UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

MONTANA

Basic data for thermal springs and wells as recorded in GEOTHERM

By

James D. Bliss

Open-File Report 83-432

Menlo Park, California

July 1983

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 (^{o}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 identifed 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 Amospheric 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046004

NAME OF SAMPLE SOURCE... ANDERSON'S PASTURE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	13S 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 1:62500			

OTHER LOCALITY INFORMATION: ELEVATION 6840 FEET

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR.....	1977/10/03 SONDEREGGER, J.L.
SAMPLE NUMBER.....	78MU438
TEMPERATURE (C).....	R 25.7
AMBIENT TEMP (C).....	3.9
DISCHARGE.....	Q 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.....	609.
TOTAL DISSOLVED SOLIDS...	394.
CHARGE IMBALANCE (% DIFF)...	0.4

ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.05			
AL....	0.051	CR.....		MG...	24.	SB...	L	0.2
AS....	0.0136							
AU....		CU.....		MO...		SE...	L	0.002
B.....	0.2	F.....	1.7	NA...	28.	SIO2.		21.
BE....		FE(TOT).	L 0.01	NB...		SO4..		114.
BI....		GA.....		NH4..	L 0.04	SR...		0.54
BR....	0.1							
CA....	67.	HCO3....	246.	NO3..	0.16			
CA+MG.		HG.....	L 0.0003	PB...		U....		0.0024
CD....		H2S.....	L 0.1					
CL....	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046005

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	05S 009W 10	SE OF NE NE	LAT/LONG... 45-25.20 N 112-41.50 W
STATE.....	MONTANA			UTM ZONE... +12
COUNTY.....	BEAVERHEAD			NORTHING... 5030783.
GEOLOGIC PROVINCE..				367645.
MAP REFERENCE.....	GLEN 1:24000			

OTHER LOCALITY INFORMATION: ELEVATION 5240 FEET

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1978/05/25 SONDEREGGER, J.L.
SAMPLE NUMBER..... 7840909
TEMPERATURE (C)..... 25.0
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 (O/OOO)
AG....		CO3.....	N					
AL....	0.12	CR.....		MG...	16.			
B.....		F.....	0.6	NA...	23.	SIO2.	20.	
BE....		FE(TOT).	L 0.01	NB...		SO4..	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046019
NAME OF SAMPLE SOURCE... BROWNS HOT SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 08S 009W 30 NW OF SW SE — LAT/LONG... 45-06.27 N 112-45.07 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... BEAVERHEAD — NORTHING... 4995834.
GEOLOGIC PROVINCE.. — 362228.
MAP REFERENCE..... DALYS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1978/06/21 SONDEREGGER, J.L.
TEMPERATURE (C)..... 23.7
AMBIENT TEMP (C)..... 5.5
DISCHARGE..... Q 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027025
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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 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 — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.05		
AL....		CR.....		MG...	N		
B.....	L 0.1	F.....	1.6	NA...	49.	SIO2.	54.
BE....		FE(TOT).		NB...		SO4..	32.
CA....	2.9	HCO3....	99.				
CO....		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 SAMPLE FILE — GEOTHERM FILE ID: 0027023
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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1964/08/06 MONTANA STATE BOARD OF HEALTH
TEMPERATURE (C)..... 46.
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 — ISOTOPES (0/00)

AG....		CO3.....	21.				
AL....		CR.....		MG...	1.		
B.....		F.....	2.9				
BA....		FE+3....		NA+K.	42.		
BE....		FE(TOT).	0.2	NB...		SO4..	25.
CA....	4.	HCO3....	49.	NO3..	N		
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 SAMPLE FILE — GEOTHERM FILE ID: 0027027
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 1:62500

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 — ISOTOPES (0/00)

B..... L 0.1	F.....	2.8	NA...	SIO2.	52.
BE....	FE(TOT).		NB...	SO4..	30.
CL.... 2.3					

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

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

RECORD 00007

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027026
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 1:62500

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
PH..... 8.4
SPECIFIC CONDUCTANCE..... 219.
ALKALINITY..... 74. AS CACO3
TOTAL DISSOLVED SOLIDS... 221.
CHARGE IMBALANCE (% DIFF)... 1.4
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....	CO3.....	3.0	LI...	0.05	
AL....	CR.....		MG...	1.5	
AS....	CS.....		MN...	N	

B.....		F.....	2.6	NA...	46.	SIO2.	57.
BE....		FE(TOT). N		NB...		SO4..	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 = .16SAR = 6.8

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

RECORD 00008

GEOTHERM SAMPLE FILE — GEOTHERM 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 1:62500

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 — ISOTOPES (O/OOO)

AG....		CO3....	2.0	LI...	0.06		
AL....		CR.....		MG... N			
B.....	0.22	F.....		NA...	43.	SIO2.	47.
BE....		FE(TOT).		NB...		SO4..	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

GEOTHERM SAMPLE FILE — GEOTHERM 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 — UTM ZONE... +12
- COUNTY..... BEAVERHEAD — NORTHING... 5035757.
- GEOLOGIC PROVINCE.. 21 — 335129.
- MAP REFERENCE..... POLARIS 1:62500

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 1974/08/20 MARINER GROUP

TEMPERATURE (C)..... 48.5
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
PH..... 8.9
SPECIFIC CONDUCTANCE..... 209.
ALKALINITY..... 85. AS HCO3
TOTAL DISSOLVED SOLIDS... 177.
CHARGE IMBALANCE (% DIFF)... 3.0

ANALYSIS IN MG/L

AG....		CO3.....	4.	LI...	0.05	S....		ISOTOPES (0/00)	
AL....	0.017	CR.....		MG...	L 0.1	SB...		DEL D OF WATER.....	-155.1
AS....		CS.....		MN...	L 0.02			DEL O(18) OF WATER...	-20.25
B.....	0.04	F.....	2.6	NA...	48.	SIO2.	55.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	27.		
CA....	1.9	HCO3....	77.						
CA+MG.		HG.....		PB...	L 0.1				
CD....		H2S.....	0.9						
CL....	1.7								
CO....		K.....	0.7	RB...	L 0.02	ZN...	L 0.01		

GAS ANALYSIS
DATE/ANALYST..... 1974/08/20 (COLLECTION DATE)
ANALYSIS IN VOLUME %

				ISOTOPES (00/00)
CH4..	L 0.1			
C2H6.		N2...	98.	
CO2..	0.2			

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... NEH-455
REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00010

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027017
NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
WELL/SPRING NUMBER..... 05S-15W-25-CBA

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	05S 015W 25	NE OF NW SW	LAT/LONG... 45-22.07 N 113-24.18 W
STATE.....	MONTANA			
COUNTY.....	BEAVERHEAD			
MAP REFERENCE.....	JACKSON 1:24000			

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1977/07/12 U.S. GEOLOGICAL SURVEY
SAMPLE NUMBER..... 2
TEMPERATURE (C)..... 58.3
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
PH..... 6.8
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 SAMPLE FILE GEOTHERM FILE ID: 0027015
NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
WELL/SPRING NUMBER..... 05S-015W-25-CBA
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 05S 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 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1977/07/12 U.S.G.S.
SAMPLE NUMBER..... 1
TEMPERATURE (C)..... 58.3
DISCHARGE..... 1003. L/MIN
PERTINENT 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 (O/OO)

AG....		CO3.....		LI...	0.36			
AL....		CR.....		MG...	3.4			
B.....		F.....	1.9	NA...	240.	SIO2.	47.	
BE....		FE(TOT).		NB...		SO4..	46.	
BI....		GA.....		NH4..		SR...	0.56	
CA....	11.	HCO3....	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 SAMPLE FILE GEOTHERM FILE ID: 0027081
NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
WELL/SPRING NUMBER..... 05S-015W-25-CBA
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW LAT/LONG... 45-22.07 N 113-24.18 W
STATE..... MONTANA
COUNTY..... BEAVERHEAD
MAP REFERENCE..... JACKSON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1967/09/21 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 (O/OO)
AG....		CO3.....	21.	LI...	0.35			
AL....		CR.....		MG...	3.5			
B.....	0.96	F.....		NA...	240.	SIO2.	44.	
BE....		FE(TOT).		NB...		SO4..	46.	
CA....	6.7	HCO3....	570.					
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 GEOTHERM FILE ID: 0027084
NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
WELL/SPRING NUMBER..... 05S-015W-25-CBA
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW LAT/LONG... 45-22.07 N 113-24.18 W
STATE..... MONTANA
COUNTY..... BEAVERHEAD
MAP REFERENCE..... JACKSON 1:24000
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 (O/OO)	
AG....		CO3.....		LI...	0.37	S....		DEL D OF WATER.....	-153.6
AL....		CR.....		MG...	3.5	SB...		DEL O(18) OF WATER...	-19.45
B.....	0.77	F.....	1.9	NA...	230.	SIO2.	47.		
BE....		FE(TOT).	0.13	NB...		SO4..	51.		
BI....		GA.....		NH4..		SR...	0.56		
CA....	12.	HCO3....	617.						
CL....	8.8								
CO....		K.....	12.						

OTHER ANALYTICAL DATA... DISSOLVED NITRATE PLUS NITRITE = 0.01; P = 0.01; GROSS ALPHA = 16 PICOCURIES/L, GROSS BETA = 28 PICOCURIES/L. SAR = 19. 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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027083
  NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
  WELL/SPRING NUMBER..... 05S-015W-25-CBA
LOCATION TOWNSHIP-RANGE COORDINATES
  COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW LAT/LONG... 45-22.07 N 113-24.18 W
  STATE..... MONTANA
  COUNTY..... BEAVERHEAD
  MAP REFERENCE..... JACKSON 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR..... 1974/08/21 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 ISOTOPES (O/OO)

AG....		CO3.....		LI...	0.35			
AL....		CR.....		MG...	3.2			
B.....	0.65	F.....	1.3	NA...	250.	SIO2.	49.	
BE....		FE(TOT).		NB...		SO4..	50.	
CA....	11.	HCO3....	630.					
CL....	11.							
CO....		K.....	11.					

GAS ANALYSIS
  DATE/ANALYST..... 1974/08/16 (COLLECTION DATE)
  ANALYSIS IN VOLUME % ISOTOPES (OO/O)

CH4..	L 0.1		
C2H6.		N2...	82.
CO2..	16.	O2...	Q 2.9

OTHER ANALYTICAL DATA... SAR = 17.
QUALIFICATION FIELD..... O2 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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027082
  NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
  WELL/SPRING NUMBER..... 05S-15W-25-BC
LOCATION TOWNSHIP-RANGE COORDINATES
  COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW LAT/LONG... 46-22.07 N 113-24.18 W
  STATE..... MONTANA
  COUNTY..... BEAVERHEAD
  MAP REFERENCE..... JACKSON 1:24000

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 CACO3
TOTAL DISSOLVED SOLIDS... 906.
CHARGE IMBALANCE (% DIFF)... 18.6
ANALYSIS IN MG/L

								ISOTOPES (O/OO)
AG....		CO3.....	54.	LI...	0.37			
AL....		CR.....		MG...	3.2			
AS....		CS.....		MN...	0.04			
B.....		F.....	2.8	NA...	230.	SIO2.	57.	
BE....		FE(TOT).	0.35	NB...		SO4..	49.	
CA....	3.4	HCO3....	490.	NO3..	0.1			
CL....	6.7							
CO....		K.....	10.					

OTHER ANALYTICAL DATA... OH = 0.01 CO2 = 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 00016

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027080
NAME OF SAMPLE SOURCE... JACKSON (JARDINE) HOT SPRINGS
WELL/SPRING NUMBER..... 05S-015W-25-CBA
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES 05S 015W 25 NE OF NW SW LAT/LONG... 45-22.07 N 113-24.18 W
STATE..... MONTANA
COUNTY..... BEAVERHEAD
MAP REFERENCE..... JACKSON 1:24000
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 CACO3
ANALYSIS IN MG/L

								ISOTOPES (O/OO)
AG....		CO3.....	N					
AL....		CR.....		MG...	2.0			
B.....		F.....	1.9					
BA....		FE+3....		NA+K.	240.			
BE....		FE(TOT).	0.140	NB...		SO4..	43.	
CA....	14.	HCO3....	610.	NO3..	N			
CL....	10.							

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 SAMPLE FILE — GEOTHERM FILE ID: 0027079

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05S 015W 25 — LAT/LONG... 45-21.58 N 113-23.18 W
STATE..... MONTANA
COUNTY..... BEAVERHEAD
MAP REFERENCE..... JACKSON 1:24000
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 — ISOTOPES (0/00)

B..... F..... NA... SIO2. 25.

REFERENCE AND IDENTIFICATION

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

RECORD 00018

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027078

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05S 015W 25 — LAT/LONG... 45-21.58 N 113-23.18 W
STATE..... MONTANA
COUNTY..... BEAVERHEAD
MAP REFERENCE..... JACKSON 1:24000
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 — ISOTOPES (0/00)

AG....		CO3.....	N	LI...	0.04		
AL....		CR.....		MG...	0.1		
AS....		CS.....		MN...	N		
B.....	0.03	F.....	0.4	NA...	36.	SIO2.	23.
BE....		FE(TOT).	0.04	NB...		SO4..	13.
BI....		GA.....		NH4..		SR...	0.01
CA....	6.3	HCO3....	73.				
CL....	2.1						
CO....		K.....	0.7				

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 SAMPLE FILE — GEOTHERM FILE ID: 0046036
  NAME OF SAMPLE SOURCE... JACKSON HOT SPRINGS (JARDINE, BIG HOLE)
  WARING NUMBER..... 25
LOCATION — TOWNSHIP-RANGE — COORDINATES
  COUNTRY..... UNITED STATES — 05S 015W 25 NE OF NW SW — LAT/LONG... 45-22.07 N 113-24.18 W
  STATE..... MONTANA — UTM ZONE... +12
  COUNTY..... BEAVERHEAD — NORTHING... 5026405.
  GEOLOGIC PROVINCE.. — 311818.
  MAP REFERENCE..... JACKSON 1:24000
  OTHER LOCALITY INFORMATION: ELEVATION 6470 FEET.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR..... 1974/08/16
  TEMPERATURE (C)..... 58.0
  AMBIENT TEMP (C)..... 4.1
  DISCHARGE..... G 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	CR.....		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.	SIO2.	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				
CD....	L 0.001	H2S.....	0.6						
CL....	7.7								
CO....	L 0.05	K.....	10.	RB...	0.03	ZN...	0.12		

ISOTOPES (O/OO)
  DEL D OF WATER..... -153.5
  DEL O(18) OF WATER... -20.44

GAS ANALYSIS
  DATE/ANALYST..... 1974/08/20 (COLLECTION DATE)
  ANALYSIS IN VOLUME %

CH4..	L 0.1		
C2H6.		N2...	82.
CO2..	16.	O2...	Q 2.9

ISOTOPES (O0/O1)

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..... SONDEREGGER, JOHN L.
  COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY

COMPILER CROSS INDEX... NEH-454
REFERENCE..... LEONARD AND OTHERS, 1978; WHITE AND WILLIAMS, 1975)-

RECORD 00020

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046044
NAME OF SAMPLE SOURCE... LOVELLS HOT SPRING
MAPING 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..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00021

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046047
NAME OF SAMPLE SOURCE... MC MENOMEY RANCH
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 1:24000
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..... 16988. 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
CHARGE IMBALANCE (% DIFF)... 0.1
ANALYSIS IN MG/L — ISOTOPES (O/OO)
AG.... — CO3..... N — LI... 0.04
AL.... — CR..... — MG... 27.5

AS....	0.0145						
B.....		F.....	0.7	NA...	28.3	SIO2.	17.5
BE....		FE(TOT). L	0.01	NB...		SO4..	191.
CA....	88.	HCO3....	217.	NO3..	0.668		
CA+MG.		HG.....		PB...	L 0.05		
CL....	16.15						
CO....		K.....	4.5			ZN...	0.01

OTHER ANALYTICAL DATA... MBMG FIELD CHECK (1978/06/21): FLOW 27633 L/MIN, SP.CONDUCTANCE: 600 UMHOS/CM. FOR SAMPLE 1 AND 730 UMHOS/CM. FOR SAMPLE 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 00022

GEOTHERM SAMPLE FILE — GEOTHERM 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..
- MAP REFERENCE..... DEER CANYON 1:24000

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

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 1978/06/20
- TEMPERATURE (C)..... 11.0
- AMBIENT TEMP (C)..... 4.3
- DISCHARGE..... Q 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..... SONDEREGGER, JOHN L.
- COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
- REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00023

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046064

NAME OF SAMPLE SOURCE... STAUDENMEYER RANCH

LOCATION — TOWNSHIP-RANGE — COORDINATES
- COUNTRY..... UNITED STATES — 13S 002W 17 — NE OF NW SW
- STATE..... MONTANA
- COUNTY..... BEAVERHEAD
- GEOLOGIC PROVINCE..
- MAP REFERENCE..... LOWER RED ROCK LAKE 1:62500

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

OTHER LOCALITY INFORMATION: ELEVATION 6750 FEET.

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 1977/10/03
- SAMPLE NUMBER..... LAB NO. 78M0440
- TEMPERATURE (C)..... 28.0
- 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 (O/OO)

AG....		CO3.....	N	LI...	0.05			
AL....	0.044	CR.....		MG...	25.			
AS....	0.016							
B.....	0.2	F.....	1.8	NA...	26.	SIO2.	20.	
BE....		FE(TOT).	0.01	NB...		SO4..	114.	
BI....		GA.....		NH4..		SR...	0.51	
BR....	0.1							
CA....	68.	HCO3....	244.	NO3..	0.33			
CA+MG.		HG.....		PB...		O....	0.0022	
CD....		H2S.....	L 0.1					
CL....	9.3							
CO....		K.....	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 — LAT/LONG... 47-59.58 N 108-26.75 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... BLAINE — NORTHING... 5318499.
GEOLOGIC PROVINCE.. — 690616.
MAP REFERENCE..... BEAR MOUNTAIN 1:24000
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 FORM SPRING 1. FIELD DATA FROM DICK FELTIS, USGS

WATER ANALYSIS

PH..... 8.0
SPECIFIC CONDUCTANCE..... 1430.
ALKALINITY..... 125. AS CACO3
TOTAL DISSOLVED SOLIDS... 1175.
CHARGE IMBALANCE (% DIFF)... 2.0

ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N				
AL....		CR.....		MG...	69.		
AS....		CS.....		MN...	L 0.01		
B.....		F.....	0.9	NA...	52.5	SIO2.	15.
BA....		FE+3....	L 0.01				

BE....		FE(TOT).		NB...		S04..	650.
CA....	187.	HC03....	153.	N03..	1.7		
CL....	38.						
CO....		K.....	8.5				

OTHER ANALYTICAL DATA... HARDNESS AS CACO3 = 747.1 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... BEDFORD HOT SPRINGS
- WARING NUMBER..... 21

LOCATION — TOWNSHIP-RANGE — COORDINATES
- COUNTRY..... UNITED STATES — 07N 001E 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 1:62500
- OTHER LOCALITY INFORMATION: ELEVATION 3880 FEET.

