027068	51.
JEFFERSON	08N 003W	16	ALHAMBRA HOT WELL (COLLECTION DATE)	0027117	54.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT WELL (NORTH)	0027115	52.2
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (NORTH)	0027114	59.4
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (NORTH)	0027113	59.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (NORTH)	0027112	50.0
JEFFERSON	08N 003W	16	HILLBROOK FLOWING WELL	0027109	28.9
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027106	54.4
JEFFERSON	08N 003W	16	HILLBROOK FLOWING WELL	0027107	30.
JEFFERSON	08N 003W	16	WALLS HOT SPRING	0027110	55.6
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (NORTH)	0046000	56.5
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027067	
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027071	55.
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027070	54.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027074	55.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027073	54.4
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027072	55.5
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027069	54.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT WELL (NORTH)	0027118	52.2
JEFFERSON	08N 003W	16	ALHAMBRA HOT WELL (NORTH)	0027116	52.0

JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (NORTH)	0027111	53.0
JEFFERSON	08N 003W	16	HILLBROOK FLOWING WELL	0027108	30.0
JEFFERSON	08N 003W	16	ALHAMBRA HOT SPRINGS (SOUTH)	0027105	54.4
LAKE	22N 023W	29	CAMP AQUA AREA TEST WELL	0046083	47.2
LAKE	22N 023W	29	CAMP AQUA AREA TEST WELL	0046081	49.3
LAKE	22N 023W	29	CAMP AQUA AREA TEST WELL	0046084	44.9
LAKE	22N 023W	29	CAMP AQUA AREA TEST WELL	0046082	47.2
LAKE	22N 023W	29	CAMP AQUA AREA TEST WELL	0046080	49.2
LEWIS AND CLARK	10N 004E	28	BROADWATER HOT SPRINGS	0027125	65.0
LEWIS AND CLARK	10N 004W		BROADWATER HOT SPRINGS	0027126	63.0
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRINGS	0027124	59.0
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRINGS	0027123	60.0
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRINGS	0027121	66.2
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRINGS	0027120	62.2
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT PIT 2	0027130	67.0
LEWIS AND CLARK	10N 004W	28	BROADWATER NORTHWEST COLD PIT	0027129	21.0
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRINGS	0027128	66.4
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRING	0027127	65.0
LEWIS AND CLARK	10N 004W	28	GLOEGE WELL	0027134	19.4
LEWIS AND CLARK	10N 004W	28	BROADWATER WELL - 3	0027132	65.5
LEWIS AND CLARK	10N 004W	28	BROADWATER WELL - 3	0027131	65.5
LEWIS AND CLARK	10N 004W	28	GLOEGE WELL	0027133	19.4
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRING	0027076	66.4
LEWIS AND CLARK	10N 004W	28	BROADWATER HOT SPRINGS	0027122	59.0
LEWIS AND CLARK	12N 006W	32	MARYSVILLE TEST WELL	0046046	Q 96.5
LEWIS AND CLARK	12N 006W	32	MARYSVILLE DEEP WELL	0027136	39.0
LEWIS AND CLARK	22N 010W	26	SUN RIVER SPRINGS	0046065	30.4
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS	0027036	71.0
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS	0027033	69.
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS	0027032	72.7
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS (BARKELLS)	0046060	71.5
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS	0027035	
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS	0027034	67.0
MADISON	02S 006W	01	SILVER STAR HOT SPRINGS	0027031	72.2
MADISON	03S 001W	14	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	0002910	52.5
MADISON	03S 001W	14	HOT SPRINGS CREEK AT NORRIS	0027103	17.5
MADISON	03S 001W	14	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	0027059	45.
MADISON	03S 001W	14	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	0027057	41.
MADISON	03S 001W	14	NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	0027060	50.
MADISON	03S 001W	14	NORRIS HOT SPRING (HAPGOOD, BEARTRAP)	0027058	
MADISON	03S 001W	14	NORRIS WARM WELL-2 (HAPGOOD, BEARTRAP)	0027104	21.
MADISON	03S 002W	07	POTOSI DRAIN SOUTH	0027056	17.
MADISON	03S 002W	07	POTOSI DRAIN NORTH	0027095	25.0
MADISON	03S 002W	07	POTOSI WARM SPRINGS VENT 15	0027094	39.0
MADISON	03S 002W	07	POTOSI HOT SPRINGS (CLARK)	0046055	49.5
MADISON	03S 002W	07	POTOSI WARM SPRINGS VENT 15	0027093	24.
MADISON	03S 002W	07	POTOSI HOT SPRINGS VENT 17	0027092	49.
MADISON	03S 002W	07	POTOSI HOT SPRINGS VENT 17	0027091	
MADISON	03S 002W	07	POTOSI HOT SPRINGS	0027090	51.0
MADISON	03S 002W	07	POTOSI HOT SPRINGS	0027088	
MADISON	03S 002W	07	POTOSI HOT SPRINGS	0027087	51.
MADISON	03S 002W	07	POTOSI HOT SPRINGS	0027086	38.
MADISON	03S 002W	07	POTOSI HOT SPRINGS	0027089	50.0
MADISON	03S 002W	07	POTOSI DRAIN SOUTH	0027055	23.