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 1964/12/09 GROFF, S.L.
- SAMPLE NUMBER..... MSBH 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 (0/00)

AG....		C03....	N				
AL....		CR.....		MG...	22.		
B.....		F.....	0.7				
BA....		FE+3....		NA+K.	8.		
BE....		FE(TOT).	N	NB...		S04..	103.
CA....	57.	HC03....	155.	N03..	0.9		
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... GREYSON WARM SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
- COUNTRY..... UNITED STATES — 06N 002E 21 NW OF NW NE — LAT/LONG... 46-28.47 N 111-31.30 W
- STATE..... MONTANA
- COUNTY..... BROADWATER
- MAP REFERENCE..... DUCK CREEK PASS 1:62500
- 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 ID: 0046054
  NAME OF SAMPLE SOURCE... PLUNKET SPRING (NAVE'S, MOCKEL)
  WARING NUMBER..... 23
LOCATION TOWNSHIP-RANGE COORDINATES
  COUNTRY..... UNITED STATES 04N 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.
  MAP REFERENCE..... RADERSBURG 1:62500
  OTHER LOCALITY INFORMATION: ELEVATION 4180 FEET. AT PLUNKET LAKE.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR..... 1979/07/17 WYATT, GLEN M.
  SAMPLE NUMBER..... 79M3561
  POINT OF COLLECTION.. S.E. CORNER OF PLUNKET LAKE
  TEMPERATURE (C)..... Q 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 ABERCROMBIE, 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 ISOTOPES (0/00)

AG....		CO3.....	16.				
AL....		CR.....		MG...	24.		
AS....	0.0017	CS.....		MN...	L 0.002		
B.....	0.11	F.....	0.7	NA...	22.	SIO2.	16.
BE....		FE(TOT).	L 0.002	NB...		SO4..	87.
BI....		GA.....		NH4..		SR...	0.45
CA....	39.	HCO3....	87.	NO3..	3.1		
CL....	9.9						
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 SAMPLE FILE — GEOTHERM FILE ID: 0046067

NAME OF SAMPLE SOURCE... TOSTON HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 04N 003E 06 — SE OF NE NE — LAT/LONG... 46-07.65 N 111-23.44 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... BROADWATER — NORTHING... 5108014.
GEOLOGIC PROVINCE.. — 469831.
MAP REFERENCE..... TOSTON 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/11/24
SAMPLE NUMBER..... MSBH LAB NO. CW-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 — ISOTOPES (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	14.		
B.....		F.....	0.8				
BA....		FE+3....		NA+K.	20.		
BE....		FE(TOT).	N	NB...		SO4..	60.
CA....	57.	HCO3....	204.	NO3..	0.7		
CL....	8.						

OTHER ANALYTICAL DATA... 1978/06/02: FLOW GI 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 SAMPLE FILE — GEOTHERM FILE ID: 0046071

NAME OF SAMPLE SOURCE... WARNER HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05N 001E 22 — NW OF NW SE — LAT/LONG... 46-10.33 N 111-35.15 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... BROADWATER — NORTHING... 5113125.
GEOLOGIC PROVINCE.. — 454777.
MAP REFERENCE..... RADERSBURG 1:62500
OTHER LOCALITY INFORMATION: ELEVATION 4100 FEET.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/02
SAMPLE NUMBER..... LAB NO. 78M0910
TEMPERATURE (C)..... 18.0
AMBIENT TEMP (C)..... 6.3
DISCHARGE..... 492. L/MIN
PERTINENT LITHOLOGY..... SPRING ISSUES FROM ALLUVIUM,TERTIARY SEDIMENTS; PRECAMBRIAN.
OTHER SAMPLE INFORMATION.. CHEMICAL DATA NOT VERIFIED.

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

AG....		CO3.....	N				
AL....		CR.....		MG...	6.8		
B.....		F.....	0.2	NA...	5.4	SIO2.	16.
BE.....		FE(TOT).		NB...		SO4..	17.
CA....	26.	HCO3....	101.	NO3..	1.0		
CL....	1.9						
CO....		K.....	0.9				

ISOTOPES (O/OO)

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 — TOWNSHIP-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..... MSBH 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

AG....		CO3.....	N				
AL....		CR.....		MG...	32.		
B.....		F.....	0.9				
BA....		FE+3....		NA+K.	N		
BE.....		FE(TOT).	N	NB...		SO4..	157.
CA....	104.	HCO3....	235.	NO3..	1.6		
CL....	8.						

ISOTOPES (O/OO)

OTHER ANALYTICAL DATA... 1941 ANALYSIS: SIO2 = 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
WARING NUMBER..... 16

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 04N 011W 13 — NE OF NE NE — LAT/LONG... 46-06.32 N 112-54.14 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... DEER LODGE — NORTHING... 5107349.
GEOLOGIC PROVINCE.. — 352924.
MAP REFERENCE..... ANACONDA 1:62500
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 — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.25			
AL....		CR.....		MG...	67.			
AS....		CS.....		MN...	0.48			
B.....		F.....	2.5	NA...	147.	SIO2.	23.	
BE....		FE(TOT).	1.2	NB...		SO4..	1362.	
CA....	470.	HCO3....	439.	NO3..	L 0.01			
CD....		H2S.....		PO4..	0.79			
CL....	7.0							
CO....		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.

RECORD 00032

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0002902

NAME OF SAMPLE SOURCE... GREGSON HOT SPRINGS (FAIRMONT)
WARING NUMBER..... 17

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03N 010W 02 — SW OF NE NW — LAT/LONG... 46-02.62 N 112-48.63 W
STATE..... MONTANA
COUNTY..... DEER LODGE
MAP REFERENCE..... ANACONDA 1:62500

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..... 166. AS HCO3
TOTAL DISSOLVED SOLIDS... 640.
CHARGE IMBALANCE (% DIFF)... 4.3
ANALYSIS IN MG/L

										ISOTOPES (0/00)	
AG....		CO3.....		LI...	0.64	S....		DEL D OF WATER.....	-149.1
AL....	0.016	CR.....		MG...	L 0.1	SB...		DEL O(18) OF WATER...	-18.6
AS....		CS.....	L 0.1	MN...	L 0.02				
AU....		CU.....	L 0.01						
B.....	0.3	F.....	18.	NA...	165.	SIO2.	85.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	180.		
BR....		GE.....		NI...	L 0.02				
CA....	3.9	HCO3....	166.						
CA+MG.		HG.....	L 0.0001	PB...	L 0.1				
CD....	L 0.01	H2S.....	1.6						
CL....	17.								
CO....	L 0.05	K.....	3.9	RB...	0.04	ZN...	L 0.01		

GAS ANALYSIS
DATE/ANALYST..... 1974/08/19 (COLLECTION DATE)
ANALYSIS IN VOLUME %

				ISOTOPES (00/0)
CH4..	0.6			
C2H6.		N2...	96.	
CO2..	0.6			

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... NEH-456
REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00033

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027011
NAME OF SAMPLE SOURCE... GREGSON HOT SPRINGS (FAIRMONT)
WELL/SPRING NUMBER..... 03N-010W-02-BDC

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 1:62500				

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

						ISOTOPES (0/00)	
B.....	F.....		NA...	SIO2.	78.		
BE....	FE(TOT).		NB...	SO4..	180.		
CA....	HCO3....	156.					
CL....	17.						

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

GEOTHERM SAMPLE FILE GEOTHERM 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 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 1:62500
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 (O/OO)

AG....		CO3.....	6.				
AL....		CR.....		MG...	2.0		
B.....		F.....	18.				
BA....		FE+3....		NA+K.	182.		
BE....		FE(TOT). N		NB...		SO4..	180.
CA....	4.9	HCO3....	170.	NO3..	N		
CL....	29.						

OTHER ANALYTICAL DATA... N NOT DETECTED IN WATER ANALYSIS. GROSS ALPHA = 2 PICOCURIES/L; GROSS BETA = 2 PICOCURIES/L.
QUALIFICATION FIELD..... O2 = O2 + 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

GEOTHERM SAMPLE FILE GEOTHERM 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 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 1:62500
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 CACO3
  TOTAL DISSOLVED SOLIDS... 589.
  CHARGE IMBALANCE (% DIFF)... 0.1
  ANALYSIS IN MG/L

AG....		CO3.....	3.0	LI...	0.7	S....		ISOTOPES (O/OO)	
AL....		CR.....		MG...	N	SB...		DEL D OF WATER.....	-149.1
B.....	0.3	F.....	11.	NA...	180.	SIO2.	83.	DEL O(18) OF WATER...	-18.6
BE....		FE(TOT).		NB...		SO4..	200.		
CA....	4.0	HCO3....	190.						
CL....	9.3								
CO....		K.....	4.1						

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-BDC
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 1:62500
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 CACO3
  TOTAL DISSOLVED SOLIDS... 542.
  CHARGE IMBALANCE (% DIFF)... 18.9
  ANALYSIS IN MG/L

AG....		CO3.....	3.	LI...	0.78			ISOTOPES (O/OO)
AL....		CR.....		MG...	N			
B.....	0.36	F.....		NA...	180.	SIO2.	77.	
BE....		FE(TOT).		NB...		SO4..	180.	
CA....	4.0	HCO3....	160.					
CL....	13.							
CO....		K.....	4.7					

OTHER ANALYTICAL DATA... CO2 = 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
WARING NUMBER..... 15

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05N 010W 24 NE — LAT/LONG... 46-10.67 N 112-47.67 W
STATE..... MONTANA
COUNTY..... DEER LODGE
MAP REFERENCE..... ANACONDA 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/21 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 — ISOTOPES (O/OO)

AG....		CO3....	N	LI...	0.38			
AL....		CR.....		MG...	29.			
B.....	0.13	F.....		NA...	120.	SIO2.	50.	
BE....		FE(TOT).		NB...		SO4..	680.	
CA....	180.	HCO3....	150.					
CL....	6.0							
CO....		K.....	24.					

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

REFERENCE AND IDENTIFICATION

COMPILED BY..... FALLS, MARILYN I.
COMPILER 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)
WARING NUMBER..... 15

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05N 010W 24 NE — LAT/LONG... 46-10.67 N 112-47.67 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... DEER LODGE — NORTHING... 5115153.
GEOLOGIC PROVINCE.. — 361490.
MAP REFERENCE..... ANACONDA 1:62500

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..... 258. AS HCO3
TOTAL DISSOLVED SOLIDS... 1310.
CHARGE IMBALANCE (% DIFF)... 1.1
ANALYSIS IN MG/L

								ISOTOPES (0/00)	
AG....		CO3.....	L 1.	LI...	0.36	S....		DEL D OF WATER.....	-152.3
AL....	L 0.001	CR.....		MG...	22.	SB...		DEL O(18) OF WATER...	-19.97
AS....		CS.....		MN...	0.05				
B.....	0.1	F.....	3.9	NA...	120.	SIO2.	56.		
BE....		FE(TOT).	0.05	NB...		SO4..	670.		
CA....	220.	HCO3....	258.						
CA+MG.		HG.....		PB...	L 0.1				
CD....		H2S.....	0.7						
CL....	5.0								
CO....		K.....	26.	RB...	0.16	ZN...	0.11		

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, 19768

RECORD 00039

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027012
NAME OF SAMPLE SOURCE... WARM SPRINGS (STATE HOSPITAL)
WELL/SPRING NUMBER..... 05N-10W-24-A
WARING NUMBER..... 15
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES 05N 010W 24 NE LAT/LONG... 46-10.67 N 112-47.67 W
STATE..... MONTANA
COUNTY..... DEER LODGE
MAP REFERENCE..... ANACONDA 1:62500
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

								ISOTOPES (0/00)
AG....		CO3.....	N					
AL....		CR.....		MG...	17.			
B.....		F.....	4.0					
BA....		FE+3....		NA+K.	150.			
BE....		FE(TOT).	1.3	NB...		SO4..	700.	
CA....	230.	HCO3....	260.	NO3..	N			
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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027014

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05N 010W 24 NE — LAT/LONG... 46-10.67 N 112-47.67 W
STATE..... MONTANA
COUNTY..... DEER LODGE
MAP REFERENCE..... ANACONDA 1:62500

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

								ISOTOPES (O/OO)	
AG....		CO3.....		LI...	0.420	S....		DEL D OF WATER.....	-152.3
AL....		CR.....		MG...	22.	SB...		DEL O(18) OF WATER...	-19.97
B.....	0.3	F.....	2.4	NA...	130.	SIO2.	56.		
BE....		FE(TOT).		NB...		SO4..	940.		
CA....	190.	HCO3....	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027075

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05N 010W 24 NE — LAT/LONG... 46-10.67 N 112-47.67 W
STATE..... MONTANA
COUNTY..... DEER LODGE
MAP REFERENCE..... ANACONDA 1:62500

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

PH..... 6.6
SPECIFIC CONDUCTANCE..... 1465.
ALKALINITY..... 208. AS CACO3

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....		LI...	420.				
B.....	309.	F.....		NA...		SIO2.	53.		

BE....	FE(TOT).	NB...	S04..	680.	
CA....	HC03....	254.			
CL.... 5.7					

OTHER ANALYTICAL DATA... CO2 = 91 MG/L; 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046088

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

LOCATION — TOWNSHIP-RANGE — COORDINATES
- COUNTRY..... UNITED STATES — 05N 010W 13 SW OF SW SE — LAT/LONG... 46-12.33 N 112-53.00 W
- STATE..... MONTANA
- COUNTY..... DEER LODGE
- MAP REFERENCE..... ANACONDA 1:62500
- OTHER LOCALITY INFORMATION: WELL LOCATED ADJACENT TO HEATING PLANT

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 1980/04/16 SONDEREGGER, 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.
- CHARGE IMBALANCE (% DIFF)... 3.5

ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		C03.....		LI...	0.43			
AL....		CR.....		MG...	25.			
AS....		CS.....		MN...	0.22			
B.....		F.....	3.7	NA...	114.	SI02.	38.	
BE....		FE(TOT).	11.	NB...		S04..	685.	
BI....		GA.....		NH4..		SR...	3.4	
CA....	216.	HC03....	290.	N03..	0.04			
CL....	7.1							
CO....		K.....	32.					

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

RECORD 00043

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046018

NAME OF SAMPLE SOURCE... BROOKS HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 17N 018E 19 SE OF NW SE — LAT/LONG... 43-13.02 N 109-28.27 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... FERGUS — NORTHING... 4785832.
GEOLOGIC PROVINCE.. — 624178.
MAP REFERENCE..... LEWISTOWN 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/09/23 R.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 OR 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..... Q 195. AS CACO3
TOTAL DISSOLVED SOLIDS... 622.
CHARGE IMBALANCE (% DIFF)... 8.1

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3..... N		MG...	40.3		
AL....		CR.....		MN...	L 0.01		
AS....		CS.....		NA...	3.4	SIO2.	8.9
B.....		F.....	1.3	NB...		SO4..	336.
BE....		FE(TOT).	L 0.01	NO3..	0.8		
CA....	133.	HCO3....	195.				
CL....	0.95						
CO....		K.....	1.4				

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

RECORD 00044

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046024

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 12N 023E 19 NW OF NW — LAT/LONG... 46-47.55 N 108-52.52 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... FERGUS — NORTHING... 5184079.
GEOLOGIC PROVINCE.. — 662156.
MAP REFERENCE..... ROUNDUP 1:250000
OTHER LOCALITY INFORMATION: SPRINGS ALONG NORTH FLANK OF DURFEE CREEK DOME. ON SE SIDE OF MADISON RIDGE, UP DURFEE CANYON, ELEV. 5100 FT.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/06/13 DONOVAN, J.J.
TEMPERATURE (C)..... 21.1
AMBIENT TEMP (C)..... 3.8
DISCHARGE..... 8706. L/MIN
PERTINENT LITHOLOGY..... SPRINGS IN MADISON LIMESTONE.

WATER ANALYSIS

PH..... 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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027064
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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 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)... 6.7
ANALYSIS IN MG/L ISOTOPES (0/00)

AG....		CO3.....		LI...	0.04			
AL....		CR.....		MG...	1.8			
B.....	0.15	F.....	7.5	NA...	135.	SIO2.	64.	
BE....		FE(TOT).		NB...		SO4..	120.	
CA....	8.5	HCO3....	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, 1976B