MADISON	03W	002W	07	POTOSI HOT SPRINGS VENT 37	0027085	52.
MADISON	04S	007W	28	NEW BILTMORE HOT SPRINGS (ZIEGLER)	0027022	53.9
MADISON	04S	007W	28	NEW BILTMORE HOT SPRINGS (ZIEGLER)	0046050	53.0
MADISON	04S	007W	28	NEW BILTMORE HOT SPRINGS (ZIEGLER)	0027019	
MADISON	04S	007W	28	NEW BILTMORE HOT SPRINGS (ZIEGLER)	0027021	54.
MADISON	04S	007W	28	NEW BILTMORE HOT SPRINGS (ZIEGLER)	0027020	
MADISON	04S	007W	28	NEW BILTMORE HOT SPRINGS (ZIEGLER)	0027018	52.
MADISON	05S	001W	28	ENNIS HOT SPRINGS (THEXTON).	0046026	83.2
MADISON	05S	001W	28	ENNIS HOT SPRINGS (THEXTON)	0027101	
MADISON	05S	001W	28	THEXTON HOT WELL	0027102	72.2
MADISON	05S	001W	28	NELSON - R. LEE WELL	0027100	16.0
MADISON	05S	007W	22	BEAVERHEAD ROCK	0046010	27.
MADISON	07S	004W	07	TRUDAU HOT SPRINGS	0046068	22.7
MADISON	08S	005W	01	PULLER WARM SPRINGS	0027028	43.0
MADISON	08S	005W	01	PULLER WARM SPRINGS	0027029	41.
MADISON	08S	005W	01	PULLER HOT SPRINGS	0027030	44.4
MADISON	09S	003W	22	VIGILANTE HOT SPRINGS	0046069	23.5
MADISON	10S	001E	07	WALL CANYON WARM SPRING	0046087	24.
MADISON	10S	001E	09	WOLF CREEK HOT SPRINGS	0046074	68.0
MADISON	10S	001E	09	WOLF CREEK WARM SPRING 1	0027099	23.
MADISON	10S	001E	09	WOLF CREEK WARM SPRING - 2	0027097	25.5
MADISON	10S	001E	09	WOLF CREEK HOT SPRINGS	0027098	67.0
MADISON	12S	001E	18	WEST FORK SWIMMING HOLE	0046072	25.5
MADISON	12S	001W	19	SLOAN COW CAMP	0046063	29.8
MEAGHER	07N	007E	25	RINGLING FLOWING WELL	0046058	48.0
MEAGHER	07N	008E	24	LUCAS FLOWING WELL	0046045	42.2
MEAGHER	09N	007E	18	WHITE SULPHUR (BREWERS) SPRINGS	0027137	
MEAGHER	09N	007E	18	WHITE SULPHUR (BREWERS) SPRINGS	0027138	45.5
MEAGHER	09N	007E	18	WHITE SULPHUR (BREWERS) SPRINGS	0046073	46.0
MISSOULA	11N	023W	07	LOLO HOT SPRINGS	0027007	
MISSOULA	11N	023W	07	LOLO HOT SPRINGS (GRANITE)	0046043	44.0
MISSOULA	11N	023W	07	GRANITE HOT SPRINGS	0046031	50.6
MISSOULA	11N	023W	07	LOLO HOT SPRINGS	0046900	46.4
MISSOULA	11N	023W	07	LOLO HOT SPRINGS	0027006	46.
PARK	01S	012E	09	HUNTERS HOT SPRINGS (C)	0002921	60.0
PARK	01S	012E	09	HUNTERS HOT SPRINGS	0027149	60.0
PARK	01S	012E	09	HUNTERS HOT SPRINGS (COMPOSITE)	0027148	57.
PARK	01S	012E	09	HUNTERS HOT SPRINGS (COMPOSITE)	0027147	53.9
PARK	01S	012E	09	HUNTERS HOT SPRINGS (COMPOSITE)	0027146	56.5
PARK	01S	012E	09	HUNTERS HOT SPRINGS (A)	0046035	60.0
PARK	01S	012E	09	HUNTERS HOT SPRINGS (B)	0002920	57.0
PARK	03S	009E	01	CARTER'S BRIDGE WARM SPRINGS	0046085	28.
PARK	06S	008E	01	CHICO HOT SPRINGS (EMIGRANT)	0027144	46.0
PARK	06S	008E	01	CHICO HOT SPRINGS (EMIGRANT)	0046022	42.0
PARK	06S	008E	01	CHICO HOT SPRINGS (EMIGRANT)	0027145	43.5
PARK	06S	008E	01	CHICO HOT SPRINGS (EMIGRANT)	0027143	45.0
PARK	06S	008E	01	CHICO HOT SPRINGS (EMIGRANT)	0027142	48.5
PARK	06S	008E	01	CHICO HOT SPRINGS - WEST VENT	0027141	42.5
PARK	08S	008E	32	LA DUKE (CORWIN) HOT SPRINGS	0027140	67.5
PARK	08S	008E	32	LA DUKE HOT SPRINGS (A)	0046037	65.0
PARK	08S	008E	32	LA DUKE (CORWIN) HOT SPRINGS	0027139	66.
PARK	08S	008E	32	LA DUKE HOT SPRINGS (B)	0002918	65.0
PARK	09S	009E	19	BEAR CREEK SPRINGS	0046007	21.5
PHILLIPS	24N	024E	12	LANDUSKY PLUNGE	0046039	24.4