RECORD 00046

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027063
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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1964/11/14 MONTANA STATE BOARD OF HEALTH
DISCHARGE..... 227. L/MIN
PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL.
WATER ANALYSIS
ALKALINITY..... 110. AS CACO3
ANALYSIS IN MG/L ISOTOPES (0/00)

```
    AG....              CO3.....   21.
    AL....              CR.......              MG...  N
    B.....              F........  13.
    BA....              FE+3....               NA+K.    150.
    BE....              FE(TOT). N             NB...              SO4..    120.
    CA....   12.        HCO3....   91.         NO3..  N
    CL....   54.
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
--------------------------------------------------------------------------------------------------------------------------------
GEOTHERM SAMPLE FILE                                                                                GEOTHERM 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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  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                                                                  ISOTOPES (0/00)
    B.....              F........  10.         NA...              SIO2.    63.
    BE....              FE(TOT).               NB...              SO4..    130.
    BI....              GA.......              NH4..              SR...    0.160
    CL....   50.
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
--------------------------------------------------------------------------------------------------------------------------------
GEOTHERM SAMPLE FILE                                                                                GEOTHERM 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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  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 ISOTOPES (O/OO)

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	SE...	N	
B.....	0.22	F.....	12.	NA...	130.	SIO2.	57.	
BE....		FE(TOT).	N	NB...		SO4..	120.	
BI....		GA.....		NH4..		SR...	0.16	
BR....		GE.....		NI...	N			
CA....	7.0	HCO3....	83.					
CA+MG.		HG.....	N	PB...	0.002			
CD....	N	H2S.....		PO4..		V....	0.0003	
CL....	48.							
CO....		K.....	3.1			ZN...	N	

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

RECORD 00049

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027062
NAME OF SAMPLE SOURCE... BOZEMAN HOT SPRINGS (FERRIS)
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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1951/09/22 HACKETT AND OTHERS
TEMPERATURE (C)..... 60.0
DISCHARGE..... 454. L/MIN
PERTINENT LITHOLOGY..... THICK ALLUVIUM AND TERTIARY FILL
WATER ANALYSIS
PH..... 8.7
SPECIFIC CONDUCTANCE..... 679.
ALKALINITY..... 104. AS CACO3
TOTAL DISSOLVED SOLIDS... 451.
CHARGE IMBALANCE (% DIFF)... 2.5
ANALYSIS IN MG/L ISOTOPES (O/OO)

AG....		CO3.....	8.				
AL....		CR.....		MG...	0.4		
B.....	0.21	F.....	10.	NA...	140.	SIO2.	60.
BE....		FE(TOT).	0.02	NB...		SO4..	120.
CA....	3.5	HCO3....	110.	NO3..	0.2		
CL....	51.						
CO....		K.....	3.3				

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 ID: 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 1:62500
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 (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	0.6		
B.....		F.....	11.	NA...	120.	SIO2.	31.
BE....		FE(TOT).		NB...		SO4..	110.
CA....	4.4	HCO3....	66.				
CL....	50.						
CO....		K.....	1.2				

OTHER ANALYTICAL DATA... CO2 = .9; NO2 PLUS NO3 AS N = .00; P = .06; 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 ID: 0046015
NAME OF SAMPLE SOURCE... BOZEMAN HOT SPRINGS WELL
WARING 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 UTM ZONE... +12
COUNTY..... GALLATIN NORTHING... 5056127.
GEOLOGIC PROVINCE.. 485496.
MAP REFERENCE..... BOZEMAN 1:62500
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				
B.....	0.2	F.....	9.2	NA...	120.	SIO2.	66.		
BE....		FE(TOT).	0.02	NB...		SO4..	110.		
CA....	9.5	HCO3....	132.						
CA+MG.		HG.....		PB...	L 0.1				
CD....		H2S.....	0.6						
CL....	46.								
CO....		K.....	2.8	RB...	0.03	ZN...	L 0.01		

ISOTOPES (O/OO)
DEL D OF WATER..... -151.3
DEL O(18) OF WATER... -19.46

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, 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-BCDD

LOCATION — TOWNSHIP-RANGE: 01S 006E 34 SE OF SW NW — COORDINATES: LAT/LONG... 45-42.44 N 110-58.53 W

COUNTRY..... UNITED STATES
STATE..... MONTANA
COUNTY..... GALLATIN
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... BOZEMAN PASS 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

TEMPERATURE (C)..... 21.0
DISCHARGE..... Q 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.....	N				
AL....		CR.....		MG...	23.		
B.....		F.....	0.47	NA...	4.3	SIO2.	8.2
BE....		FE(TOT).	L 0.025	NB...		SO4..	80.
CA....	55.	HCO3....	209.	NO3..	0.05		
CD....		H2S.....		PO4..	0.01		
CL....	0.19						

ISOTOPES (O/OO)

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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046008
NAME OF SAMPLE SOURCE... BEARMOUTH WARM SPRINGS #1
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 11N 014W 11 SW OF SW SE LAT/LONG... 46-43.03 N 113-19.32 W
STATE..... MONTANA UTM ZONE... +12
COUNTY..... GRANITE NORTHING... 5176205.
GEOLOGIC PROVINCE.. 322666.
MAP REFERENCE..... BEARMOUTH 1:62500
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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046009
NAME OF SAMPLE SOURCE... BEARMOUTH WARM SPRINGS #2
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 11N 014W 12 SE OF SW LAT/LONG... 46-43.08 N 113-18.33 W
STATE..... MONTANA UTM ZONE... +12
COUNTY..... GRANITE NORTHING... 5176190.
GEOLOGIC PROVINCE.. 323800.
MAP REFERENCE..... BEARMOUTH 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1972/03/18 BOETTCHER, 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..... 7.7
SPECIFIC CONDUCTANCE..... 610.
ALKALINITY..... 180. AS CACO3
TOTAL DISSOLVED SOLIDS... 527.
CHARGE IMBALANCE (% DIFF)... 0.7
ANALYSIS IN MG/L ISOTOPES (D/OO)

AG....		CO3.....	N					
AL....		CR.....		MG...	28.			
AS....		CS.....		MN...	0.01			
B.....		F.....	0.5	NA...	7.6	SIO2.	16.	
BE....		FE(TOT).	0.03	NB...		SO4..	163.	
CA....	89.	HCO3....	220.	NO3..	0.2			
CL....	1.5							
CO....		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..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00055

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046051

NAME OF SAMPLE SOURCE... NIMROD SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 11N 015W 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..... BEARMOUTH 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/03/18
SAMPLE NUMBER..... MBMG LAB NO. 72-112
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 (D/D01)

AG....		CO3.....	N					
AL....	0.07	CR.....		MG...	36.			
AS....		CS.....		MN...	0.01			
B.....		F.....	0.8	NA...	15.5	SIO2.	21.	
BE....		FE(TOT).	0.01	NB...		SO4..	340.	
CA....	126.	HCO3....	168.	NO3..	0.4			
CL....	2.7							
CO....		K.....	3.4					

OTHER ANALYTICAL DATA... MBMG 1978/06/17: TEMP.=20.5 C, FLOW= 12185. L/MIN., PH= 7.76, S.C.= 856 UMHOS/CM.

REFERENCE AND IDENTIFICATION

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

RECORD 00056

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027114

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

WELL/SPRING NUMBER..... 08N-03W-16-AAC2
WARING NUMBER..... 18
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 08N 003W 16 SW OF NE NE — LAT/LONG... 46-26.98 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500
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 — ISOTOPES (0/00)

B.....	F.....	NA...	SIO2.	67.	
BE....	FE(TOT).	NB...	SO4..	100.	
CL.... 11.					
CO....	K.....	10.			

GAS ANALYSIS
DATE/ANALYST..... 1976/06/29 (COLLECTION DATE)
ANALYSIS IN VOLUME % — ISOTOPES (00/00)

CO2..	O2...	0 4.1

OTHER ANALYTICAL DATA... DISSOLVED GROSS ALPHA AS U-NAT. = .29; 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 SAMPLE FILE — GEOTHERM FILE ID: 0027113
NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (NORTH)
WELL/SPRING NUMBER..... 08N-03W-16-AAC2
WARING NUMBER..... 18
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 08N 003W 16 SW OF NE NE — LAT/LONG... 46-26.98 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1974/08/29 ROBERTSON, 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 — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.38	S.....		DEL D OF WATER.....	-146.5
AL.....		CR.....		MG...	3.2	SB...		DEL O(18) OF WATER...	-19.23
B.....	0.2	F.....	4.8	NA...	220.	SIO2.	65.		
BE....		FE(TOT).		NB...		SO4..	93.		

CA.... 19. HCO3.... 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..... 08N-03W-16-AAC2
WARING NUMBER..... 18
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 08N 003W 16 SW OF NE NE LAT/LONG... 46-26.98 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/29 KACZMAREK
TEMPERATURE (C)..... 50.0
WATER ANALYSIS
PH,..... 7.0
ANALYSIS IN MG/L ISOTOPES (0/00)
AL.... CR..... MG... 3.3
B..... F..... NA... 150. SIO2. 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 08N 003W 16 SW OF NE NE LAT/LONG... 46-26.98 N 111-58.83 W
STATE..... MONTANA UTM ZONE... +12
COUNTY..... JEFFERSON NORTHING... 5144259.
GEOLOGIC PROVINCE.. 21 424693.
MAP REFERENCE..... CLANCY 1:62500
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 4C. L/MIN
PERTINENT LITHOLOGY..... GRANITE BEDROCK
OTHER SAMPLE INFORMATION.. NUMEROUS SMALL CARBONATE MOUNDS.
WATER ANALYSIS
PH..... 7.2

SPECIFIC CONDUCTANCE..... 929.
ALKALINITY..... 484. AS HCO3
TOTAL DISSOLVED SOLIDS... 660.
CHARGE IMBALANCE (% DIFF)... 5.0

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....	L 1.0	LI...	0.32	S....		DEL D OF WATER.....	-146.5
AL....	0.001	CR.....		MG...	3.5	SB...		DEL O(18) OF WATER...	-19.23
AS....		CS.....	L 0.1	MN...	L 0.02				
AU....		CU.....	L 0.01						
B.....	0.24	F.....	8.4	NA...	220.	SIO2.	66.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	89.		
BR....		GE.....		NI...	L 0.02				
CA....	18.	HCO3....	480.						
CA+MG.		HG.....	L 0.0001	PB...	L 0.1				
CD....	L 0.01	H2S.....	L 0.5	PO4..	L 0.02				
CL....	16.								
CO....	L 0.05	K.....	9.5	RB...	0.05	ZN...	0.06		

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 00060

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027111

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (NORTH)
WELL/SPRING NUMBER..... 08N-03W-16-AAC2
MARING NUMBER..... 18

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 08N 003W 16 SW OF NE NE — LAT/LONG... 46-26.98 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1967/09/29 FOURNIER AND ROBERTSON
TEMPERATURE (C)..... 53.0

WATER ANALYSIS
PH..... 8.5
ALKALINITY..... 359. AS CACO3
TOTAL DISSOLVED SOLIDS... 637.
CHARGE IMBALANCE (% DIFF)... 9.0

ANALYSIS IN MG/L

								ISOTOPES (O/OO)
AG....		CO3.....	9.	LI...	0.33			
AL....		CR.....		MG...	0.3			
B.....	0.25	F.....		NA...	200.	SIO2.	64.	
BE....		FE(TOT).		NB...		SO4..	88.	
CA....	9.0	HCO3....	420.					
CL....	49.							
CO....		K.....	11.					

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027105

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-03W-16-ACD
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 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/12/02 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 54.4
DISCHARGE..... 189. L/MIN

WATER ANALYSIS

PH..... 6.8
SPECIFIC CONDUCTANCE..... 1510.
ALKALINITY..... 572. AS CACO3
TOTAL DISSOLVED SOLIDS... 1000.
TOTAL SUSPENDED SOLIDS... 1000.
CHARGE IMBALANCE (% DIFF)... 4.3

ANALYSIS IN MG/L — ISOTOPES (0/00)

AL.... — CR..... — MG... 4.3
B..... — F..... 9.4 — NA... 300.
BE.... — FE(TOT). — NB... — SO4.. 160.
CA.... 27. — HCO3.... 698.
CA+MG. — HG..... — PB... — U.... L 0.0004
CL.... 20.
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 SR90/Y90 = 170.; DISSOLVED RA-226 = 73.; DISSOLVED RA-222 = 17,000.; DISSOLVED URANIUM (DIRECT FLOUROMETRIC) = 0.4

REFERENCE AND IDENTIFICATION

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

RECORD 00062

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027069

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-03W-16-ACD
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 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1967/09/29 FOURNIER AND ROBERTSON
TEMPERATURE (C)..... 54.0
PERTINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS.

WATER ANALYSIS

PH..... 8.6

ALKALINITY..... 543. AS CACO3
CHARGE IMBALANCE (% DIFF)... 5.2
ANALYSIS IN MG/L

								ISOTOPES (O/OO)
AG....		CO3.....	21.	LI...	0.7			
AL....		CR.....		MG...	4.5			
B.....	0.46	F.....		NA...	330.			
BE....		FE(TOT).		NB...		S04..	160.	
CA....	6.8	HCO3....	620.					
CL....	22.							
CO....		K.....	17.					

OTHER ANALYTICAL DATA... DISSOLVED CO2 = 2.7
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER 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-16-ACD
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 1:62500					

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 (O/OO)
AG....		CO3....	N					
AL....		CR.....		MG...	18.			
B.....		F.....	1.5					
BA....		FE+3....		NA+K.	248.			
BE....		FE(TOT).	0.2	NB...		S04..	150.	
CA....	25.	HCO3....	610.	NO3..	L 0.1			
CL....	16.							

REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER 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-16-ACD
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 1:62500					

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 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..... 584. AS CACO3
TOTAL DISSOLVED SOLIDS... 953.
CHARGE IMBALANCE (% DIFF)... 0.0
ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	0.710	S....		ISOTOPES (O/OOO)	
AL....		CR.....		MG...	5.2	SB...		DEL D OF WATER.....	-149.0
AS....	0.036	CS.....		MN...	0.020			DEL O(18) OF WATER...	-18.35
AU....		CU.....	N	MO...	0.015	SE...	N		
B.....	0.410	F.....	9.0	NA...	310.	SIO2.	61.		
BE....	0.010	FE(TOT).	0.120	NB...		SO4..	150.		
BI....		GA.....		NH4..		SR...	1.9		
BR....		GE.....		NI...	0.01				
CA....	27.	HCO3....	712.						
CA+MG.		HG.....	N	PB...	0.002				
CD....	N	H2S.....		PO4..		V....	0.0007		
CL....	20.								
CO....		K.....	17.			ZN...	N		

OTHER ANALYTICAL DATA... CO2 = 227.; NO2 + NO3 AS N = .00; P = .02; SECOND SAMPLE SAME DATE REPORTS: CA = 26, SIO2 = 58, SR = 1.6
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00065

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027070
NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-03W-16-ACD
MARING 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 1:62500					

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/29 KACZMAREK
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

B.....		F.....		NA...	270.			ISOTOPES (O/OOO)
BE....		FE(TOT).		NB...		SO4..	54.	
CA....	26.							
CL....	20.							
CO....		K.....	15.					

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027074
  NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
  WELL/SPRING NUMBER..... 08N-03W-16-ACD
  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 1:62500
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 MG/L — ISOTOPES (0/00)
    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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027073
  NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
  WELL/SPRING NUMBER..... 08N-03W-16-ACD
  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 1:62500
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 CACO3
TOTAL DISSOLVED SOLIDS... 1000.
CHARGE IMBALANCE (% DIFF)... 4.3
ANALYSIS IN MG/L ISOTOPES (0/00)

AL....		CR.....		MG...	4.3		
B.....		F.....	9.4	NA...	300.		
BE....		FE(TOT).		NB...		S04..	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 ID: 0027072

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-03W-16-ACD
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 1:62500

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 % ISOTOPES (00/00)

CH4..	N						
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 AR= 5.7, 6.0; 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 ID: 0027106

NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-03W-16-ACD
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 1:62500
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 — ISOTOPES (0/00)
CL.... 20.
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 ID: 0027068
NAME OF SAMPLE SOURCE... ALHAMBRA HOT SPRINGS (SOUTH)
WELL/SPRING NUMBER..... 08N-03W-16-ACD
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 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1964/08/05 MONTANA STATE BOARD OF HEALTH
TEMPERATURE (C)..... 51.
PERTINENT LITHOLOGY..... GRANITE BEDROCK, NUMEROUS SMALL CARBONATE MOUNDS.
WATER ANALYSIS
ALKALINITY..... 582. AS CACO3
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	5.0		
B.....		F.....	7.8				
BA....		FE+3....		NA+K.	314.		
BE....		FE(TOT).	0.8	NB...		SO4..	150.
CA....	30.	HCO3....	710.	NO3..	N		

CL.... 23.
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 ID: 0027117
NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (COLLECTION DATE)
WELL/SPRING NUMBER..... 08N-03W-16-AAC

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 08N 003W 16 SW OF NE NE — LAT/LONG... 46-27.01 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500
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..... 1080.
TOTAL SUSPENDED SOLIDS... 660.
ANALYSIS IN MG/L — ISOTOPES (0/00)

B.....		F.....		NA...		SIO2..	61.
BE.....		FE(TOT).		NB...		SO4..	90.
CL.....	9.9						
CO.....		K.....	9.5				

OTHER ANALYTICAL DATA... DISSOLVED GROSS ALPHA AS U-NAT. = .24; 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 FLUOROMETRIC) = .9 PICOCURIES/L.
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00072

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027115
NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (NORTH)
WELL/SPRING NUMBER..... 08N-03W-16-AAC
WARING NUMBER..... 18
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 08N 003W 16 SW OF NE NE — LAT/LONG... 46-27.02 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500
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 MG/L — ISOTOPES (0/00)

AG.....		CO3.....		LI...	0.36	S.....		DEL D OF WATER.....	-147.3
AL.....		CR.....		MG...		SB...		DEL O(18) OF WATER...	-19.93
AS.....	0.025	CS.....		MN...	0.02				
AU.....		CU.....	1.	MO...	0.023	SE...	N		
B.....	0.41								
BE.....	N	FE(TOT).	0.12						
BI.....		GA.....		NH4..		SR...	1.		
BR.....		GE.....		NI...	0.002				
CA+MG.		HG.....	N	PB...	0.002				
CD.....	N	H2S.....		PO4..		V.....	0.001		

CO.... K..... ZN... N

GAS ANALYSIS
DATE/ANALYST..... 1976/04/29 (COLLECTION DATE)
ANALYSIS IN VOLUME % ISOTOPES (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..... O2 = O2 + AR.
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978.

RECORD 00073

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027118
NAME OF SAMPLE SOURCE... ALHAMBRA HOT WELL (NORTH)
WELL/SPRING NUMBER..... 08N-03W-16-AAC
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 08N 003W 16 SW OF NE NE LAT/LONG... 46-27.01 N 111-58.83 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... CLANCY 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/12/02 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 52.2 AT (M).. 31.
WATER ANALYSIS
PH..... 7.0
SPECIFIC CONDUCTANCE..... 1000.
ALKALINITY..... 378. AS CACO3
TOTAL SUSPENDED SOLIDS... 680.
CHARGE IMBALANCE (% DIFF)... 3.8
ANALYSIS IN MG/L ISOTOPES (0/00)
AL.... CR..... MG... 3.3
B..... F..... 8.1 NA... 190.
BE.... FE(TOT). NB... SO4.. 86.
CA.... 18. HCO3.... 461.
CA+MG. HG..... PB... U.... 0.0008
CL.... 10.
CO.... K..... 9.6
GAS ANALYSIS
DATE/ANALYST..... 1976/12/02 (COLLECTION DATE)
ANALYSIS IN VOLUME % ISOTOPES (00/01)
CH4.. L 0.1
C2H6. L 0.1 N2... 89.4
CO2.. 7.7 O2... 1.9
OTHER ANALYTICAL DATA... CO2 = 74.; 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 FLUOROMETRIC) = .8 PICOCURIES/L.
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 00074

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027116

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	08N 003W	16	SW OF NE NE	LAT/LONG... 47-27.01 N 111-58.83 W
STATE.....	MONTANA				
COUNTY.....	JEFFERSON				
MAP REFERENCE.....	CLANCY 1:62500				

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/04/29 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 52.0 AT (M).. 31.
DISCHARGE..... 174. L/MIN

WATER ANALYSIS

PH..... 6.8
SPECIFIC CONDUCTANCE..... 1040.
ALKALINITY..... 380. AS CACO3
TOTAL DISSOLVED SOLIDS... 613.
CHARGE IMBALANCE (% DIFF)... 3.8

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3..... N		MG...	3.9		
AL....		CR.....					
H.....		F.....	7.4	NA...	190.	SIO2.	58.
HE....		FE(TOT).		NB...		SO4..	88.
CA....	17.	HCO3....	463.				
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.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00075

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046014

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
WARING 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 1:62500				

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 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....	0.014	CR.....		MG...	L 0.1	SB...			
AS....		CS.....	L 0.1	MN...	L 0.02				
AU....		CU.....	L 0.01						
B.....	0.56	F.....	11.	NA...	120.	SIO2.	108.		