PHILLIPS	25N 024E	32	LANDUSKY #1	0046038	21.1
POWELL	07N 010W	29	DEER LODGE PRISON RANCH NO. 4	0046023	26.0
POWELL	10N 008W	24	AVON WARM SPRING	0046006	25.5
POWELL	10N 009W	19	GARRISON WARM SPRINGS	0046029	25.0
RAVALLI	01N 020W	12	MEDICINE HOT SPRINGS	0046048	45.0
RAVALLI	01N 020W	12	MEDICINE HOT SPRINGS	0027001	
RAVALLI	01N 020W	12	MEDICINE HOT SPRINGS	0027000	49.
RAVALLI	01N 020W	12	MEDICINE HOT SPRINGS	0027002	47.2
RAVALLI	01S 019W	15	GALLOGLY (LOST TRAIL) HOT SPRINGS	0046028	Q 48.9
RAVALLI	02S 022W	06	BLUE JOINT CREEK- HOT SPRING 2	0046013	29.4
RAVALLI	02S 023W	01	BLUE JOINT CREEK- HOT SPRING 1	0046012	28.8
RAVALLI	04N 019W	07	SLEEPING CHILD HOT SPRINGS	0027003	
RAVALLI	04N 019W	07	SLEEPING CHILD HOT SPRINGS-B	0002923	43.0
RAVALLI	04N 019W	07	SLEEPING CHILD HOT SPRINGS	0027005	50.
RAVALLI	04N 019W	07	SLEEPING CHILD HOT SPRINGS	0027004	435.
SANDERS	18N 025W	09	QUINN'S HOT SPRINGS WELL	0046086	46.4
SANDERS	18N 025W	09	QUINN'S HOT SPRINGS (PARADISE)	0046056	42.8
SANDERS	20N 024W	33	GREEN SPRINGS	0046032	18.9
SANDERS	21N 024W	03	CAMAS HOT SPRINGS	0046020	45.0
SANDERS	21N 024W	04	SYMES HOT SPRINGS (DEVELOPED WELL)	0046066	46.1
SWEET GRASS	03S 013E	29	ANDERSONS HOT SPRINGS	0046003	25.0

Index to GEOTHERM sample file for the state of Montana sorted into one-degree blocks by latitude and longitude. Records are sorted by name of source within each one-degree block. Adjacent one-degree blocks which are published as a 1:250,000 map are combined under the appropriate map name. See Table 1 for explanation of alphabetic qualifiers proceeding temperature. I.D. - GEOTHERM record identifier. Temp. - Temperature °C.

Latitude	Longitude	Name of Source	County	I.D.	Temp.
ASHTON 1:250,000					
44-42.15 N	111-53.30 W	ANDERSON'S PASTURE	BEAVERHEAD	0046004 R	25.7
44-46.13 N	111-38.92 W	SLOAN COW CAMP	MADISON	0046063	29.8
44-42.05 N	111-52.68 W	STAUDENMEYER RANCH	BEAVERHEAD	0046064	28.0
44-58.57 N	111-39.08 W	WALL CANYON WARM SPRING	MADISON	0046087	24.
44-47.12 N	111-38.92 W	WEST FORK SWIMMING HOLE	MADISON	0046072	25.5
44-59.03 N	111-36.78 W	WOLF CREEK HOT SPRINGS	MADISON	0046074	68.0
44-59.03 N	111-36.78 W	WOLF CREEK HOT SPRINGS	MADISON	0027098	67.0
44-58.55 N	111-39.03 W	WOLF CREEK WARM SPRING - 2	MADISON	0027097	25.5
44-59.13 N	111-36.78 W	WOLF CREEK WARM SPRING 1	MADISON	0027099	23.
DUBOIS 1:250,000					
44-48.56 N	112-58.95 W	MEDICINE LODGE (WARM SPRINGS)	BEAVERHEAD	0046049	11.0
BOZEMAN 1:250,000					
45-33.18 N	110-08.52 W	ANDERSONS HOT SPRINGS	SWEET GRASS	0046003	25.0
45-02.12 N	110-39.92 W	BEAR CREEK SPRINGS	PARK	0046007 Q	21.5
45-42.44 N	110-58.53 W	BRIDGER CANYON WARM SPRING	GALLATIN	0046016	21.0
45-36.53 N	110-33.70 W	CARTER'S BRIDGE WARM SPRINGS	PARK	0046085	28.
45-20.22 N	110-41.48 W	CHICO HOT SPRINGS (EMIGRANT)	PARK	0027144	46.0
45-20.22 N	110-41.48 W	CHICO HOT SPRINGS (EMIGRANT)	PARK	0046022	42.0
45-20.22 N	110-41.48 W	CHICO HOT SPRINGS (EMIGRANT)	PARK	0027145	43.5
45-20.22 N	110-41.48 W	CHICO HOT SPRINGS (EMIGRANT)	PARK	0027143	45.0
45-20.22 N	110-41.48 W	CHICO HOT SPRINGS (EMIGRANT)	PARK	0027142	48.5
45-20.22 N	110-41.48 W	CHICO HOT SPRINGS - WEST VENT	PARK	0027141	42.5
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS	PARK	0027149	60.0
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS (B)	PARK	0002920	57.0
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS (A)	PARK	0046035	60.0
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS (C)	PARK	0002921	60.0
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS (COMPOSITE)	PARK	0027146	56.5
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS (COMPOSITE)	PARK	0027148	57.
45-45.43 N	110-15.43 W	HUNTERS HOT SPRINGS (COMPOSITE)	PARK	0027147	53.9
45-05.58 N	110-46.42 W	LA DUKE (CORWIN) HOT SPRINGS	PARK	0027140	67.5
45-05.58 N	110-46.42 W	LA DUKE (CORWIN) HOT SPRINGS	PARK	0027139	66.
45-05.58 N	110-46.42 W	LA DUKE HOT SPRINGS (A)	PARK	0046037	65.0
45-05.58 N	110-46.42 W	LA DUKE HOT SPRINGS (B)	PARK	0002918	65.0
45-39.63 N	111-11.17 W	BOZEMAN (FERRIS) HOT SPRINGS	GALLATIN	0027065	54.6
45-39.63 N	111-11.17 W	BOZEMAN (FERRIS) HOT SPRINGS	GALLATIN	0027064	51.0
45-39.63 N	111-11.17 W	BOZEMAN (FERRIS) HOT SPRINGS	GALLATIN	0027063	
45-39.63 N	111-11.17 W	BOZEMAN (FERRIS) HOT SPRINGS	GALLATIN	0027066	54.4
45-39.63 N	111-11.17 W	BOZEMAN HOT SPRINGS (FERRIS)	GALLATIN	0027062	60.0
45-39.62 N	111-11.17 W	BOZEMAN HOT SPRINGS WELL	GALLATIN	0027061	48.3

45-39.63 N 111-11.17 W BOZEMAN HOT SPRINGS WELL
 45-22.03 N 111-44.85 W ENNIS HOT SPRINGS (THEXTON)
 45-22.03 N 111-44.85 W ENNIS HOT SPRINGS (THEXTON).
 45-34.22 N 111-41.35 W HOT SPRINGS CREEK AT NORRIS
 45-22.02 N 111-43.77 W NELSON - R. LEE WELL
 45-34.50 N 111-41.00 W NORRIS HOT SPRING (HAPGOOD, BEARTRAP)
 45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
 45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
 45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
 45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
 45-34.32 N 111-41.08 W NORRIS WARM WELL - 2 (HAPGOOD, BEARTRAP)
 45-35.40 N 111-53.90 W POTOSI DRAIN NORTH
 45-35.32 N 111-53.88 W POTOSI DRAIN SOUTH
 45-35.32 N 111-53.88 W POTOSI DRAIN SOUTH
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS (CLARK)
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS VENT 17
 45-35.35 N 111-53.92 W POTOSI HOT SPRINGS VENT 17
 45-35.33 N 111-53.87 W POTOSI HOT SPRINGS VENT 37
 45-35.37 N 111-53.93 W POTOSI WARM SPRINGS VENT 15
 45-35.37 N 111-53.93 W POTOSI WARM SPRINGS VENT 15
 45-22.12 N 111-43.62 W THEXTON HOT WELL
 45-02.27 N 111-57.13 W VIGILANTE HOT SPRINGS