BE....		FE(TOT).	0.02	NB...		SO4..	74.		
BR....		GE.....		NI...	L 0.02				
CA....	2.2	HCO3....	161.						
CA+MG.		HG.....	0.0001	PB...	L 0.1				
CD....	L 0.01	H2S.....	L 0.5						
CL....	19.								
CO....	L 0.05	K.....	3.8	RB...	0.06	ZN...	L 0.01		

ISOTOPES (O/OO)
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..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00076

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0002906
NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
WELL/SPRING NUMBER..... 05N-004W-10-CAB

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES 05N 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
PH..... 8.5
SPECIFIC CONDUCTANCE..... 525.
ALKALINITY..... 171. AS HCO3
CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.22	S....			
AL....	0.020	CR.....		MG...	L 0.1	SB...			
AS....		CS.....		MN...	L 0.02				
B.....	0.54	F.....	11.	NA...	120.	SIO2.	106.		
BE....		FE(TOT).		NB...		SO4..	74.		
CA....	2.7	HCO3....	171.						
CD....		H2S.....	L 0.5						
CL....	19.								
CO....		K.....	3.8	RB...	0.06	ZN...	0.01		

ISOTOPES (O/OO)
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

GEOTHERM_SAMPLE_FILE — GEOTHERM FILE ID: 0027051

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
WELL/SPRING NUMBER..... 05N-04W-10-CAB
WARING 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					
COUNTY.....	JEFFERSON					
MAP REFERENCE.....	BOULDER 1:62500					

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 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 (0/00)

AG....		CO3.....		LI...	0.25			
AL....		CR.....		MG...	N			
B.....	0.57	F.....	12.	NA...	120.	SIO2.	96.	
BE....		FE(TOT).	0.02	NB...		SO4..	74.	
BI....		GA.....		NH4..		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

GEOTHERM_SAMPLE_FILE — GEOTHERM FILE ID: 0027049

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
WELL/SPRING NUMBER..... 05N-04W-10-CAB
WARING 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					
COUNTY.....	JEFFERSON					
MAP REFERENCE.....	BOULDER 1:62500					

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 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.. ISOTOPIC SAMPLE 1 DATE 8/22/74; ISOTOPIC SAMPLE 2 (SAME DATE) REPORTS DEL D FOR WATER =

-146.5 AND DEL 18 O FOR WATER = -19.03

WATER ANALYSIS

ALKALINITY.....	164.	AS CACO3							
TOTAL DISSOLVED SOLIDS...	437.								
CHARGE IMBALANCE (% DIFF)...	3.8								

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.26	S....			
AL....		CR.....		MG...	N	SB...			
B.....	0.56	F.....	6.9	NA...	124.	SIO2.	100.		
BE....		FE(TOT).		NB...		SO4..	74.		
CA....	2.3	HCO3....	200.						
CL....	24.								
CO....		K.....	3.8						

ISOTOPES (O/OO)

DEL D OF WATER.....	-146.0
DEL O(18) OF WATER...	-18.91

REFERENCE AND IDENTIFICATION

COMPILED BY.....	FALLS, MARILYN I.
COMPILER 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				
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				
COUNTY.....	JEFFERSON				
MAP REFERENCE.....	BOULDER 1:62500				

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

PH.....	8.4								
ALKALINITY.....	144.	AS CACO3							
TOTAL DISSOLVED SOLIDS...	407.								
CHARGE IMBALANCE (% DIFF)...	10.3								

ANALYSIS IN MG/L

AG....		CO3.....	3.	LI...	0.21				
AL....		CR.....		MG...	N				
B.....	0.63	F.....		NA...	120.	SIO2.	95.		
BE....		FE(TOT).		NB...		SO4..	79.		
CA....	3.3	HCO3....	170.						
CL....	17.								
CO....		K.....	5.5						

ISOTOPES (O/OO)

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

REFERENCE AND IDENTIFICATION

COMPILED BY.....	FALLS, MARILYN I.
COMPILER 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 — 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
COUNTY..... JEFFERSON
MAP REFERENCE..... BOULDER 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

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

WATER ANALYSIS

PH..... 8.3
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AL....		CR.....		MG...	0.7		
B.....		F.....		NA...	100.	SIO2.	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027046

NAME OF SAMPLE SOURCE... BOULDER HOT SPRINGS
WELL/SPRING NUMBER..... 05N-04W-10-CAB
WARING 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
COUNTY..... JEFFERSON
MAP REFERENCE..... BOULDER 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1964/11/24 MONTANA STATE BOARD OF HEALTH
POINT OF COLLECTION.. ROUND CONCRETE TANK BEHIND HOTEL
TEMPERATURE (C)..... 38.0
DISCHARGE..... 946. L/MIN
PERTINENT LITHOLOGY..... GRANITE BEDROCK

WATER ANALYSIS

ALKALINITY..... 148. AS CACO3
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3....	15.				
AL....		CR.....		MG...	N		
B.....		F.....	15.				
BA....		FE+3....		NA+K.	132.		
BE....		FE(TOT). N		NB...		SO4..	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 SAMPLE FILE — GEOTHERM FILE ID: 0027050

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

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05N 004W 10 — NE OF NE SW — LAT/LONG... 46-11.88 N 112-05.62 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... BOULDER 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/03/26 U.S. GEOLOGICAL SURVEY
POINT OF COLLECTION.. ROUND CONRETE 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....		CO3.....		LI...	0.26	S....			
AL....		CR.....		MG...	0.1	SB...			
AS....	0.018	CS.....		MN...	N				
AU....		CU.....	N	MO...	0.044	SE...	N		
B.....	0.57	F.....	12.	NA...	120.	SIO2.	95.		
BE....		FE(TOT).	0.01	NB...		SO4..	80.		
BI....		GA.....		NH4..		SR...	0.14		
BR....		GE.....		NI...	0.007				
CA....	2.8	HCO3....	171.						
CA+MG.		HG.....	N	PB...	0.001				
CD....	N	H2S.....		PO4..		V....	0.0007		
CL....	17.								
CO....		K.....	4.0			ZN...	N		

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 SAMPLE FILE — GEOTHERM FILE ID: 0027052

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

COUNTY..... JEFFERSON
MAP REFERENCE..... BOULDER 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/28 KACZMAREK
TEMPERATURE (C)..... 59.0
DISCHARGE..... 7.6 L/MIN
WATER ANALYSIS
PH..... 7.0
ANALYSIS IN MG/L
B..... F..... NA... 82. SIO2. 100.
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
WARING 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
COUNTY..... JEFFERSON
MAP REFERENCE..... BOULDER 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/28 KACZMAREK
TEMPERATURE (C)..... 64.0
DISCHARGE..... 19. L/MIN
WATER ANALYSIS
PH..... 7.0
ANALYSIS IN MG/L
B..... F..... NA... 74. SIO2. 97.
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 05N 004W 10 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..... 1973/07/28
TEMPERATURE (C)..... 42.0
DISCHARGE..... 7.6 L/MIN

WATER ANALYSIS
PH..... 7.0
ANALYSIS IN MG/L — ISOTOPES (0/00)

B.....		F.....		NA...	84.	SIO2.	97.
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 ID: 0027107
NAME OF SAMPLE SOURCE... HILLBROOK FLOWING WELL
WELL/SPRING NUMBER..... 08N-03W-16-BDA

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES 08N 003W 16 NE OF SE NW LAT/LONG... 46-26.87 N 111-59.23 W
STATE..... MONTANA
COUNTY..... JEFFERSON
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... CLANCY 1:62500
OTHER LOCALITY INFORMATION: ALHAMBRA HOT SPRINGS AREA

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 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 — ISOTOPES (0/00)

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	
B.....	0.48	F.....	8.7	NA...	340.	SIO2.	67.
BA....		FE+3....	0.63				
BE.... N		FE(TOT).		NB...		SO4..	170.
BI....		GA.....		NH4..		SR...	2.2
BR....		GE.....		NI... N			
CA....	32.	HCO3....	787.				
CA+MG.		HG.....	0.0002	PB...	0.002	U....	0.0005
CD.... N		H2S.....		PO4..		V....	0.0006
CL....	25.						
CO....		K.....	20.			ZN...	0.02

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 003W 16 NE OF SE NW LAT/LONG... 46-26.87 N 111-59.23 W
  STATE..... MONTANA
  COUNTY..... JEFFERSON
  MAP REFERENCE..... CLANCY 1:62500
  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 (M).. 95.
  DISCHARGE..... 114. L/MIN
WATER ANALYSIS
  PH..... 6.8
  SPECIFIC CONDUCTANCE..... 1620.
  ALKALINITY..... 641. AS CACO3
  TOTAL SUSPENDED SOLIDS... 1200.
  CHARGE IMBALANCE (% DIFF)... 3.9
  ANALYSIS IN MG/L ISOTOPES (0/00)

AL....		CR.....		MG...	5.3		
B.....		F.....	8.9	NA...	340.		
BE....		FE(TOT).		NB...		SO4..	190.
CA....	36.	HCO3....	781.				
CA+MG.		HG.....		PB...		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 PICOCURIES/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 FLOUROMETRIC) = .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-003W-16-BDA
LOCATION TOWNSHIP-RANGE COORDINATES
  COUNTRY..... UNITED STATES 08N 003W 16 NE OF SE NW LAT/LONG... 46-26.87 N 111-59.23 W
  STATE..... MONTANA
  COUNTY..... JEFFERSON
  MAP REFERENCE..... CLANCY 1:62500
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 (O/OO)

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

RECORD 00089

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027037
NAME OF SAMPLE SOURCE... JEFFERSON RIVER AT 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...	45-47.47 N 112-07.58 W
STATE.....	MONTANA					
COUNTY.....	JEFFERSON					
MAP REFERENCE.....	VENDOME, MONTANA 1:24000					

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 (O/OO)

AG....		CO3.....	5.	LI...	0.02				
AL....		CR.....		MG...	18.				
AS....		CS.....		MN...	0.02				
B.....	0.04	F.....	0.9	NA...	19.	SIO2.	17.		
BE....		FE(TOT).	0.1	NB...		SO4..	71.		
BI....		GA.....		NH4..		SR...	0.44		
CA....	59.	HCO3....	208.						
CD....		H2S.....		PO4..	0.03				
CL....	9.9								
CO....		K.....	4.4						

OTHER ANALYTICAL DATA... CO2 = .7; ORTHO-PHOSPHORUS (P) = .01SAR = 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 — GEOTHERM FILE ID: 0027043
NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRING
WARING NUMBER..... 20

LOCATION		TOWNSHIP-RANGE			COORDINATES	
COUNTRY.....	UNITED STATES	02N 005W	28	SE OF SE NW	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. 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 MG/L

AG....		CO3.....	N	LI...	0.09	S....			
AL....		CR.....		MG...	N	SB...			
B.....	0.5	F.....	3.1	NA...	100.	SIO2.	66.		
BE....		FE(TOT).		NB...		SO4..	99.		
CA....	2.6	HCO3....	134.						
CL....	27.								
CO....		K.....	2.0						

ISOTOPES (O/OO)
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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027045

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRING
WARING NUMBER..... 20

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 02N 005W 28 SE OF SE NW — LAT/LONG... 45-53.7 N 112-13.70 W
STATE..... MONTANA
COUNTY..... JEFFERSON
MAP REFERENCE..... DRY MOUNTAIN 1:24000
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)..... 60.
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 MG/L

B.....		F.....		NA...		SIO2.	67.		

ISOTOPES (O/OO)

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

RECORD 00092

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027044

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 02N 005W 28 — SE OF SE NW — 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..... 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 — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.09			
AL....		CR.....		MG...	N			
AS....		CS.....		MN...	N			
B.....	0.29	F.....	5.6	NA...	98.	SIO2.	61.	
BE....		FE(TOT).	0.06	NB...		SO4..	97.	
BI....		GA.....		NH4..		SR...	0.1	
CA....	3.2							
CL....	22.							
CO....		K.....	1.9					

GAS ANALYSIS

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

ANALYSIS — ISOTOPES (00/0)

CO2.. 8.9

OTHER ANALYTICAL DATA... DISSOLVED NO2 PLUS NO3 = .01; 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027041

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS
WARING NUMBER..... 20

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 02N 005W 28 — SE OF SE NW — LAT/LONG... 45-53.78 N 112-14.57 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..... 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 (O/OO)

AG....		CO3.....	18.					
AL....		CR.....		MG...	N			
B.....		F.....	5.4					
BA....		FE+3....		NA+K.	99.			
BE....		FE(TOT).	0.1	NB...		S04..	93.	
CA....	4.0	HCO3....	70.	NO3..	N			
CL....	24.							

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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027040
NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS
WARING NUMBER..... 20
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 02N 005W 28 SE OF SE NW 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..... 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
PH..... 8.1
SPECIFIC CONDUCTANCE..... 592.
ANALYSIS IN MG/L

ISOTOPES (O/OO)

AG....		CO3.....		LI...	0.09			
AL....		CR.....		MG...	0.1			
AS....		CS.....		MN...	0.004			
B.....	0.29	F.....	5.5	NA...	100.	SIO2.	70.	
BE....		FE(TOT).	0.07	NB...		S04..	95.	
BI....		GA.....		NH4..		SR...	0.09	
CA....	3.1	HCO3....	N					
CL....	22.							
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 SAMPLE FILE — GEOTHERM FILE ID: 0027042

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS
WARING NUMBER..... 20

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	02N 005W 28	SE OF SE NW	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.		
CHARGE IMBALANCE (% DIFF)...	7.7		

ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.1				
AL....		CR.....		MG...	0.1				
B.....	0.35	F.....		NA...	100.	SIO2.	59.		
BE....		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 SAMPLE FILE — GEOTHERM FILE ID: 0002908

NAME OF SAMPLE SOURCE... PIPESTONE HOT SPRINGS
WARING NUMBER..... 20

LOCATION — TOWNSHIP-RANGE — COORDINATES

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

PH.....	8.7
SPECIFIC CONDUCTANCE.....	455.
ALKALINITY.....	108. AS HCO3
TOTAL DISSOLVED SOLIDS...	396.
CHARGE IMBALANCE (% DIFF)...	2.6

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.09	S....			
AL....	0.015	CR.....		MG...	L 0.1	SB...			
AS....		CS.....		MN...	L 0.02				
B.....	0.28	F.....	5.3	NA...	98.	SIO2.	60.		
BE....		FE(TOT).		NB...		SO4..	94.		
CA....	2.6	HCO3....	108.						
CD....		H2S.....	2.3						
CL....	20.								
CO....		K.....	1.9	RB...	0.02	ZN...	L 0.01		

ISOTOPES (O/OO)

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

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

REFERENCE AND IDENTIFICATION

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

RECORD 00097

GEOTHERM SAMPLE FILE — GEOTHERM 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/COLLECTOR.....	1976/08/13 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C).....	50.
DISCHARGE.....	151. L/MIN

WATER ANALYSIS

PH.....	7.5
SPECIFIC CONDUCTANCE.....	1100.
ALKALINITY.....	254. AS CACO3
TOTAL DISSOLVED SOLIDS...	655.
CHARGE IMBALANCE (% DIFF)...	1.4

ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	0.13				
AL....		CR.....		MG...	13.				
AS....	0.019	CS.....		MN...	0.03				
AU....		CU.....	N	MO...	N	SE...	N		
B.....	0.48	F.....	3.0	NA...	150.	SIO2.	37.		
BE....	N	FE(TOT).	0.08	NB...		SO4..	200.		
BI....		GA.....		NH4..		SR...	0.85		
BR....		GE.....		NI...	0.004				
CA....	51.	HCO3....	310.						
CA+MG.		HG.....	N	PB...	0.006				
CD....	N	H2S.....		PO4..		V....	0.0003		

ISOTOPES (O/OO)

CL.... 34.
CO.... K..... 13. ZN... N
OTHER ANALYTICAL DATA... CO2 = 14.1 NO2 PLUS NO3 = .01; P = .03; GROSS ALPHA = 8 PICOCURIES/L AND GROSS BETA = 10 PICOCURIES/L.SAR = 4.9
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00098

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027039
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
MAP REFERENCE..... VENDOME, MONTANA 1:24000
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 (O/OO)
CL.... 34.
GAS ANALYSIS
DATE/ANALYST..... 1976/08/13 (COLLECTION DATE)
ANALYSIS IN VOLUME % ISOTOPES (OO/O)
AR... 1.3
CH4.. 1.7
C2H6. N2... 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

GEOTHERM SAMPLE FILE GEOTHERM 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 1:62500
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 (O/OO)

AG....		CO3.....		LI...	0.37			
AL....		CR.....		MG...	3.5			
B.....	0.24	F.....	6.9	NA...	210.	SIO2.	60.	
BE....		FE(TOT).	0.15	NB...		SO4..	88.	
BI....		GA.....		NH4..		SR...	1.3	
CA....	18.	HCO3....	489.	NO3..	N			
CL....	11.							
CO....		K.....	10.					

GAS ANALYSIS
DATE/ANALYST..... 1976/09/00
ANALYSIS IN VOLUME % — ISOTOPES (O/OO)

CH4..	L 0.1		
C2H6.		N2...	89.2
CO2..		O2...	2.3

OTHER ANALYTICAL DATA... P = N; SAMPLE DATED 6-29-76 YIELDED GROSS ALPHA = 97 PICOCURIES/L AND GROSS BETA = 48 PICOCURIES/L.
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 00100

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046084
NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL
WELL/SPRING NUMBER..... 22N-23W-29-BADD
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 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1980/12/16 DONOVAN, 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
ANALYSIS IN MG/L — ISOTOPES (O/OO)

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		
B.....	0.59	F.....	4.6	NA...	130.	SIO2.	38.
BE....		FE(TOT).	0.25	NB...		SO4..	0.1
BI....		GA.....		NH4..		SR...	0.25
BR....		GE.....		NI...	L 0.01		
CA....	13.	HCO3....	344.	NO3..	0.29	TI...	L 0.001
CA+MG.		HG.....		PB...	L 0.04		
CD....	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-BADD

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 (BELT QUARTZITE).

WATER ANALYSIS

DATE/ANALYST..... 1981/01/20 ABERCROMBIE, FRANK N.
PH..... 8.21
SPECIFIC CONDUCTANCE..... 651.5
ALKALINITY..... 283. AS CACO3
TOTAL DISSOLVED SOLIDS... 399.
CHARGE IMBALANCE (% DIFF)... 4.0

ANALYSIS IN MG/L — ISOTOPES (O/OO)

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		
B.....	0.57	F.....	4.5	NA...	132.	SIO2.	39.
BE....		FE(TOT).	0.081	NB...		SO4..	0.1
BI....		GA.....		NH4..		SR...	0.23
BR....		GE.....		NI...	L 0.01		
CA....	12.	HCO3....	345.	NO3..	0.44	TI...	0.003
CA+MG.		HG.....		PB...	L 0.04		
CD....	L 0.002	H2S.....		PO4..		V....	L 0.001

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 ID: 0046081
NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL
WELL/SPRING NUMBER..... 22N-23W-29-BADD
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..... 1980/12/11 DONOVAN, JOSEPH J.
SAMPLE NUMBER..... 800281B
POINT OF COLLECTION.. BESIDE DRILL RIG AT "T"
TEMPERATURE (C)..... 49.3
AMBIENT TEMP (C)..... 7.5
WELL DEPTH (M)..... 81.
DISCHARGE..... 850. 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 ISOTOPES (D/OOO)

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		
B.....	0.64	F.....	5.2	NA...	159.	SIO2.	46.
BE....		FE(TOT).	0.23	NB...		SO4..	0.4
BI....		GA.....		NH4..		SR...	0.064
BR....	N	GE.....		NI...	L 0.01		
CA....	3.4	HCO3....	341.	NO3..	1.2	TI...	0.004
CA+MG.		HG.....		PB...	L 0.02		
CD....	L 0.002	H2S.....		PO4..		V....	0.003
CL....	36.						
CO....		K.....	3.2			ZN...	0.009

OTHER ANALYTICAL DATA... LAB ZN = 0.009 MG/L. NO FIELD MEASUREMENTS. DEGASSES RAPIDLY (CLOUDY), H2S ODOR 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046082

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL
WELL/SPRING NUMBER..... 22N-23W-29-BADD

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.....	1980/12/15 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 ABERCROMBIE, FRANK N.
PH.....	8.18
SPECIFIC CONDUCTANCE.....	656.6
ALKALINITY.....	285. AS CACO3
TOTAL DISSOLVED SOLIDS...	406.

ANALYSIS IN MG/L — ISOTOPES (O/OOO)

AG....	L 0.002	CO3.....		LI...	0.050				
AL....	L 0.03	CR.....	L 0.002	MG...	2.1				
AS....	L 0.0001	CS.....		MN...	0.027				
AU....		CU.....	L 0.002	MO...	L 0.02				
B.....	0.63	F.....	4.6	NA...	139.	SIO2.	39.		
BE....		FE(TOT).	0.22	NB...		SO4..	L 0.1		
BI....		GA.....		NH4..		SR...	0.17		
BR....		GE.....		NI...	L 0.01				
CA....	11.	HCO3....	348.	NO3..	0.53	TI...	L 0.001		
CA+MG.		HG.....		PB...	L 0.04				
CD....	L 0.002	H2S.....		PO4..		V....	L 0.001		
CL....	36.								
CO....		K.....	2.9			ZN...	0.006		

OTHER ANALYTICAL DATA... FIELD PH, SP. COND., ALKALINITY ARE : 7.82, 653., 327.6 LAB ZR LESS THAN 0.004 MG/L

REFERENCE AND IDENTIFICATION

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

RECORD 00104

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046080

NAME OF SAMPLE SOURCE... CAMP AQUA AREA TEST WELL
WELL/SPRING NUMBER..... 22N-23W-29-BADD

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..... 1980/12/11 DONOVAN, 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..... 850. 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 ABERCROMBIE, FRANK N.
PH..... 8.71
SPECIFIC CONDUCTANCE..... 693.2
ALKALINITY..... 296. AS CACO3
TOTAL DISSOLVED SOLIDS... 437.
ANALYSIS IN MG/L

								ISOTOPES (O/OOO)
AG....	L 0.002	CO3.....	11.	LI...	0.085			
AL....	1.6	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.	SIO2.	51.	
BE....		FE(TOT).	1.7	NB...		SO4..	0.1	
BI....		GA.....		NH4..		SR...	0.1	
BR....	N	GE.....		NI...	L 0.01			
CA....	4.2	HCO3....	339.	NO3..	2.5	TI...	0.011	
CA+MG.		HG.....		PB...	0.04			
CD....		H2S.....		PO4..		V....	L 0.001	
CO....		K.....	3.4			ZN...	0.015	

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 GEOTHERM FILE ID: 0027130
NAME OF SAMPLE SOURCE... BROADWATER HOT PIT 2
WELL/SPRING NUMBER..... 10N-004W-28 -A
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 10N 004W 28 NE LAT/LONG... 46-35.44 N 112-06.42 W
STATE..... MONTANA
COUNTY..... LEWIS AND CLARK
MAP REFERENCE..... HELENA 1:62500
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 IMBALANCE (% DIFF)... 4.0