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45-25.20 N 112-41.50 W APEX HOT SPRINGS (BIRCH CREEK)
 45-36.62 N 112-33.28 W AVON WARM SPRING
 45-23.38 N 112-27.07 W BEAVERHEAD ROCK
 45-06.27 N 112-45.07 W BROWNS HOT SPRING
 45-47.47 N 112-07.58 W JEFFERSON RIVER AT RENOVA HOT SPRINGS
 45-06.65 N 112-42.85 W LOVELLS HOT SPRING
 45-01.72 N 112-50.73 W MC MENOMEY RANCH
 45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)
 45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)
 45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)
 45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)
 45-27.72 N 112-28.47 W NEW BILTMORE HOT SPRINGS (ZIEGLER)
 45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)
 45-53.7 N 112-13.70 W PIPESTONE HOT SPRING
 45-53.7 N 112-13.70 W PIPESTONE HOT SPRING
 45-53.7 N 112-13.70 W PIPESTONE HOT SPRINGS
 45-53.78 N 112-14.57 W PIPESTONE HOT SPRINGS
 45-53.7 N 112-13.70 W PIPESTONE HOT SPRINGS
 45-53.78 N 112-14.57 W PIPESTONE HOT SPRINGS
 45-53.7 N 112-13.70 W PIPESTONE HOT SPRINGS
 45-10.30 N 112-09.12 W PULLER HOT SPRINGS
 45-10.28 N 112-09.12 W PULLER WARM SPRINGS
 45-10.28 N 112-09.12 W PULLER WARM SPRINGS
 45-47.50 N 112-07.58 W RENOVA HOT SPRINGS

GALLATIN 0046015 50.0
 MADISON 0027101
 MADISON 0046026 83.2
 MADISON 0027103 17.5
 MADISON 0027100 16.0
 MADISON 0027058
 MADISON 0002910 52.5
 MADISON 0027059 45.
 MADISON 0027057 41.
 MADISON 0027060 50.
 MADISON 0027104 21.
 MADISON 0027095 25.0
 MADISON 0027056 17.
 MADISON 0027055 23.
 MADISON 0027089 50.0
 MADISON 0027090 51.0
 MADISON 0027088
 MADISON 0027087 51.
 MADISON 0027086 38.
 MADISON 0046055 49.5
 MADISON 0027091
 MADISON 0027092 49.
 MADISON 0027085 52.
 MADISON 0027093 24.
 MADISON 0027094 39.0
 MADISON 0027102 72.2
 MADISON 0046069 23.5

BEAVERHEAD 0046005 25.0
 POWELL 0046006 25.5
 MADISON 0046010 27.
 BEAVERHEAD 0046019 23.7
 JEFFERSON 0027037 21.
 BEAVERHEAD 0046044 19.4
 BEAVERHEAD 0046047 19.6
 MADISON 0027021 54.
 MADISON 0027020
 MADISON 0027019
 MADISON 0046050 53.0
 MADISON 0027022 53.9
 MADISON 0027018 52.
 JEFFERSON 0027045 60.
 JEFFERSON 0027043 61.0
 JEFFERSON 0027042 61.0
 JEFFERSON 0002908 57.0
 JEFFERSON 0027044 60.0
 JEFFERSON 0027041 57.0
 JEFFERSON 0027040 38.8
 MADISON 0027030 44.4
 MADISON 0027029 41.
 MADISON 0027028 43.0
 JEFFERSON 0027039 48.9

45-47.50 N 112-07.58 W RENOVA HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS
 45-41.12 N 112-17.70 W SILVER STAR HOT SPRINGS (BARKELLS)
 45-14.18 N 112-08.07 W TRUDAU HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN (POLARIS) HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN (POLARIS) HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN (POLARIS) HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN (POLARIS) HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN (POLARIS) HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN (POLARIS) HOT SPRINGS
 45-27.47 N 113-06.52 W ELKHORN HOT SPRINGS
 45-44.97 N 113-56.37 W GALLOGLY (LOST TRAIL) HOT SPRINGS
 45-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 45-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 45-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 45-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 45-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 45-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 45-21.58 N 113-23.18 W JACKSON (JARDINE, BIG HOLE) RANGER STATION
 45-21.58 N 113-23.18 W JACKSON (JARDINE, BIG HOLE) RANGER STATION
 45-22.07 N 113-24.18 W JACKSON HOT SPRINGS (JARDINE, BIG HOLE)