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....	N	LI...	0.59	S....		DEL D OF WATER.....	-18.35
AL....		CR.....		MG...	0.8	SB...		DEL O(18) OF WATER... Q	-18.35
AS....		CS.....		MN...	0.04				
B.....	0.78	F.....	9.3	NA...	180.	SIO2.	98.		
BE....		FE(TOT).	0.01	NB...		SO4..	180.		
BI....		GA.....		NH4..		SR...	0.14		
CA....	9.4	HCO3....	188.						
CD....		H2S.....		PO4..	0.31				
CL....	34.								
CO....		K.....	6.3						

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

GEOTHERM SAMPLE FILE — GEOTHERM 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 1:62500
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 8-24-74 FROM MARINER AND OTHERS, 1976B

WATER ANALYSIS

ALKALINITY..... 246. AS CACO3
TOTAL DISSOLVED SOLIDS... 673.
CHARGE IMBALANCE (% DIFF)... 6.9

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....		LI...	0.55	S....		DEL D OF WATER.....	-147.6
AL....		CR.....		MG...	0.8	SB...		DEL O(18) OF WATER...	-18.56
B.....	0.82	F.....	6.2	NA...	190.	SIO2.	97.		
BE....		FE(TOT).		NB...		SO4..	190.		
CA....	12.	HCO3....	300.						
CL....	22.								
CO....		K.....	6.0						

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027076

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 1:625000
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 CACO3
ANALYSIS IN MG/L — ISOTOPES (0/00)
CA.... 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 00108

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027122
NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
WELL/SPRING NUMBER..... 10N-004W-28-A

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 10N 004W 28 NE — LAT/LONG... 46-35.73 N 112-06.55 W
STATE..... MONTANA
COUNTY..... LEWIS AND CLARK
MAP REFERENCE..... HELENA 1:62500
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 CACO3
TOTAL DISSOLVED SOLIDS... 580.
TOTAL SUSPENDED SOLIDS... 650.
CHARGE IMBALANCE (% DIFF)... 3.3
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.53	S....		DEL D OF WATER.....	-18.20
AL....		CR.....		MG...	1.0	SB...		DEL O(18) OF WATER... @	-18.20
B.....	0.75	F.....	7.9	NA...	170.	SIO2.	84.		
BE....		FE(TOT).	0.03	NB...		SO4..	170.		
BI....		GA.....		NH4..		SR...	0.33		
CA....	12.	HCO3....	192.	NO3..	N				
CL....	33.								
CO....		K.....	5.7						

OTHER ANALYTICAL DATA... NO2 + NO3 = .001 P = .01; DISSOLVED GROSS ALPHA AS U-NAT. = .007; DISSOLVED GROSS BETA AS

CS-137 = 8.3 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027128
  NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
  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 1:62500					

  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 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

								ISOTOPES (0/00)
AG....		CO3.....	N	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.	SIO2.	93.	
BE....	0.01	FE(TOT).	0.13	NB...		SO4..	180.	
BI....		GA.....		NH4..		SR...	0.29	
BR....		GE.....		NI...	N			
CA....	10.	HCO3....	152.					
CA+MG.		HG.....	0.0002	PB...	0.004			
CD....	0.001	H2S.....		PO4..		V....	0.0004	
CL....	34.							
CO....		K.....	6.3			ZN...	0.01	

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.5 MG/L; NO2 + NO3 AS N = .00; 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027126
  NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
  WELL/SPRING NUMBER..... 10N-004W-28 -A
  WARING NUMBER..... 28

LOCATION		TOWNSHIP-RANGE			COORDINATES	
COUNTRY.....	UNITED STATES	10N 004W		NE	LAT/LONG...	46-35.73 N 112-06.7 W

STATE..... MONTANA
COUNTY..... LEWIS AND CLARK
MAP REFERENCE..... HELENA 1:62500
OTHER LOCALITY INFORMATION: LOCATION APPROXIMATE

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/09/21 KAZMAREK
POINT OF COLLECTION.. AT MANHOLE
TEMPERATURE (C)..... 63.0
DISCHARGE..... 113. L/MIN

WATER ANALYSIS
PH..... 7.0
ANALYSIS IN MG/L — ISOTOPES (0/00)

AL....		CR.....		MG...	0.7		
B.....		F.....		NA...	150.	SIO2.	60.
CA....	12.						
CL....	35.						
CO....		K.....	4.7				

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027125
NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
WELL/SPRING NUMBER..... 10N-004W-28 -A

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES 10N 004E 28 NE LAT/LONG... 46-35.73 N 112-06.7 W
STATE..... MONTANA
COUNTY..... LEWIS AND CLARK
MAP REFERENCE..... HELENA 1:62500
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..... 8.4
ALKALINITY..... 162. AS CACO3
TOTAL DISSOLVED SOLIDS... 600.
CHARGE IMBALANCE (% DIFF)... 1.0
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	4.	LI...	0.55		
AL....		CR.....		MG...	0.4		
B.....	0.88	F.....		NA...	170.	SIO2.	92.
BE....		FE(TOT).		NB...		SO4..	180.
CA....	9.6	HCO3....	190.				
CL....	40.						
CO....		K.....	8.7				

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 SAMPLE FILE — GEOTHERM FILE ID: 0027124

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
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 1:62500				

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 — ISOTOPES (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	2.		
B.....		F.....	9.6				
BA....		FE+3....		NA+K.	180.		
BE....		FE(TOT).	N	NB...		SO4..	184.
CA....	12.	HCO3....	190.	NO3..	N		
CL....	39.						

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 SAMPLE FILE — GEOTHERM FILE ID: 0027123

NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
WELL/SPRING NUMBER..... 10N-004W-28 -A

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	10N 004W	28	NE	LAT/LONG... 46-35.73 N 112-06.63 W
STATE.....	MONTANA				
COUNTY.....	LEWIS AND CLARK				
MAP REFERENCE.....	HELENA 1:62500				

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 (% DIFF)...	2.1

ANALYSIS IN MG/L — ISOTOPES (0/00)

AL....		CR.....		MG...	0.9		
B.....		F.....		NA...	170.		
BE....		FE(TOT).		NB...		S04..	190.
CA....	11.	HCO3....	188.				
CL....	34.						
CO....		K.....	5.8				

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.9 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 00114

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027121
NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 10N 004W 28 NE — LAT/LONG... 46-35.73 N 112-06.55 W
STATE..... MONTANA
COUNTY..... LEWIS AND CLARK
MAP REFERENCE..... HELENA 1:62500
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)..... 66.2
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..... 156. AS CACO3

ANALYSIS IN MG/L					ISOTOPES (0/00)	
B.....	F.....	NA...		SIO2.	82.	
BI....	GA.....	NH4..		SR...	0.27	
CA....	12.					

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027120
NAME OF SAMPLE SOURCE... BROADWATER HOT SPRINGS
WELL/SPRING NUMBER..... 10N-04W-28-A
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 10N 004W 28 NE — LAT/LONG... 46-35.73 N 112-06.55 W
STATE..... MONTANA
COUNTY..... LEWIS AND CLARK
MAP REFERENCE..... HELENA 1:62500
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

PH..... 8.3
SPECIFIC CONDUCTANCE..... 906.
ALKALINITY..... 146. AS CACO3
TOTAL DISSOLVED SOLIDS... 582.
CHARGE IMBALANCE (% DIFF)... 166.7

ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	570.	S....			
AL....		CR.....		MG...	0.9	SB...			
AS....	0.022	CS.....		MN...	0.030				
AU....		CU.....	0.009	MO...	0.026	SE...	N		
B.....	780.	F.....	11.	NA...	170.	SIO2.	82.		
BE....	N	FE(TOT).	0.06	NB...		SO4..	170.		
BI....		GA.....		NH4..		SR...	0.29		
BR....		GE.....		NI...	0.002				
CA....	11.	HCO3....	178.						
CA+MG.		HG.....	N	PB...	0.003				
CD....	N	H2S.....		PO4..		V....	0.0002		
CL....	41.								
CO....		K.....	6.1			ZN...	0.01		

OTHER ANALYTICAL DATA... CO2 FOR WATER = 1.4; NO2 + NO3 = .00; 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 00116

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027129

NAME OF SAMPLE SOURCE... BROADWATER NORTHWEST COLD PIT

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 1:62500
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

PH..... 8.0
SPECIFIC CONDUCTANCE..... 1065.
ALKALINITY..... 174. AS CACO3
TOTAL SUSPENDED SOLIDS... 701.
CHARGE IMBALANCE (% DIFF)... 0.4

ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	0.6				
AL....		CR.....		MG...	1.4				
AS....		CS.....		MN...	0.01				
B.....	0.78	F.....	9.7	NA...	190.	SIO2.	100.		

BE....		FE(TOT).	0.12	NB...		S04..	220.
BI....		GA.....		NH4..		SR...	0.55
CA....	20.	HCO3....	212.				
CD....		H2S.....		P04..	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, 1978; 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 — 10N 004W 28 NE — LAT/LONG... 46-35.73 N 112-06.7 W
- STATE..... MONTANA
- COUNTY..... LEWIS AND CLARK
- MAP REFERENCE..... HELENA 1:62500
- 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 (O/OO)

AG....		CO3.....		LI...	0.6
AL....		CR.....		MG...	0.8
B.....		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, 1978.

RECORD 00118

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027131

- NAME OF SAMPLE SOURCE... BROADWATER WELL - 3

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
- GEOLOGIC PROVINCE.. 21
- MAP REFERENCE..... HELENA 1:62500
- 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....		CO3.....	N	LI...	0.6	S....		ISOTOPES (O/OO)	
AL....		CR.....		MG...	0.8	SB...		DEL D OF WATER.....	-149.8
AS....		CS.....		MN...	0.02			DEL O(18) OF WATER...	-18.75
B.....	0.81	F.....	11.	NA...	180.	SIO2.	93.		
BE....		FE(TOT).	0.11	NB...		SO4..	180.		
BI....		GA.....		NH4..		SR...	0.31		
CA....	13.	HCO3....	193.						
CL....	34.								
CO....		K.....	5.9						

GAS ANALYSIS
DATE/ANALYST..... 1976/12/16 (COLLECTION DATE)
ANALYSIS IN VOLUME %

				ISOTOPES (OO/OO)
CH4..	0.1			
C2H6.	L 0.1	N2...	94.7	
CO2..	0.9	O2...	Q 1.8	

OTHER ANALYTICAL DATA... CO2 FOR WATER = 11. MG/L.; NO2 + NO3 = .00. AR + O2 = 1.8% FOR GAS. GROSS ALPHA = 12 PICOCURIES/L; GROSS BETA = 13 PICOCURIES/L. FOR SAMPLE DATED OF 10/06/76. GROSS ALPHA = 4 PICOCURIES/L, GROSS BETA = 8 PICOCURIES/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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027133
NAME OF SAMPLE SOURCE... GLOEGE WELL
WELL/SPRING NUMBER..... 10N-04W -28-ADD
LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	10N 004W	28	SE OF SE NE	LAT/LONG... 46-35.75 N 112-06.25 W
STATE.....	MONTANA				
COUNTY.....	LEWIS AND CLARK				
GEOLOGIC PROVINCE..	21				
MAP REFERENCE.....	HELENA 1:62500				

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 (M).. 84.
DISCHARGE..... 49. L/MIN
WATER ANALYSIS
PH..... 7.4
SPECIFIC CONDUCTANCE..... 728.
ALKALINITY..... 237. AS CACO3
TOTAL DISSOLVED SOLIDS... 403.
CHARGE IMBALANCE (% DIFF)... 1.6
ANALYSIS IN MG/L

AG....		CO3.....	0	LI...	0.08	ISOTOPES (O/OO)
AL....		CR.....		MG...	16.	
AS....	0.015	CS.....		MN...	0.03	

AL....		CU.....	0.005	MO...	0.043	SE...	0.002
B.....	0.17	F.....	0.7	NA...	38.	SIO2.	28.
BE.... N		FE(TOT).	0.02	NB...		SO4..	84.
BI....		GA.....		NH4..		SR...	0.56
BR....		GE.....		NI...	0.002		
CA....	78.	HCO3....	289.				
CA+MG.		HG..... N		PB...	0.003		
CD.... N		H2S.....		PO4..		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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027134
- NAME OF SAMPLE SOURCE... GLOEGE WELL
- WELL/SPRING NUMBER..... 10N-04W -28-ADD

LOCATION — TOWNSHIP-RANGE — COORDINATES
- COUNTRY..... UNITED STATES — 10N 004W 28 — SE OF SE NE — LAT/LONG... 46-35.75 N 112-06.25 W
- STATE..... MONTANA
- COUNTY..... LEWIS AND CLARK
- MAP REFERENCE..... HELENA 1:62500

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 — ISOTOPES (0/00)

BI....	GA.....	NH4..	SR...	0.55	
CA.... 79.					

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

RECORD 00121

GEOTHERM SAMPLE FILE — GEOTHERM 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 1:24000

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. AS CACO3
TOTAL DISSOLVED SOLIDS... 655.
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....		LI...	6.5		
AL....		CR.....		MG...	0.6		
AS....		CS.....		MN...	0.03		
B.....	0.82	F.....	19.	NA...	200.	SIO2.	83.
BE....		FE(TOT).	0.25	NB...		SO4..	160.
BI....		GA.....		NH4..		SR...	0.23
CA....	7.8	HCO3....	238.				
CL....	47.						

OTHER ANALYTICAL DATA... CO2 = 6.0; 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046046
NAME OF SAMPLE SOURCE... MARYSVILLE TEST WELL
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 — UTM ZONE... +12
COUNTY..... LEWIS AND CLARK — NORTHING... 5178510.
GEOLOGIC PROVINCE.. — 394919.
MAP REFERENCE..... GRANITE BUTTE 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/08/29
TEMPERATURE (C)..... Q 96.5 AT (M).. 1753.
AMBIENT TEMP (C)..... 4.3
WELL DEPTH (M)..... 1753.
GRADIENT (C/KM)..... Q
WATER ANALYSIS
PH..... 7.9
SPECIFIC CONDUCTANCE..... 950.
TOTAL DISSOLVED SOLIDS... 675.
CHARGE IMBALANCE (% DIFF)... 3.8
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....		LI...	2.		
AL....		CR.....		MG...	0.5		
B.....	0.1	F.....	20.	NA...	210.	SIO2.	69.
BE....		FE(TOT).	0.02	NB...		SO4..	180.
BI....		GA.....		NH4..		SR...	0.07
CA....	7.7	HCO3....	260.	NO3..	1.0		
CL....	51.						
CO....		K.....	10.				

OTHER ANALYTICAL DATA... TWO OTHER TEMPERATURES (SAME DATE): 42. C AT 1601.8MAND 39. C AT 1374 M.
QUALIFICATION FIELD..... GRADIENT CALCULATION IS MISLEADING, CONTACT U.S. GEOLOGICAL SURVEY DISTRICT OFFICE (MT. HELENA) 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046065

NAME OF SAMPLE SOURCE... SUN RIVER SPRINGS
WARING 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 1:24000					

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

RECORD 00124

GEOTHERM SAMPLE FILE — GEOTHERM 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 1:24000					

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

RECORD 00125

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027101

NAME OF SAMPLE SOURCE... ENNIS HOT SPRINGS (THEXTON)
WELL/SPRING NUMBER..... 05S-01W-28-DCA

LOCATION		TOWNSHIP-RANGE				COORDINATES	
COUNTRY.....	UNITED STATES	05S	001W	28	NE OF SW SE	LAT/LONG...	45-22.03 N 111-44.85 W
STATE.....	MONTANA						
COUNTY.....	MADISON						
MAP REFERENCE.....	ENNIS 1:62500						

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 — ISOTOPES (O/OO)

AL....		CR.....		MG...	20.		
B.....		F.....	0.3				
BA....		FE+3....		NA+K.	55.		
BE....		FE(TOT).	0.7	NB...		SO4..	30.
CA....	32.	HCO3....	250.	NO3..	N		
CL....	72.						

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

RECORD 00126

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046026

NAME OF SAMPLE SOURCE... ENNIS HOT SPRINGS (THEXTON).

LOCATION		TOWNSHIP-RANGE				COORDINATES	
COUNTRY.....	UNITED STATES	05S	001W	28	NE OF SW SE	LAT/LONG...	45-22.03 N 111-44.85 W
STATE.....	MONTANA					UTM ZONE...	+12
COUNTY.....	MADISON					NORTHING...	5023794.
GEOLOGIC PROVINCE..						441461.	
MAP REFERENCE.....	ENNIS 1:62500						

OTHER LOCALITY INFORMATION: ELEVATION 4920 FEET.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/04/01 USGS
TEMPERATURE (C)..... 83.2
AMBIENT TEMP (C)..... 5.9
DISCHARGE..... L 76. L/MIN
PERTINENT LITHOLOGY..... TERTIARY SEDIMENTS OVER PRE-BELT
OTHER SAMPLE INFORMATION.. SEE USGS OPEN-FILE REPORT 80-1182 FOR WATER CHEMISTRY AND TEMPERATURE DATA FROM SURROUNDING WELLS.

WATER ANALYSIS
PH..... 7.7
SPECIFIC CONDUCTANCE..... 1510.
ALKALINITY..... 363. AS CACO3
TOTAL DISSOLVED SOLIDS... 1030.
CHARGE IMBALANCE (% DIFF)... 1.3
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.26		
AL....		CR.....		MG...	0.6		

AS....	0.025	CS.....		MN...	0.01		
AU....		CU.....	0.001	MO...	0.012	SE...	N
B.....	0.61	F.....	11.	NA...	340.	SIO2.	96.
BE....	0.01	FE(TOT).	0.02	NB...		SO4..	220.
BI....		GA.....		NH4..		SR...	0.18
BR....		GE.....		NI...	0.007		
CA....	5.8	HCO3....	442.				
CA+MG.		HG.....	N	PB...	N		
CD....	N	H2S.....		PO4..		V....	0.0012
CL....	120.						
CO....		K.....	17.			ZN...	N

OTHER ANALYTICAL DATA... CO2 = 14., NO2 + NO3 AS N = .01, P = .02; SAMPLE DATED 1-15-77 YEILDED: GROSS ALPHA = 4 PICOCURIES/L, GROSS BETA = 13 PICOCURIES/L. ADDITIONAL SAMPLE-: SAMPLE DATED 1-15-77 YIELDED: GROSS ALPHA = 4 PICOCURIES/L, GROSS BETA = 13 PICOCURIES/L. ADDITIONAL SAMPLE (1976/04/01): CA = 5.6, SIO2 = 91.0, SR = 0.16 IN MG/L.

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

RECORD 00127

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027103

NAME OF SAMPLE SOURCE... HOT SPRINGS CREEK AT NORRIS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03S 001W 14 — NW OF SW SE — LAT/LONG... 45-34.22 N 111-41.35 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... NORRIS 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/07/09 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 17.5

WATER ANALYSIS

SPECIFIC CONDUCTANCE..... 294.
ALKALINITY..... 86. AS CACO3
CHARGE IMBALANCE (% DIFF)... 2.0

ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....		LI...	0.01		
AL....		CR.....		MG...	8.1		
B.....		F.....		NA...	15.		
BE....		FE(TOT).		NB...		SO4..	18.
CA....	32.	HCO3....	105.				
CL....	6.5						
CO....		K.....	2.9				

OTHER ANALYTICAL DATA... GROSS ALPHA=0.0 PICOCURIES/L. AND GROSS BETA=10 PICOCURIES/L.

REFERENCE AND IDENTIFICATION

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

RECORD 00128

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027100

NAME OF SAMPLE SOURCE... NELSON - R. LEE WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05S 001W 28 — NW OF NW SE — LAT/LONG... 45-22.02 N 111-43.77 W

STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... ENNIS 1:62500
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

								ISOTOPES (O/OO)
AG....		CO3.....		LI...	0.03			
AL....		CR.....		MG...	14.			
AS....		CS.....		MN...	0.03			
B.....	0.05	F.....	0.4	NA...	22.	SIO2.	41.	
BE....		FE(TOT).	1.4	NB...		SO4..	33.	
BI....		GA.....		NH4..		SR...	0.41	
CA....	47.	HCO3....	206.					
CL....	21.							
CO....		K.....	5.1					

REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER 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..... 04S-07W-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 1:24000
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

								ISOTOPES (O/OO)
AG....		CO3..... N		LI...	0.21			
AL....		CR.....		MG...	71.			
B.....	1.0	F.....		NA...	160.	SIO2.	42.	
BE....		FE(TOT).		NB...		SO4..	1100.	
CA....	280.	HCO3....	150.					
CL....	50.							
CO....		K.....	27.					

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-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 1:24000				

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

								ISOTOPES (O/OO)	
AG....		CO3.....		LI...	0.21	S....		DEL D OF WATER.....	Q -149.0
AL....		CR.....		MG...	69.	SB...		DEL O(18) OF WATER...	Q -19.30
B.....	0.88	F.....	1.8	NA...	110.	SIO2.	45.		
BE....		FE(TOT).		NB...		SO4..	1180.		
CA....	280.	HCO3....	258.						
CL....	52.								
CO....		K.....	27.						

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-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 1:24000				

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
PH..... 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			
B.....		F.....	4.6		NA...	170.	SIO2.	55.	
BE....		FE(TOT).	N		NB...		SO4..	1100.	
CA....	250.	HCO3....	49.		NO3..	N			
CL....	45.								
CO....		K.....	26.						

ISOTOPES (O/OO)

OTHER ANALYTICAL DATA... OH = 0.0; CO2 = 3.9; N = 0.0

REFERENCE AND IDENTIFICATION

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

RECORD 00132

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046050

NAME OF SAMPLE SOURCE... NEW BILTMORE HOT SPRINGS (ZIEGLER)

LOCATION — TOWNSHIP-RANGE

COUNTRY..... UNITED STATES
STATE..... MONTANA
COUNTY..... MADISON
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... BEAVERHEAD ROCK 1:24000

TOWNSHIP-RANGE: 04S 007W 28 NE OF SW NW

COORDINATES

LAT/LONG... 45-27.72 N 112-28.50 W
UTM ZONE... +12
NORTHING... 5035039.
384811.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/17 MARINER
TEMPERATURE (C)..... 53.0
AMBIENT TEMP (C)..... 6.2
DISCHARGE..... 280. 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						
B.....	0.92	F.....	3.3		NA...	160.	SIO2.	46.	
BE....		FE(TOT).	0.1		NB...		SO4..	1100.	
BI....		GA.....			NH4..	0.2			
BR....		GE.....			NI...	0.02			
CA....	290.	HCO3....	230.						
CA+MG.		HG.....	L 0.0001		PB...	L 0.1			
CD....	L 0.01	H2S.....	1.1						
CL....	46.								
CO....	L 0.05	K.....	24.		RB...	0.08	ZN...	0.08	

ISOTOPES (O/OO)

DEL D OF WATER..... -149.0
DEL O(18) OF WATER... -19.30

OTHER ANALYTICAL DATA... CO2 FOR WATER = 58.

REFERENCE AND IDENTIFICATION

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

RECORD 00133

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027022

NAME OF SAMPLE SOURCE... NEW BILTMORE HOT SPRINGS (ZIEGLER)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 04S 007W 28 — NE OF SW NW — LAT/LONG... 45-27.72 N 112-28.47 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... BEAVERHEAD ROCK 1:24000

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 — ISOTOPES (0/00)

AG....		CO3.....	N	LI...	0.21			
AL....		CR.....		MG...	72.			
AS....		CS.....		MN...	0.03			
B.....	0.87	F.....	3.6	NA...	160.	SIO2.	44.	
BE....		FE(TOT).	N	NB...		SO4..	1200.	
BI....		GA.....		NH4..		SR...	4.	
CA....	300.	HCO3....	229.					
CL....	45.							
CO....		K.....	26.					

OTHER ANALYTICAL DATA... CO2 = 58. MG/L.; N = 0.0; 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 SAMPLE FILE — GEOTHERM FILE ID: 0027018

NAME OF SAMPLE SOURCE... NEW BILTMORE HOT SPRINGS (ZIEGLER)

WELL/SPRING NUMBER..... 04S-07W-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 1:24000

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 — ISOTOPES (0/00)

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