ELK CITY 1:250,000

45-41.83 N 114-22.85 W BLUE JOINT CREEK- HOT SPRING 1
 45-41.78 N 114-21.80 W BLUE JOINT CREEK- HOT SPRING 2
 45-50.75 N 114-02.08 W MEDICINE HOT SPRINGS
 45-50.75 N 114-02.08 W MEDICINE HOT SPRINGS
 45-50.75 N 114-02.08 W MEDICINE HOT SPRINGS
 45-50.75 N 114-02.08 W MEDICINE HOT SPRINGS

ROUNDUP 1:250,000

46-47.55 N 108-52.52 W DURFEE CREEK SPRINGS (NO. 2)

WHITE SULPHUR SPRINGS 1:250,000

46-21.50 N 110-40.68 W LUCAS FLOWING WELL
 46-20.37 N 110-47.18 W RINGLING FLOWING WELL
 46-32.35 N 110-53.75 W WHITE SULPHUR (BREWERS) SPRINGS
 46-32.35 N 110-53.75 W WHITE SULPHUR (BREWERS) SPRINGS
 46-32.35 N 110-53.75 W WHITE SULPHUR (BREWERS) SPRINGS
 46-26.98 N 111-58.83 W ALHAMBRA HOT SPRINGS (NORTH)
 46-26.98 N 111-58.83 W ALHAMBRA HOT SPRINGS (NORTH)
 46-26.98 N 111-58.83 W ALHAMBRA HOT SPRINGS (NORTH)
 46-26.98 N 111-58.83 W ALHAMBRA HOT SPRINGS (NORTH)
 46-26.98 N 111-58.83 W ALHAMBRA HOT SPRINGS (NORTH)
 46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)
 46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)
 46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)

JEFFERSON 0027038 50.
 MADISON 0027031 72.2
 MADISON 0027035
 MADISON 0027034 67.0
 MADISON 0027036 71.0
 MADISON 0027033 69.
 MADISON 0027032 72.7
 MADISON 0046060 71.5
 MADISON 0046068 22.7
 BEAVERHEAD 0027025 49.
 BEAVERHEAD 0027023 46.
 BEAVERHEAD 0027026
 BEAVERHEAD 0027024
 BEAVERHEAD 0027027 47.8
 BEAVERHEAD 0046025 48.5
 RAYALLI 0046028 Q 48.9
 BEAVERHEAD 0027015 58.3
 BEAVERHEAD 0027017 58.3
 BEAVERHEAD 0027081 58.
 BEAVERHEAD 0027084 60.
 BEAVERHEAD 0027083 59.
 BEAVERHEAD 0027080 57.
 BEAVERHEAD 0027079 14.5
 BEAVERHEAD 0027078 14.5
 BEAVERHEAD 0046036 58.0

RAYALLI 0046012 28.8
 RAYALLI 0046013 29.4
 RAYALLI 0046048 45.0
 RAYALLI 0027001
 RAYALLI 0027002 47.2
 RAYALLI 0027000 49.

FERGUS 0046024 21.1

MEAGHER 0046045 42.2
 MEAGHER 0046058 48.0
 MEAGHER 0027138 45.5
 MEAGHER 0027137
 MEAGHER 0046073 46.0
 JEFFERSON 0027111 53.0
 JEFFERSON 0046000 56.5
 JEFFERSON 0027114 59.4
 JEFFERSON 0027113 59.0
 JEFFERSON 0027112 50.0
 JEFFERSON 0027106 54.4
 JEFFERSON 0027068 51.
 JEFFERSON 0027067

46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027071	55.
46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027070	54.0
46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027074	55.0
46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027073	54.4
46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027072	55.5
46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027105	54.4
46-26.78 N 111-58.97 W ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027069	54.0
46-27.01 N 111-58.83 W ALHAMBRA HOT WELL (COLLECTION DATE)	JEFFERSON	0027117	54.0
46-27.02 N 111-58.83 W ALHAMBRA HOT WELL (NORTH)	JEFFERSON	0027115	52.2
46-27.01 N 111-58.83 W ALHAMBRA HOT WELL (NORTH)	JEFFERSON	0027118	52.2
46-21.27 N 111-33.90 W BEDFORD HOT SPRINGS	BROADWATER	0046011	23.3
46-28.47 N 111-31.30 W GREYSON WARM SPRING	BROADWATER	0046034	17.9
46-26.87 N 111-59.23 W HILLBROOK FLOWING WELL	JEFFERSON	0027109	28.9
46-26.87 N 111-59.23 W HILLBROOK FLOWING WELL	JEFFERSON	0027108	30.0
46-26.87 N 111-59.23 W HILLBROOK FLOWING WELL	JEFFERSON	0027107	30.
46-04.60 N 111-34.80 W PLUNKET SPRING (NAVE'S, MOCKEL)	BROADWATER	0046054	16.5
46-07.65 N 111-23.44 W TOSTON HOT SPRINGS	BROADWATER	0046067	13.9
46-26.88 N 111-58.83 W WALLS HOT SPRING	JEFFERSON	0027110	55.6
46-10.33 N 111-35.15 W WARNER HOT SPRINGS	BROADWATER	0046071	18.0

BUTTE 1:250,000

46-06.32 N 112-54.14 W ANACONDA HOT SPRINGS	DEER LODGE	0046002	21.7
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0027050	76.0
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0027046	38.0
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0027048	75.0
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0027047	67.0
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0027051	74.4
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0027049	76.0
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0046014	76.0
46-11.88 N 112-05.62 W BOULDER HOT SPRINGS	JEFFERSON	0002906	62.0
46-11.88 N 112-05.62 W BOULDER SPRING - 1	JEFFERSON	0027052	59.0
46-11.88 N 112-05.62 W BOULDER SPRING - 2	JEFFERSON	0027053	64.0
46-11.88 N 112-05.62 W BOULDER TUNNEL	JEFFERSON	0027054	42.0
46-35.44 N 112-06.42 W BROADWATER HOT PIT 2	LEWIS AND CLARK	0027130	67.0
46-35.73 N 112-06.7 W BROADWATER HOT SPRING	LEWIS AND CLARK	0027127	65.0
46-35.73 N 112-06.7 W BROADWATER HOT SPRING	LEWIS AND CLARK	0027076	66.4
46-35.73 N 112-06.55 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027122	59.0
46-35.73 N 112-06.7 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027128	66.4
46-35.73 N 112-06.55 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027121	66.2
46-35.73 N 112-06.55 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027120	62.2
46-35.73 N 112-06.7 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027126	63.0
46-35.73 N 112-06.7 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027125	65.0
46-35.73 N 112-06.7 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027124	59.0
46-35.73 N 112-06.63 W BROADWATER HOT SPRINGS	LEWIS AND CLARK	0027123	60.0
46-35.73 N 112-06.7 W BROADWATER NORTHWEST COLD PIT	LEWIS AND CLARK	0027129	21.0
46-35.73 N 112-06.7 W BROADWATER WELL - 3	LEWIS AND CLARK	0027132	65.5
46-35.73 N 112-06.7 W BROADWATER WELL - 3	LEWIS AND CLARK	0027131	65.5
46-20.05 N 112-53.18 W DEER LODGE PRISON RANCH NO. 4	POWELL	0046023	26.0
46-36.53 N 112-46.48 W GARRISON WARM SPRINGS	POWELL	0046029	25.0
46-35.75 N 112-06.25 W GLOEGE WELL	LEWIS AND CLARK	0027133	19.4
46-35.75 N 112-06.25 W GLOEGE WELL	LEWIS AND CLARK	0027134	19.4
46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)	DEER LODGE	0002902	70.0
46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)	DEER LODGE	0027008	68.

46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)
 46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)
 46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)
 46-45.23 N 112-22.55 W MARYSVILLE DEEP WELL
 46-45.23 N 112-22.55 W MARYSVILLE TEST WELL
 46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)
 46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)
 46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)
 46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)
 46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)
 46-12.33 N 112-53.00 W WARM SPRINGS STATE HOSPITAL WELL
 46-43.03 N 113-19.32 W BEARMOUTH WARM SPRINGS #1
 46-43.08 N 113-18.33 W BEARMOUTH WARM SPRINGS #2
 46-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS
 46-42.33 N 113-27.43 W NIMROD SPRINGS

HAMILTON 1:250,000

46-43.82 N 114-32.05 W GRANITE HOT SPRINGS
 46-43.56 N 114-31.97 W LOLO HOT SPRINGS
 46-43.56 N 114-31.97 W LOLO HOT SPRINGS
 46-43.56 N 114-31.97 W LOLO HOT SPRINGS
 46-45.13 N 114-31.97 W LOLO HOT SPRINGS (GRANITE)
 46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS
 46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS
 46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS
 46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS-B

LEWISTOWN 1:250,000

47-52.58 N 108-39.37 W LANDUSKY #1
 47-50.57 N 108-35.88 W LANDUSKY PLUNGE
 47-59.58 N 108-26.75 W LODGEPOLE 1
 47-13.14 N 109-28.27 W BROOKS HOT SPRINGS