```
    AL....              CR......              MG...    70.
    B.....              F.......   4.5        NA...    190.
    BE....              FE(TOT).   0.2        NB...              S04..    1200.
    CA....   310.       HCO3....   230.       NO3..  N
    CL....   50.
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 00135

```
GEOTHERM SAMPLE FILE                                                              GEOTHERM FILE ID:  0027058
  NAME OF SAMPLE SOURCE... NORRIS HOT SPRING (HAPGOOD, BEARTRAP)
LOCATION                              TOWNSHIP-RANGE                          COORDINATES
  COUNTRY.............  UNITED STATES     03S 001W  14   NW OF NE SE          LAT/LONG...  45-34.50 N 111-41.00 W
  STATE...............  MONTANA
  COUNTY..............  MADISON
  MAP REFERENCE.......  NORRIS 1:62500
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
  ANALYSIS IN MG/L                                                          ISOTOPES (0/00)
    AG....              CO3..... N
    AL....              CR......              MG...    10.
    B.....              F.......   8.5
    BA....              FE+3....              NA+K.    180.
    BE....              FE(TOT). N            NB...              S04..    130.
    CA....   35.        HCO3....   390.       NO3..  N
    CL....   25.
OTHER ANALYTICAL DATA... NO2 = .00
REFERENCE AND IDENTIFICATION
  COMPILED BY.............  FALLS, MARILYN I.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE...............  LEONARD AND OTHERS, 1978
```

RECORD 00136

```
GEOTHERM SAMPLE FILE                                                              GEOTHERM FILE ID:  0027059
  NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
LOCATION                              TOWNSHIP-RANGE                          COORDINATES
  COUNTRY.............  UNITED STATES     03S 001W  14   NW OF NE SE          LAT/LONG...  45-34.50 N 111-41.00 W
  STATE...............  MONTANA
  COUNTY..............  MADISON
  MAP REFERENCE.......  NORRIS 1:62500
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 (O/OO)

AG....		CO3.....		LI...	0.1		
AL....		CR.....		MG...	2.6		
B.....	0.2	F.....	4.4	NA...	210.	SIO2.	87.
BE....		FE(TOT).		NB...		SO4..	150.
CA....	19.	HCO3....	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 SAMPLE FILE — GEOTHERM FILE ID: 0027057
NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 03S 001W 14 — NW OF NE SE — LAT/LONG... 45-34.50 N 111-41.00 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... NORRIS 1:62500
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 (O/OO)

AG....		CO3.....	9.	LI...	0.11		
AL....		CR.....		MG...	3.0		
B.....	0.37	F.....		NA...	200.	SIO2.	79.
BE....		FE(TOT).		NB...		SO4..	150.
CA....	8.1	HCO3....	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 SAMPLE FILE — GEOTHERM FILE ID: 0027060
NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES 03S 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..... NORRIS 1:62500

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..... 314. AS CACO3
TOTAL DISSOLVED SOLIDS... 651.
CHARGE IMBALANCE (% DIFF)... 2.6

ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	0.1	S....			
AL....		CR.....		MG...	3.2	SB...			
AS....	0.002	CS.....		MN...	0.02				
AU....		CU.....	N	MO...	0.005	SE...	N		
B.....	0.12	F.....	8.1	NA...	190.	SIO2..	78.		
BE....	0.01	FE(TOT).	0.12	NB...		SO4..	130.		
BI....		GA.....		NH4..		SR...	0.32		
BR....		GE.....		NI...	0.006				
CA....	19.	HCO3....	383.						
CA+MG.		HG.....	N	PB...	N				
CD....	N	H2S.....		PO4..		V....	0.0007		
CL....	22.								
CO....		K.....	11.			ZN...	N		

ISOTOPES (O/OO)
DEL D OF WATER..... -149.2.
DEL O(18) OF WATER... -18.75

OTHER ANALYTICAL DATA... CO2 = 9.7; NO2 PLUS NO3 = .00; P = .02; SECOND SAMPLE 76-03-29 CONTAINED CA = 18, SIO2 = 73, SR = .31. SAMPLE DATED 7-09-76 SHOWS GROSS ALPHA = 0; GROSS BETA = 10 PICOCURIES/L.

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

RECORD 00139

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0002910
NAME OF SAMPLE SOURCE... NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)
WELL/SPRING NUMBER..... 03S-001W-14-DAB

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 03S 001W 14 NW OF NE SE LAT/LONG... 45-34.50 N 111-41.00 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... NORRIS 1:62500

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1974/08/21 MARINER
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. AS HCO3
TOTAL DISSOLVED SOLIDS... 839.
CHARGE IMBALANCE (% DIFF)... 7.9

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.09	S....		ISOTOPES (O/OO)	
AL....	L 0.001	CR.....		MG...	3.2	SB...		DEL D OF WATER.....	-148.4
AS....		CS.....		MN...	0.02			DEL O(18) OF WATER...	-19.11
B.....	0.1	F.....	7.4	NA...	180.	SIO2.	88.		
BE....		FE(TOT).		NB...		SO4..	130.		
CA....	17.	HCO3....	380.						
CD....		H2S.....	L 1.0						
CL....	23.								
CO....		K.....	10.	RB...	0.08	ZN...	0.04		

GAS ANALYSIS

ANALYSIS IN VOLUME %

CH4..	0.2			ISOTOPES (OO/OO)
C2H6.		N2...	95.	
CO2..	2.8	O2...	Q 2.9	

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... NEH-457
REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00140

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027104
NAME OF SAMPLE SOURCE... NORRIS WARM WELL - 2 (HAPGOOD, 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 1:62500

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			ISOTOPES (O/OO)	
AL....		CR.....		MG...	5.4				
AS....		CS.....		MN...	0.01				
B.....	0.08	F.....	5.4	NA...		SIO2.	56.		
BE....		FE(TOT).	0.12	NB...		SO4..	110.		
BI....		GA.....		NH4..		SR...	0.41		
CA....	22.	HCO3....	310.						
CD....		H2S.....		PO4..	0.15				
CL....	16.								
CO....		K.....	8.4						

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027095
  NAME OF SAMPLE SOURCE... POTOSI DRAIN NORTH
LOCATION — TOWNSHIP-RANGE — COORDINATES
  COUNTRY..... UNITED STATES — 03S 002W 07 — LAT/LONG... 45-35.40 N 111-53.90 W
  STATE..... MONTANA
  COUNTY..... MADISON
  MAP REFERENCE..... HARRISON 1:62500
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.
  CHARGE IMBALANCE (% DIFF)... 0.7
  ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.05				
AL....		CR.....		MG...	0.1				
B.....	0.03	F.....	5.0	NA...	67.	SIO2.	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027056
  NAME OF SAMPLE SOURCE... POTOSI DRAIN SOUTH
LOCATION — TOWNSHIP-RANGE — COORDINATES
  COUNTRY..... UNITED STATES — 03S 002W 07 — LAT/LONG... 45-35.32 N 111-53.88 W
  STATE..... MONTANA
  COUNTY..... MADISON
  MAP REFERENCE..... HARRISON 1:62500
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		
B.....		F.....		NA...	82.		
CA....	11.						
CO....		K.....	1.6				

ISOTOPES (O/OO)

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 — 035 002W 07 — LAT/LONG... 45-35.32 N 111-53.88 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500

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		
B.....	0.03	F.....	3.7	NA...	39.	SIO2.	31.
BE....		FE(TOT).	0.13	NB...		SO4..	53.
BI....		GA.....		NH4..		SR...	0.3
CA....	7.8	HCO3....	54.				
CL....	2.7						
CO....		K.....	1.2				

ISOTOPES (O/OO)

OTHER ANALYTICAL DATA... CO2 = .6; NO2 PLUS NO3 = .01; 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 — 035 002W 07 — LAT/LONG... 45-35.35 N 111-53.92 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500

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 (% DIFF)... 0.1
ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....		LI...	0.06	S....		DEL D OF WATER.....	-150.0
AL....		CR.....		MG... N		SB...		DEL O(18) OF WATER...	-19.60
B.....	0.02	F.....	6.6	NA...	86.	SIO2.	44.		
BE....		FE(TOT).	0.01	NB...		SO4..	130.		
BI....		GA.....		NH4..		SR...	0.51		
CA....	10.	HCO3....	66.						
CL....	5.8								
CO....		K.....	1.7						

OTHER ANALYTICAL DATA... CO2 = 0.3; 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, 1976B

RECORD 00145

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027090
NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 03S 002W 07 LAT/LONG... 45-35.35 N 111-53.92 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500
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

								ISOTOPES (O/OO)	
AG....		CO3.....		LI...	0.06				
AL....		CR.....		MG...	0.1				
B.....		F.....		NA...	88.	SIO2.	45.		
BE....		FE(TOT).		NB...		SO4..	140.		
CA....	11.								
CL....	6.9								
CO....		K.....	1.7						

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, 1976B

RECORD 00146

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027088

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS

LOCATION		TOWNSHIP-RANGE	COORDINATES
COUNTRY.....	UNITED STATES	03S 002W 07	LAT/LONG... 45-35.35 N 111-53.92 W
STATE.....	MONTANA		
COUNTY.....	MADISON		
MAP REFERENCE.....	HARRISON 1:62500		

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 — ISOTOPES (O/OO)

AG....		CO3.....	2.	LI...	60.		
AL....		CR.....		MG... N			
B.....	L 0.1	F.....	3.6	NA...	94.	SIO2..	47.
BE....		FE(TOT).		NB...		SO4..	160.
CA....	11.	HCO3....	64.				
CL....	4.4						
CO....		K.....	1.9				

REFERENCE AND IDENTIFICATION

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

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

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

RECORD 00147

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027087

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS

LOCATION		TOWNSHIP-RANGE	COORDINATES
COUNTRY.....	UNITED STATES	03S 002W 07	LAT/LONG... 45-35.35 N 111-53.92 W
STATE.....	MONTANA		
COUNTY.....	MADISON		
MAP REFERENCE.....	HARRISON 1:62500		

SAMPLE DESCRIPTION AND CONDITIONS

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

TEMPERATURE (C)..... 51.

DISCHARGE..... 298. 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..... 56. AS CACO3

TOTAL DISSOLVED SOLIDS... 319.

ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	2.	LI...	0.08		
AL....		CR.....		MG... N			
B.....	0.25	F.....		NA...	88.	SIO2..	41.
BE....		FE(TOT).		NB...		SO4..	140.
CA....	11.	HCO3....	67.				

CL.... N
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, 1976B

RECORD 00148

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027086
NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 03S 002W 07 LAT/LONG... 45-35.35 N 111-53.92 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500
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 ISOTOPES (0/00)
AL.... CR..... MG... 1.0
B..... F..... 5.8
BA.... FE+3.... NA+K. 93.
BE.... FE(TOT). N NB... SO4.. 53.
CA.... 12. HCO3.... 79. NO3.. N
CL.... 8.0
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 00149

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046055
NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS (CLARK)
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 03S 002W 07 NW OF NE SW LAT/LONG... 45-35.35 N 111-53.92 W
STATE..... MONTANA UTM ZONE... +12
COUNTY..... MADISON NORTHING... 5048578.
GEOLOGIC PROVINCE.. 21 429899.
MAP REFERENCE..... HARRISON 1:62500
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. AS CACO3
TOTAL DISSOLVED SOLIDS... 333.
CHARGE IMBALANCE (% DIFF)... 0.0

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....	2.	LI...	0.05	S....		DEL D OF WATER.....	-149.0
AL....	0.006	CR.....		MG...	L 0.1	SB...		DEL O(18) OF WATER...	-19.81
AS....		CS.....	L 0.1	MN...	L 0.02				
AU....		CU.....	L 0.01						
B.....	L 0.02	F.....	6.2	NA...	91.	SIO2.	46.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	140.		
BR....		GE.....		NI...	0.02				
CA....	10.	HCO3....	63.						
CA+MG.		HG.....	L 0.0001	PB...	0.1				
CD....	L 0.01	H2S.....	L 0.5						
CL....	5.9								
CO....	L 0.05	K.....	1.6	RB...	L 0.02	ZN...	0.01		

OTHER ANALYTICAL DATA... SAMPLE DATED 1978/05/24, WITH TEMPERATURE: 35.0 C; SPECIFIC CONDUCTANCE = 464.; PH = 8.45.CO2 FOR WATER = 0.3

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

RECORD 00150

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027091

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS VENT 17

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 03S 002W 07 — LAT/LONG... 45-35.35 N 111-53.92 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500

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. AS CACO3
CHARGE IMBALANCE (% DIFF)... 7.9

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....	2.	LI...	0.06				
AL....		CR.....		MG...	0.2				
B.....	0.3	F.....		NA...	87.				
BE....		FE(TOT).		NB...		SO4..	140.		
CA....	13.	HCO3....	69.						
CL....	2.5								
CO....		K.....	2.8						

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027092

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS VENT 17

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03S 002W 07 — LAT/LONG... 45-35.35 N 111-53.92 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/12 U.S. GEOLOGICAL SURVEY

TEMPERATURE (C)..... 49.

DISCHARGE..... 30. 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...			
B.....	0.02	F.....	5.9	NA...	79.	SIO2.	43.		
BE....		FE(TOT).	0.04	NB...		SO4..	120.		
BI....		GA.....		NH4..		SR...	0.49		
CA....	10.	HCO3....	62.						
CL....	5.6								
CO....		K.....	1.8						

ISOTOPES (O/OO)

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, 1976B

RECORD 00152

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027085

NAME OF SAMPLE SOURCE... POTOSI HOT SPRINGS VENT 37

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03W 002W 07 — LAT/LONG... 45-35.33 N 111-53.87 W

STATE..... MONTANA

COUNTY..... MADISON

MAP REFERENCE..... HARRISON 1:62500

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....		CR.....		MG...	0.1				
B.....		F.....		NA...	89.				
CA....	12.								
CO....		K.....	1.7						

ISOTOPES (O/OO)

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027093

NAME OF SAMPLE SOURCE... POTOSI WARM SPRINGS VENT 15

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03S 002W 07 — LAT/LONG... 45-35.37 N 111-53.93 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500

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

								ISOTOPES (0/00)	
AG....		CO3.....	N	LI...	0.03	S....		DEL D OF WATER.....	-144.5
AL....		CR.....		MG...	0.1	SB...		DEL O(18) OF WATER...	-18.65
B.....	0.02	F.....	2.4	NA...	36.	SIO2.	30.		
BE....		FE(TOT).	0.2	NB...		SO4..	46.		
BI....		GA.....		NH4..		SR...	0.29		
CA....	5.9	HCO3....	49.						
CL....	2.4								
CO....		K.....	1.1						

OTHER ANALYTICAL DATA... CO2 = 7.8; NO2 PLUS NO3 = .00; P = .01

REFERENCE AND IDENTIFICATION

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

RECORD 00154

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027094

NAME OF SAMPLE SOURCE... POTOSI WARM SPRINGS VENT 15

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03S 002W 07 — LAT/LONG... 45-35.37 N 111-53.93 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... HARRISON 1:62500

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

					ISOTOPES (0/00)
AG....		CO3.....	LI...	0.06	
AL....		CR.....	MG...	0.4	

B..... F..... NA... 88.
CA.... 11.
CO.... K..... 1.7
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00155

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027030
NAME OF SAMPLE SOURCE... PULLER HOT SPRINGS
WELL/SPRING NUMBER..... 08S-005W-01-ABD
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 08S 005W 01 SW OF NW NE LAT/LONG... 45-10.30 N 112-09.12 W
STATE..... MONTANA
COUNTY..... MADISON
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... METZEL RANCH, MONTANA 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/05/14 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 44.4
DISCHARGE..... 189. L/MIN
WATER ANALYSIS
PH..... 7.7
SPECIFIC CONDUCTANCE..... 1680.
ALKALINITY..... 419. AS CACO3
TOTAL DISSOLVED SOLIDS... 1160.
CHARGE IMBALANCE (% DIFF)... 5.5
ANALYSIS IN MG/L ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.19			
AL....		CR.....		MG...	19.			
AS....	0.034	CS.....		MN...	0.03			
AU....		CU.....	N	MO...	0.003	SE...	N	
B.....	0.69	F.....	2.2	NA...	330.	SIO2.	33.	
BE....	N	FE(TOT).	0.04	NB...		SO4..	350.	
BI....		GA.....		NH4..		SR...	1.0	
BR....		GE.....		NI...	0.003			
CA....	56.	HCO3....	511.					
CA+MG.		HG.....	N	PB...	0.004			
CD....	N	H2S.....		PO4..		V....	N	
CL....	91.							
CO....		K.....	24.			ZN...	0.02	

GAS ANALYSIS
DATE/ANALYST..... 1976/05/14 (COLLECTION DATE)
ANALYSIS IN VOLUME % ISOTOPES (O/OO)

CH4..	0.1		
C2H6.		N2...	89.5
CO2..	2.5		

OTHER ANALYTICAL DATA... CO2 = 16 MG/L; NO2 + NO3 = 0.0; P = 0.0; IN GAS ANALYSIS O2 + AR = 7.7SAR = 9.7
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00156

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027029

NAME OF SAMPLE SOURCE... PULLER WARM SPRINGS
WELL/SPRING NUMBER..... 08S-005W-01-ABD

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	08S 005W 01	SE OF NW NE	LAT/LONG... 45-10.28 N 112-09.12 W
STATE.....	MONTANA			
COUNTY.....	MADISON			
MAP REFERENCE.....	METZEL RANCH, MONTANA 1:24000			

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 — ISOTOPES (0/00)

AG....		CO3.....	N	LI...	0.2			
AL....		CR.....		MG...	20.			
B.....	0.69	F.....	2.1	NA...	330.	SIO2.	32.	
BE....		FE(TOT).	0.06	NB...		SO4..	370.	
BI....		GA.....		NH4..		SR...	1.1	
CA....	64.	HCO3....	537.					
CL....	91.							
CO....		K.....	24.					

GAS ANALYSIS

DATE/ANALYST..... 1976/05/14 (COLLECTION DATE)

ANALYSIS IN VOLUME % — ISOTOPES (00/00)

CH4..	0.1		
C2H6.		N2,..	91.8
CO2..	2.6	O2...	@ 5.6

OTHER ANALYTICAL DATA... CO2 = 43.1 NO2 PLUS NO3 = .061 P = .00SAR = 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

RECORD 00157

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027028

NAME OF SAMPLE SOURCE... PULLER WARM SPRINGS
WELL/SPRING NUMBER..... 08S-005W-01-ABD

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	08S 005W 01	SE OF NW NE	LAT/LONG... 45-10.28 N 112-09.12 W
STATE.....	MONTANA			
COUNTY.....	MADISON			
MAP REFERENCE.....	METZEL RANCH, MONTANA 1:24000			

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR.....	1973/07/21 KACZMAREK (1974), TABLE 3
TEMPERATURE (C).....	43.0

DISCHARGE..... 5.7 L/MIN.
WATER ANALYSIS
PH..... 7.0
ANALYSIS IN MG/L ISOTOPES (O/OO)
AL.... CR..... MG... 19.
B..... F..... NA... 250. SIO2. 20.
CA.... 58.
CL.... 91.
CO.... K..... 20.
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 1:62500
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 ISOTOPES (O/OO)
B..... F..... NA... SIO2. 110.
CL.... 32.
GAS ANALYSIS
ANALYSIS ISOTOPES (OO/O)
C2H6. N2... 96.
QUALIFICATION FIELD..... O2 = O2 + 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-06W-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 1:62500
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 CACO3
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	190.	LI...	0.32			
AL....		CR.....		MG...	0.5			
B.....	0.45	F.....	5.4	NA...	170.	SIO2.	110.	
BE....		FE(TOT).		NB...		SO4..	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 — GEOTHERM FILE ID: 0027033
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 1:62500

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..... 148. AS CACO3
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	N					
AL....		CR.....		MG...	3.			
B.....		F.....	8.0					
BA....		FE+3....		NA+K.	170.			
BE....		FE(TOT).	0.1	NB...		SO4..	200.	
CA....	8.0	HCO3....	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 — GEOTHERM FILE ID: 0027031
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 1:62500
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

AG....		CO3.....	N	LI...	0.38	ISOTOPES (0/00)			
AL....		CR.....		MG...	0.3				
AS....		CS.....		MN...	0.04				
B.....	0.26	F.....	8.9	NA...	170.	SIO2.	110.		
BE....		FE(TOT).		NB...		SO4..	190.		
BI....		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 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 00162

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027035
NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS
WELL/SPRING NUMBER..... 02S-06W-01-CB A
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 1:62500
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

AG....		CO3.....	N	LI...	0.38	ISOTOPES (0/00)
AL....		CR.....		MG...	2.2	

AS....		CS.....		MN...	0.02		
B.....		F.....	9.2	NA...	170.	SIO2.	120.
BE....		FE(TOT). N		NB...		SO4..	230.
CA....	9.1	HCO3....	140.	NO3..	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

GEOTHERM SAMPLE FILE — GEOTHERM 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 006W 01 NE OF NW SW — LAT/LONG... 45-41.12 N 112-17.70 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... TWIN BRIDGE 1:62500

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		
B.....	0.32	F.....		NA...	170.	SIO2.	100.
BE....		FE(TOT).		NB...		SO4..	200.
CA....	9.7	HCO3....	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046060

NAME OF SAMPLE SOURCE... SILVER STAR HOT SPRINGS (BARKELLS)

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 — UTM ZONE... +12
COUNTY..... MADISON — NORTHING... 5059685.
GEOLOGIC PROVINCE.. — 399155.
MAP REFERENCE..... TWIN BRIDGES 1:62500

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 FRO SWIMMING POOL AND ISSUE IN ROCK-LINED TANKS. SPORADIC GAS DISCHARGE. SPRINGS MAY BE SILTED UP. LEASE FOR GREENHOUSES BEING NEGOTIATED.

WATER ANALYSIS
PH..... 8.2
SPECIFIC CONDUCTANCE..... 808.
ALKALINITY..... 170. AS HCO3
TOTAL DISSOLVED SOLIDS... 698.
CHARGE IMBALANCE (% DIFF)... 0.5

ANALYSIS IN MG/L

AG....		CO3.....	2.	LI...	0.34	S....			
AL....	0.007	CR.....		MG...	0.3	SB...			
AS....		CS.....		MN...	0.02				
B.....	0.25	F.....	8.7	NA...	170.	SIO2.	110.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	190.		
CA....	9.3	HCO3....	170.						
CA+MG.		HG.....		PB...	L 0.1				
CD....		H2S.....	1.6						
CL....	31.								
CO....		K.....	6.4	RB...	0.05	ZN...	L 0.01		

ISOTOPES (O/OO)
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.		N2...	96.
CO2..	1.2	O2...	Q 2.7

ISOTOPES (OO/OO)

OTHER ANALYTICAL DATA... NH4 AS N = L 0.1FLOW 114. L/MIN, 1978/04/13
QUALIFICATION FIELD..... O2 PLUS AR = 2.7
REFERENCE AND IDENTIFICATION
COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
COMPILER CROSS INDEX... NEH-458
REFERENCE..... LEONARD AND OTHERS, 1978; MARINER AND OTHERS, 1976B

RECORD 00165

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046063
NAME OF SAMPLE SOURCE... SLOAN COW CAMP

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	12S 001W	19	NE OF SE SW	LAT/LONG... 44-46.13 N 111-38.92 W
STATE.....	MONTANA				UTM ZONE... +12
COUNTY.....	MADISON				NORTHING... 4957259.
GEOLOGIC PROVINCE..	21				448668.
MAP REFERENCE.....	CLIFF LAKE 1:62500				

OTHER LOCALITY INFORMATION: ELEVATION 6560 FEET

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1977/09/29
SAMPLE NUMBER..... LAB NO. 78M0397
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.
CHARGE IMBALANCE (% DIFF)... 1.6

ANALYSIS IN MG/L

								ISOTOPES (0/00)
AG....		CO3.....	74.4	LI...	L 0.01			
AL....	0.086	CR.....		MG...	0.1			
AS....	L 0.002							
B.....	0.16	F.....	3.1	NA...	88.	SIO2.	50.9	
BE....		FE(TOT).	0.17	NB...		SO4..	3.7	
BI....		GA.....		NH4..		SR...	0.01	
BR....	0.1							
CA....	0.9	HCO3....	64.	NO3..	0.2			
CA+MG.		HG.....		PB...		U....	0.0003	
CO....		H2S.....	0.94					
CL....	7.65							
CO....		K.....	1.1					

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 00166

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027102

NAME OF SAMPLE SOURCE... THEXTON HOT WELL
WELL/SPRING NUMBER..... 05S-01W-28-DBD

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 05S 001W 28 — SE OF NW SE — LAT/LONG... 45-22.12 N 111-43.62 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... ENNIS 1:62500

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.
CHARGE IMBALANCE (% DIFF)... 5.7

ANALYSIS IN MG/L

								ISOTOPES (0/00)
AL....		CR.....		MG...	0.9			
B.....	0.61	F.....	11.	NA...	330.	SIO2.	98.	
BE....		FE(TOT).	1.7	NB...		SO4..	250.	
CA....	5.8	HCO3....	437.					
CL....	110.							
CO....		K.....	17.					

OTHER ANALYTICAL DATA... NO2 + NO3 AS N = .001 P = .031 SECOND SAMPLE SIO2 = 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	07S 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 1:24000			

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-BELT 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 — ISOTOPES (0/00)

AG....		CO3.....	N					
AL....	0.09	CR.....		MG...	30.			
B.....		F.....	0.8	NA...	70.	SIO2.	19.0	
BE.....		FE(TOT).	L 0.01	NB...		SO4..	102.	
CA....	78.	HCO3....	425.	NO3..	0.77			
CL....	18.2							
CO.....		K.....	11.1					

REFERENCE AND IDENTIFICATION

COMPILED BY.....	SONVEREGGER, JOHN L.
COMPILER AFFILIATION...	MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE.....	*SONDREGGER, 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	09S 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.....	VARNEY 1:62500			

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

								ISOTOPES (0/00)
AG....		CO3.....	181.8					
AL....	0.08	CR.....		MG...	27.			
B.....		F.....	0.9	NA...	6.7	SIO2.	15.5	
BE....		FE(TOT). L	0.01	NB...		SO4..	174.	
CA....	85.	HCO3....	182.	NO3..	0.67			
CL....	1.9							
CO....		K.....	3.1					

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

GEOTHERM SAMPLE FILE — GEOTHERM 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/COLLECTOR..... 1977/09/13 WEINHEIMER, GERALD J.
SAMPLE NUMBER..... 78Q0293
TEMPERATURE (C)..... 24.
DISCHARGE..... Q 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

								ISOTOPES (0/00)
AL....	0.036	CR.....		MG...	1.7			
AS....		CS.....		MN...	0.02			
B.....		F.....	14.4	NA...	260.	SIO2.	41.7	
BE....		FE(TOT).	0.08	NB...		SO4..	80.8	
CA....	6.6	HCO3....	493.	NO3..	0.22			
CL....	49.2							
CO....		K.....	6.6					

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046072

NAME OF SAMPLE SOURCE... WEST FORK SWIMMING HOLE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	12S	001E	18	SE OF SW	LAT/LONG... 44-47.12 N 111-38.92 W
STATE.....	MONTANA					UTM ZONE... +12
COUNTY.....	MADISON					NORTHING... 4959092.
GEOLOGIC PROVINCE..	21					448683.
MAP REFERENCE.....	CLIFF LAKE 1:62500					

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 (O/OO)

AG....		CO3.....	N	LI...	L 0.01		
AL....	0.023	CR.....		MG...	29.		
AS....	0.0028						
B.....	0.02	F.....	0.4	NA...	4.8	SIO2.	13.7
BE....		FE(TOT).	L 0.01	NB...		SO4..	11.8
BI....		GA.....		NH4..		SR...	0.12
CA....	19.	HCO3....	194.	NO3..	0.44		
CA+MG.		HG.....		PB...		U....	0.0010
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

GEOTHERM SAMPLE FILE — GEOTHERM 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	LAT/LONG... 44-59.03 N 111-36.78 W
STATE.....	MONTANA					UTM ZONE... +12
COUNTY.....	MADISON					NORTHING... 4981120.
GEOLOGIC PROVINCE..	21					451671.
MAP REFERENCE.....	CLIFF LAKE 1:62500					

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 BACKHOE *MBMG LAB. NO. 78M0425 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								
B.....	0.04	F.....	18.	NA...	120.	SIO2.	55.		
BE....		FE(TOT). N		NB...		SO4..	53.		
BI....		GA.....		NH4..		SR...	0.07		
BR....	0.1								
CA....	0.2	HCO3....	157.	NO3..	0.28				
CA+MG.		HG.....		PB...	0.003	U....	0.0006		
CL....	23.	I.....	0.01						
CO....		K.....	1.9			ZN...	N		

ISOTOPES (O/OO)
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.		N2...	93.8
CO2..	0.3	O2... Q	5.1

ISOTOPES (OO/OO)

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..... SONDEREGGER, 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..... 10S-01E-09-BBB
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 10S 001E 09 NW OF NW NW LAT/LONG... 44-59.03 N 111-36.78 W