GREAT FALLS 1:250,000

47-27.01 N 111-58.83 W ALHAMBRA HOT WELL (NORTH)
 47-32.05 N 111-13.73 W GIANT SPRINGS

CHOTEAU 1:250,000

47-37.92 N 112-51.28 W SUN RIVER SPRINGS

WALLACE 1:250,000

47-36.93 N 114-39.98 W CAMAS HOT SPRINGS
 47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL
 47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL
 47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL
 47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL
 47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL
 47-27.08 N 114-38.87 W GREEN SPRINGS
 47-19.77 N 114-47.32 W QUINN'S HOT SPRINGS (PARADISE)

DEER LODGE 0027011 70.
 DEER LODGE 0027010 73.
 DEER LODGE 0027009 71.
 LEWIS AND CLARK 0027136 39.0
 LEWIS AND CLARK 0046046 96.5
 DEER LODGE 0027013 78.
 DEER LODGE 0046070 77.0
 DEER LODGE 0027012 71.
 DEER LODGE 0027014 78.
 DEER LODGE 0027075 78.
 DEER LODGE 0046088 67.
 GRANITE 0046008 20.2
 GRANITE 0046009 15.0
 BEAVERHEAD 0027082 58.
 GRANITE 0046051 19.0

MISSOULA 0046031 50.6
 MISSOULA 0046900 46.4
 MISSOULA 0027006 46.
 MISSOULA 0027007
 MISSOULA 0046043 44.0
 RAVALLI 0027005 50.
 RAVALLI 0027003
 RAVALLI 0027004 435.
 RAVALLI 0002923 43.0

PHILLIPS 0046038 21.1
 PHILLIPS 0046039 24.4
 BLAINE 0046042 26.0
 FERGUS 0046018 19.5

JEFFERSON 0027116 52.0
 CASCADE 0046030 12.

LEWIS AND CLARK 0046065 30.4

SANDERS 0046020 45.0
 LAKE 0046084 44.9
 LAKE 0046083 47.2
 LAKE 0046081 49.3
 LAKE 0046082 47.2
 LAKE 0046080 49.2
 SANDERS 0046032 18.9
 SANDERS 0046056 42.8

160

47-19.80 N 114-47.23 W QUINN'S HOT SPRINGS WELL
47-36.98 N 114-40.58 W SYMES HOT SPRINGS (DEVELOPED WELL)

SANDERS
SANDERS

0046086 46.4
0046066 46.1

APPENDIX D

Sources for the records in the GEOTHERM sample file for Montana. Each reference is preceded by its abbreviated form (called CODE) used in the sample file (Table 1). Entries in this computer-generated appendix are sorted by CODE.

CODE = LEONARD AND OTHERS, 1978

LEONARD, R. B., BROSTEN, T. M., AND MIDTLING, N. A., 1978, SELECTED DATA FROM THERMAL-SPRING AREAS, SOUTHWESTERN MONTANA: U. S. GEOLOGICAL SURVEY OPEN-FILE REPORT 78-438, 77 P.

CODE = MARINER AND OTHERS, 1976B

MARINER, R. H., PRESSER, T. S., AND EVANS, W. C., 1976B, CHEMICAL CHARACTERISTICS OF THE MAJOR THERMAL SPRINGS OF MONTANA: U. S. GEOLOGICAL SURVEY OPEN-FILE REPORT 76-480, 31 P.

CODE = MUDGE AND OTHERS, 1977

MUDGE, M. R., EARHART, R. L., AND RICE, D. D., 1977, PRELIMINARY BEDROCK GEOLOGIC MAP OF PART OF THE NORTHERN DISTURBED BELT, LEWIS AND CLARK, TETON, PONDERA, GLACIER, FLATHEAD, AND POWELL COUNTIES, MONTANA: U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 77-25, 30 P.

CODE = SONDEREGGER AND OTHERS, 1977

SONDEREGGER, J. L., BERGANTINO, R. N., AND MILLER, M. R., 1977, PHASE ZERO STUDY RESULTS - GEOTHERMAL POTENTIAL OF THE MADISON GROUP AT SHALLOW DEPTH IN EASTERN MONTANA--FINAL REPORT: U.S. ATOMIC ENERGY COMMISSION PUBLICATION RLO-2426-T2-2.

CODE = WARING, 1965

WARING, G. A., 1965, THERMAL SPRINGS OF THE UNITED STATES AND OTHER COUNTRIES OF THE WORLD - A SUMMARY: U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 492, 383 P.

CODE = WHITE AND WILLIAMS, 1975

WHITE, D. E., AND WILLIAMS, D. L., ED., 1975, ASSESSMENT OF GEOTHERMAL RESOURCES OF THE UNITED STATES - 1975: U. S. GEOLOGICAL SURVEY CIRCULAR 726, 155 P.