STATE..... MONTANA
COUNTY..... MADISON
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

B.....		F.....	18.						
BE....		FE(TOT).		NB...		SO4..	50.		
CL....	22.								

ISOTOPES (O/OO)

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 — 10S 001E 09 NW OF NW NW — LAT/LONG... 44-58.55 N 111-39.03 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... CLIFF LAKE 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/13 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 25.5
DISCHARGE..... 38. 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 (O/OO)
AG....		CO3.....	N	LI...	0.12			
AL....		CR.....		MG...	1.8			
B.....	0.19	F.....	21.	NA...	270.	SIO2.	38.	
BE....		FE(TOT).	0.01	NB...		SO4..	80.	
BI....		GA.....		NH4..		SR...	0.13	
CA....	6.5	HCO3....	491.					
CL....	49.							
CO....		K.....	6.5					

OTHER ANALYTICAL DATA... CO2 = 12.; NO2 PLUS NO3 = .02 AS N; 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..... 10S-01E-09-BBB

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 10S 001E 09 NW OF NW NW — LAT/LONG... 44-59.13 N 111-36.78 W
STATE..... MONTANA
COUNTY..... MADISON
MAP REFERENCE..... CLIFF LAKE 1:62500
OTHER LOCALITY INFORMATION: MBMG LOCATION IS T.10S., R.1E.,SEC. 4CCCD(JUST ACROSS SECTION LINE FENCE, NORTH OF THE W. C. HOT SPRING); 44-59.133N, 111-36.600W.

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

								ISOTOPES (0/00)	
AG....		CO3..... N		LI...	0.04	S....		DEL D OF WATER.....	-140.7
AL....		CR.....		MG...	3.5	SB...		DEL O(18) OF WATER...	-18.95
B.....	0.04	F.....	6.5	NA...	49.	SIO2.	24.		
BE....		FE(TOT).	0.14	NB...		SO4..	22.		
BI....		GA.....		NH4..		SR...	0.15		
CA....	19.	HCO3....	145.						
CL....	8.5								
CO....		K.....	1.6						

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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046045
NAME OF SAMPLE SOURCE... LUCAS FLOWING WELL
LOCATION TOWNSHIP-RANGE COORDINATES
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

								ISOTOPES (0/00)	
AG....		CO3.....		LI...	0.1				
AL....		CR.....		MG...	140.				
B.....	0.18	F.....	2.8	NA...	32.	SIO2.	25.		
BE....		FE(TOT).	1.6	NB...		SO4..	2200.		
BI....		GA.....		NH4..		SR...	12.		
CA....	660.	HCO3....	115.						
CL....	6.0								
CO....		K.....	13.						

OTHER ANALYTICAL DATA... NO2 PLUS NO3 = .00, P = .00
REFERENCE AND IDENTIFICATION
COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00176

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046058
NAME OF SAMPLE SOURCE... RINGLING FLOWING WELL
LOCATION TOWNSHIP-RANGE COORDINATES

COUNTRY..... UNITED STATES 07N 007E 25 SW OF SE NE LAT/LONG... 46-20.37 N 110-47.18 W
STATE..... MONTANA UTM ZONE... +12
COUNTY..... MEAGHER NORTHING... 5131573.
GEOLOGIC PROVINCE.. 516444.
MAP REFERENCE..... RINGLING 1:24000

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 ISOTOPES (O/OO)

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			
B.....	0.08	F.....	2.7	NA...	8.8	SIO2.	25.	
BE....	N	FE(TOT).	0.1	NB...		SO4..	860.	
BI....		GA.....		NH4..		SR...	4.3	
BR....		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							
CO....		K.....	6.5			ZN...	0.02	

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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027137
NAME OF SAMPLE SOURCE... WHITE SULPHUR (BREWERS) SPRINGS
WELL/SPRING NUMBER..... 09N-07E-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 1:24000

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 ISOTOPES (O/OO)

AG....	CO3.....	24.	

AL....		CR.....		MG...	33.			
B.....		F.....	1.8					
BA....		FE+3....		NA+K.	450.			
BE....		FE(TOT).	0.1	NB...		SO4..	320.	
CA....	42.	HCO3....	730.	NO3..	2.0			
CL....	170.							

OTHER ANALYTICAL DATA... OH = 0.0; 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 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 1976/05/11 U.S. GEOLOGICAL SURVEY
- TEMPERATURE (C)..... 45.5
- DISCHARGE..... G 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 — ISOTOPES (O/OO)

B.....		F.....	6.5	NA...		SIO2.	44.
BE....		FE(TOT).		NB...		SO4..	320.
CA....		HCO3....	721.				
CL....	180.						

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 — UTM ZONE... +12
- COUNTY..... MEAGHER — NORTHING... 5153742.
- GEOLOGIC PROVINCE.. — 507987.
- MAP REFERENCE..... WHITE SULPHUR SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
- DATE/COLLECTOR..... 74/08 MARINER
- TEMPERATURE (C)..... 46.0
- AMBIENT TEMP (C)..... 4.5
- DISCHARGE..... G 1514. L/MIN

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

PH..... 6.5
SPECIFIC CONDUCTANCE..... 2220.
ALKALINITY..... 681. AS CACO3
TOTAL DISSOLVED SOLIDS... 1530.
CHARGE IMBALANCE (% DIFF)... 3.1

ANALYSIS IN MG/L

AG....		CO3.....	L 1.0	LI...	1.3	S....		ISOTOPES (O/OO)	
AL....	0.006	CR.....		MG...	12.	SB...		DEL D OF WATER.....	-148.6
AS....		CS.....	0.1	MN...	0.15			DEL O(18) OF WATER...	-18.91
AU....		CU.....	L 0.01						
B.....	9.1	F.....	7.4	NA...	480.	SIO2.	51.		
BE....		FE(TOT).	0.11	NB...		SO4..	310.		
BR....		GE.....		NI...	L 0.02				
CA....	44.	HCO3....	830.						
CA+MG.		HG.....		PB...	L 0.1				
CO....	L 0.1	H2S.....	0.7						
CL....	180.								
CO....	L 0.05	K.....	20.	RB...	0.09	ZN...	0.02		

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, 1978, MARINER AND OTHERS, 1976B

RECORD 00180

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046031

NAME OF SAMPLE SOURCE... GRANITE HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 11N 023W 07 — SE OF NW NE
STATE..... MONTANA
COUNTY..... MISSOULA
GEOLOGIC PROVINCE..
MAP REFERENCE..... LOLO HOT SPRINGS 1:24000
LAT/LONG... 46-43.82 N 114-32.05 W
UTM ZONE... +11
NORTHING... 5177932.
688410.

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..... 379. L/MIN
PERTINENT LITHOLOGY..... SOURCE OF WATER- WALLACE, IDAHO BATHOLITH

WATER ANALYSIS

PH..... 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046900

NAME OF SAMPLE SOURCE... LOLO HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 11N 023W 07 — SW OF SE NE — LAT/LONG... 46-43.56 N 114-31.97 W
STATE..... MONTANA
COUNTY..... MISSOULA
MAP REFERENCE..... LOLO HOT SPRINGS 1:24000
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

PH..... 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 — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 11N 023W 07 — SW OF SE NE — LAT/LONG... 46-43.56 N 114-31.97 W
STATE..... MONTANA
COUNTY..... MISSOULA
MAP REFERENCE..... LOLO HOT SPRINGS 1:24000

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 — ISOTOPES (O/OO)

AG....		CO3.....	30.				
AL....		CR.....		MG...	N		
B.....		F.....	8.3				
BA....		FE+3....		NA+K.	50.		
BE....		FE(TOT).	0.34	NB...		SO4..	18.
CA....	4.	HCO3....	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

RECORD 00183

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027007

NAME OF SAMPLE SOURCE... LOLO HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 11N 023W 07 — SW OF SE NE — LAT/LONG... 46-43.56 N 114-31.97 W
STATE..... MONTANA
COUNTY..... MISSOULA
MAP REFERENCE..... LOLO HOT SPRINGS 1:24000

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 — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.040			
AL....		CR.....		MG...	0.2			
AS....		CS.....		MN...	N			
B.....		F.....	6.4	NA...	50.	SIO2.	71.	
BE....		FE(TOT).	0.03	NB...		SO4..	20.	
CA....	2.0	HCO3....	68.	NO3..	0.3			
CL....	5.5							
CO....		K.....	1.2					

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046043

NAME OF SAMPLE SOURCE... LOLO HOT SPRINGS (GRANITE)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 11N 023W 07 — SW OF SE NE — LAT/LONG... 46-45.13 N 114-31.97 W
STATE..... MONTANA
COUNTY..... MISSOULA
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... LOLO HOT SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/08/17 MARINER
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)... 3.8

ANALYSIS IN MG/L

								ISOTOPES (O/OO)	
AG....		CO3.....	8.	LI...	0.03	S....		DEL D OF WATER.....	-139.8
AL....	0.010	CR.....		MG...	L 0.1	SB...		DEL O(18) OF WATER...	-16.08
AS....		CS.....		MN...	L 0.02				
B.....	0.11	F.....	6.4	NA...	52.	SIO2.	72.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	18.		
BI....		GA.....		NH4..	L 0.13				
CA....	1.8	HCO3....	70.						
CA+MG.		HG.....		PB...	L 0.1				
CO....		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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046007

NAME OF SAMPLE SOURCE... BEAR CREEK SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 09S 009E 19 NW OF SE — LAT/LONG... 45-02.12 N 110-39.92 W
STATE..... MONTANA
COUNTY..... PARK
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... GARDINER 1:62500
OTHER LOCALITY INFORMATION: ELEVATION 5600 FEET. LOCATION APPROXIMATE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/05/23 SONDEREGGER, J.L.
TEMPERATURE (C)..... W 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046085

NAME OF SAMPLE SOURCE... CARTER'S BRIDGE WARM SPRINGS
WELL/SPRING NUMBER..... 03S-009E-01-BDBA

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 03S 009E 01.02NW OF SE NW — LAT/LONG... 45-36.53 N 110-33.70 W
STATE..... MONTANA
COUNTY..... PARK
MAP REFERENCE..... BRISBIN 1:24000

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..... G 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

								ISOTOPES (0/00)
AG....		CO3.....		LI...	0.03			
AL....	0.05	CR.....		MG...	35.			
AS....	0.0011	CS.....		MN...	0.01			
B.....	0.11	F.....	1.3	NA...	7.3	SIO2.	19.	
BE....		FE(TOT).	L 0.01	NB...		SO4..	307.	
CA....	129.	HCO3....	187.	NO3..	0.57			
CL....	3.2							
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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027144
NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)
WELL/SPRING NUMBER..... 06S-08E-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 1:62500					

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/07/09 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 46.0
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

								ISOTOPES (0/00)
AG....		CO3.....	N					
B.....		F.....	0.8	NA...		SIO2.	31.	
BE....		FE(TOT).		NB...		SO4..	53.	
CL....	11.							

REFERENCE AND IDENTIFICATION

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 — LAT/LONG... 45-20.22 N 110-41.48 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... PARK — NORTHING... 5020217.
GEOLOGIC PROVINCE.. 21 — 524225.
MAP REFERENCE..... EMIGRANT 1:62500

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. AS HCO3
TOTAL DISSOLVED SOLIDS... 342.
CHARGE IMBALANCE (% DIFF)... 5.0

ANALYSIS IN MG/L

AG....		CO3.....	L 1.	LI...	0.03	S....		
AL....		CR.....		MG...	8.8	SB...		
AS....		CS.....		MN...	L 0.02			
B.....	0.06	F.....	0.9	NA...	35.	SIO2.	34.	
BE....		FE(TOT).	0.02	NB...		SO4..	41.	
CA....	35.	HCO3....	170.					
CA+MG.		HG.....		PB...	L 0.1			
CD....		H2S.....	0.6					
CL....	10.							
CO....		K.....	6.8	RB...	L 0.02	ZN...	0.01	

ISOTOPES (O/OO)

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..... SONDEREGGER, 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-08E-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 1:62500

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 CACO3
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.....	0.06	F.....	1.0	NA...	34.	SIO2.	34.		
BE....	N	FE(TOT).	0.05	NB...		SO4..	47.		
BI....		GA.....		NH4..		SR...	0.36		
BR....		GE.....		NI...	0.006				
CA....	36.	HCO3....	170.						
CA+MG.		HG.....	N	PB...	N				
CD....	N	H2S.....		PO4..		V....	0.0037		
CL....	10.								
CO....		K.....	6.9			ZN...	N		

OTHER ANALYTICAL DATA... CO2 FOR WATER = 14.0; NO2 + NO3 = 0.21; 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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027143
NAME OF SAMPLE SOURCE... CHICO HOT SPRINGS (EMIGRANT)
WELL/SPRING NUMBER..... 06S-08E-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 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 CACO3

ANALYSIS IN MG/L

B.....		F.....	0.9	NA...		SIO2.	33.
BE....		FE(TOT).		NB...		SO4..	53.
CA....		HCO3....	172.				
CL....	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 00191

GEOTHERM SAMPLE FILE — GEOTHERM 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 1:62500

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 (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	2.0		
B.....		F.....	0.8				
BA....		FE+3....		NA+K.	41.		
BE....		FE(TOT).	N	NB...		SO4..	41.
CA....	43.	HCO3....	170.	NO3..	N		
CL....	13.						

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

GEOTHERM SAMPLE FILE — GEOTHERM 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 1:62500

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 (0/00)

AG....		CO3....	N	LI...	0.03		
AL....		CR....		MG...	8.0		
AS....		CS....		MN...	N		
B.....	0.05	F.....	0.9	NA...	31.	SIO2.	31.
BE....		FE(TOT).	0.09	NB...		SO4..	42.
BI....		GA....		NH4..		SR...	0.38
CA....	37.	HCO3....	172.				
CL....	12.						
CO....		K.....	6.6				

OTHER ANALYTICAL DATA... CO_2 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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027149

NAME OF SAMPLE SOURCE... HUNTERS HOT 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 HOT SPRINGS 1:62500

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 — ISOTOPES (0/00)

B.....		F.....		NA...	60.	SIO2.	50.
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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0002920

NAME OF SAMPLE SOURCE... HUNTERS HOT 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.. MIDDLE 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 MG/L

AG....		CO3.....		LI...	0.03				
AL....		CR.....		MG...	L 0.1				
AS....		CS.....		MN...	L 0.02				
B.....	0.73	F.....	5.6	NA...	85.	SIO2.	64.		
BE....		FE(TOT).		NB...		SO4..	10.		
CA....	0.8	HCO3....	194.						
CL....	19.								
CO....		K.....	0.6	RB...	L 0.02	ZN...	0.05		

ISOTOPES (0/00)

GAS ANALYSIS

ANALYSIS IN VOLUME %

CH4..	62.		
C2H6.		N2...	38.
CO2..	L 0.1		

ISOTOPES (00/0)

REFERENCE AND IDENTIFICATION

COMPILED BY..... TESHIN, VICTOR
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
COMPILER CROSS INDEX... NEH-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 — 01S 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 1:62500

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 MG/L

AG....		CO3.....	15.	LI...	0.03	S....			
AL....	0.040	CR.....		MG...	L 0.1	SB...			

ISOTOPES (0/00)

DEL D OF WATER.....	-138.9
DEL O(18) OF WATER...	-18.52

AS....		CS.....		MN...	L 0.02		
B.....	0.67	F.....	5.6	NA...	85.	SIO2.	65.
BE....		FE(TOT).	L 0.02	NB...		SO4..	11.
CA....	0.9	HCO3....	197.				
CD....		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 %

ISOTOPES (00/01)

CH4..	64.		
C2H6.		N2...	36.
CO2..	L 0.1		

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

RECORD 00196

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0002921
NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (C)
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 01S 012E 09 SE OFTS9SW — 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 (0/00)

AG....		CO3....		LI...	0.03		
AL....		CR.....		MG...	L 0.1		
B.....	0.72	F.....	5.6	NA...	88.	SIO2.	65.
BE....		FE(TOT).		NB...		SO4..	18.
CA....	0.7						
CL....	16.						
CO....		K.....	0.6	RB...	L 0.02		

REFERENCE AND IDENTIFICATION
COMPILED BY..... TESHIN, VICTOR
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
COMPILER CROSS INDEX... NEH-459
REFERENCE..... MARINER AND OTHERS, 1976B

RECORD 00197

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027146
NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (COMPOSITE)
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 HOT SPRINGS 1:62500

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

								ISOTOPES (0/00)
AG....		CO3.....	4.	LI...	0.04			
AL....		CR.....		MG...	N			
AS....		CS.....		MN...	N			
B.....	0.72	F.....	5.8	NA...	85.	SIO2.	63.	
BE....		FE(TOT).	0.04	NB...		SO4..	19.	
BI....		GA.....		NH4..		SR...	0.01	
CA....	1.0	HCO3....	150.					
CL....	14.							
CO....		K.....	1.4					

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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0027148
NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (COMPOSITE)

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES 01S 012E 09 SW LAT/LONG... 45-45.43 N 110-15.43 W
STATE..... MONTANA
COUNTY..... PARK
MAP REFERENCE..... HUNTERS HOT SPRINGS 1:62500

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

								ISOTOPES (0/00)
AG....		CO3.....		LI...	0.04			
AL....		CR.....		MG...	N			
B.....	0.7	F.....	4.6	NA...	88.	SIO2.	62.	

BE....		FE(TOT).		NB...	
CA....	0.6	HCO3....	200.		
CL....	24.				
CO....		K.......	1.9		

				SO4..	19.

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

RECORD 00199

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027147

NAME OF SAMPLE SOURCE... HUNTERS HOT SPRINGS (COMPOSITE)

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 HOT SPRINGS 1:62500

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/10/29 U.S. GEOLOGICAL SURVEY
TEMPERATURE (C)..... 53.9
DISCHARGE..... 2688. 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..... 6.9
SPECIFIC CONDUCTANCE..... 441.
ALKALINITY..... 139. AS CACO3
TOTAL DISSOLVED SOLIDS... 273.
CHARGE IMBALANCE (% DIFF)... 1.8

ANALYSIS IN MG/L

AG....		CO3.....	22.	LI...	0.04	S....			
AL....		CR.....		MG...	0.2	SB...			
AS....	N	CS.....		MN...	0.01				
AU....		CU.....	0.021	MO...	0.008	SE...	N		
B.....	0.72	F.....	5.8	NA...	86.	SIO2.	59.		
BE....	N	FE(TOT).	0.07	NB...		SO4..	16.		
BI....		GA.....		NH4..		SR...	0.06		
BR....		GE.....		NI...	0.007				
CA....	1.0	HCO3....	125.						
CA+MG.		HG.....	N	PB...	0.049				
CD....	0.005	H2S.....		PO4..		V....	0.0007		
CL....	17.								
CO....		K.......	0.6			ZN...	0.01		

ISOTOPES (O/OO)
DEL D OF WATER..... -138.9
DEL O(18) OF WATER... -18.52

OTHER ANALYTICAL DATA... CO2 FOR WATER = 0.3, NO2 + NO3 FOR WATER = .01, P = 0.001, GROSSALPHA = 8.0 PC/L, GROSSBETA = 3.0 PC/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 00200

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027140

NAME OF SAMPLE SOURCE... LA DUKE (CORWIN) HOT SPRINGS

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
MAP REFERENCE..... MINER 1:62500

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 — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.27			
AL....		CR.....		MG...	61.			
B.....	0.48	F.....	3.5	NA...	240.	SIO2.	45.	
BE....		FE(TOT).	0.3	NB...		SO4..	1400.	
BI....		GA.....		NH4..		SR...	3.9	
CA....	330.	HCO3....	281.					
CL....	42.							

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 ID: 0027139

NAME OF SAMPLE SOURCE... LA DUKE (CORWIN) HOT SPRINGS
WELL/SPRING NUMBER..... 08S-008E-32-CD

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
MAP REFERENCE..... MINER 1:62500

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			
B.....		F.....	3.6		NA...	230.	SIO2.	52.	
BE....		FE(TOT).	0.26		NB...		SO4..	1300.	
CA....	270.	HCO3....	94.		NO3..	N			
CL....	42.								
CO....		K.....	24.						

ISOTOPES (O/OO)

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 — 08S 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 — 517810.
MAP REFERENCE..... MINER 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/02
POINT OF COLLECTION.. TANK
TEMPERATURE (C)..... 65.0
AMBIENT TEMP (C)..... 5.5
DISCHARGE..... Q 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 HCO3
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			
B.....	0.46	F.....	3.6		NA...	230.	SIO2.	49.	
BE....		FE(TOT).	0.16		NB...		SO4..	1200.	
CA....	320.	HCO3....	297.						
CD....		H2S.....	L 1.0						
CL....	45.								
CO....		K.....	23.		RB...	0.07	ZN...	L 0.01	

ISOTOPES (O/OO)

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 833 L/MIN MAY BE MORE ACCURATE.

REFERENCE AND IDENTIFICATION

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

RECORD 00203

GEOTHERM SAMPLE FILE — GEOTHERM 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 (0/00)

AG....		CO3.....		LI...	0.26				
AL....		CR.....		MG...	57.				
AS....		CS.....		MN...	L 0.02				
B.....	0.49	F.....	3.6	NA...	230.	SIO2.	48.		
BE....		FE(TOT).		NB...		SO4..	1200.		
CA....	310.	HCO3....	329.						
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

GEOTHERM SAMPLE FILE — GEOTHERM 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				UTM ZONE...	+12
COUNTY.....	PHILLIPS				NORTHING...	5304996.
GEOLOGIC PROVINCE..						675258.
MAP REFERENCE.....	HAYS 1:24000					

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR.....	1973/08/16 GROFF, S.L.
SAMPLE NUMBER.....	MBMG NO. 73 M0844
TEMPERATURE (C).....	21.1
AMBIENT TEMP (C).....	4.7
DISCHARGE.....	227]. L/MIN
PERTINENT LITHOLOGY.....	SPRING OCCURS ALONG CONTACT OF MADISON (MISSION CANYON FMT.) WITH OVERLYING JURASSIC ELLIS 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 — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.09		
AL....		CR.....		MG...	86.		
AS....		CS.....		MN...	L 0.01		
B.....		F.....	1.5	NA...	39.	SIO2.	18.2
BE....		FE(TOT).	L 0.01	NB...		SO4..	982.
CA....	266.	HCO3....	109.	NO3..	1.1		
CL....	18.8						
CO....		K.....	9.				

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

RECORD 00205

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046039

NAME OF SAMPLE SOURCE... LANDUSKY PLUNGE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	24N 024E 12	SE OF SE SW	LAT/LONG... 47-50.57 N 108-35.88 W
STATE.....	MONTANA			UTM ZONE... +12
COUNTY.....	PHILLIPS			NORTHING... 5301407.
GEOLOGIC PROVINCE..				679722.
MAP REFERENCE.....	HAYS SE 1:24000			

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR.....	1973/08/16 GROFF, 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 — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.05		
AL....		CR.....		MG...	65.		
AS....		CS.....		MN...	L 0.01		
B.....		F.....	1.6	NA...	24.	SIO2.	17.8
BE....		FE(TOT).	L 0.01	NB...		SO4..	620.
CA....	161.	HCO3....	101.	NO3..	1.1		
CL....	9.5						
CO....		K.....	6.7				

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 — LAT/LONG... 45-36.62 N 112-33.28 W
  STATE..... MONTANA — UTM ZONE... +12
  COUNTY..... POWELL — NORTHING... 5051712.
  GEOLOGIC PROVINCE.. 21 — 378773.
  MAP REFERENCE..... AVON 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR..... 1978/06/16 DONOVAN, 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 — LAT/LONG... 46-20.05 N 112-53.18 W
  STATE..... MONTANA — UTM ZONE... +12
  COUNTY..... POWELL — NORTHING... 5132688.
  GEOLOGIC PROVINCE.. 21 — 354815.
  MAP REFERENCE..... MT. POWELL, MONT. 1:24000
  OTHER LOCALITY INFORMATION: SPRING LOWEST IN GULCH.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR..... 1978/03/27
  SAMPLE NUMBER..... MBMG NO. 78M0627
  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 IMBALANCE (% DIFF)... 1.5
  ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	12.5	LI...	0.07
AL....		CR.....		MG...	0.1

B.....		F.....	7.5	NA...	45.8	SIO2.	45.8
BE....		FE(TOT).	L 0.01	NB...		SO4..	33.
CA....	3.9	HCO3....	40.9	NO3..	0.51		
CL....	2.55						
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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046029

NAME OF SAMPLE SOURCE... GARRISON WARM SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 10N 009W 19 SW OF NE — LAT/LONG... 46-36.53 N 112-46.48 W
STATE..... MONTANA — UTM ZONE... +12
COUNTY..... POWELL — NORTHING... 5163008.
GEOLOGIC PROVINCE.. 21 — 364095.
MAP REFERENCE..... GARRISON 1:62500
OTHER LOCALITY INFORMATION: ELEVATION 4900 FEET

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 CACO3
TOTAL DISSOLVED SOLIDS... 558.
CHARGE IMBALANCE (% DIFF)... 2.3

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	N	LI...	0.15		
AL....		CR.....		MG...	35.		
AS....		CS.....		MN...	L 0.01		
B.....		F.....	1.3	NA...	24.	SIO2.	18.
BE....		FE(TOT).	L 0.01	NB...		SO4..	335.
CA....	77.	HCO3....	59.	NO3..	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046012

NAME OF SAMPLE SOURCE... BLUE JOINT CREEK- HOT SPRING 1

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES 02S 023W 01 NW OF NE LAT/LONG... 45-41.83 N 114-22.85 W
STATE..... MONTANA UTM ZONE... +11
COUNTY..... RAVALLI NORTHING... 5063328.
GEOLOGIC PROVINCE.. 704273.
MAP REFERENCE..... PAINTED ROCKS LAKE 1:62500
OTHER LOCALITY INFORMATION: ELEVATION 5040 FEET.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1972/08/11 BERG, R.B.
SAMPLE NUMBER..... MBMG 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 MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N					
AL....		CR.....		MG...	0.1			
B.....		F.....	8.8	NA...	32.	SIO2.	45.	
BE....		FE(TOT).	N	NB...		SO4..	3.4	
CA....	3.4	HCO3....	61.	NO3..	N			
CL....	2.8							
CO....		K.....	0.25					

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

RECORD 00210

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046013

NAME OF SAMPLE SOURCE... BLUE JOINT CREEK- HOT SPRING 2

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES 02S 022W 06 NE OF NW LAT/LONG... 45-41.78 N 114-21.80 W
STATE..... MONTANA UTM ZONE... +11
COUNTY..... RAVALLI NORTHING... 5063547.
GEOLOGIC PROVINCE.. 21 705279.
MAP REFERENCE..... PAINTED ROCKS LAKE 1:62500
OTHER LOCALITY INFORMATION: ELEVATION 4940 FEET

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1972/08/11 BERG, R.B.
SAMPLE NUMBER..... MBMG 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..... 180.

TOTAL DISSOLVED SOLIDS... 178.7
CHARGE IMBALANCE (% DIFF)... 0.8
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N					
AL....		CR.....		MG...	0.1			
B.....		F.....	9.5	NA...	37.5	SIO2.	54.	
BE....		FE(TOT).	N	NB...		SO4..	4.8	
CA....	2.6	HCO3....	67.	NO3..	N			
CL....	3.1							
CO....		K.....	0.34					

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046028
NAME OF SAMPLE SOURCE... GALLOGLY (LOST TRAIL) HOT SPRINGS

LOCATION		TOWNSHIP-RANGE			COORDINATES	
COUNTRY.....	UNITED STATES	01S 019W	15	SW OF SW NW	LAT/LONG...	45-44.97 N 113-56.37 W
STATE.....	MONTANA				UTM ZONE...	+12
COUNTY.....	RAVALLI				NORTHING...	5070309.
GEOLOGIC PROVINCE..	21					271453.
MAP REFERENCE.....	LOST TRAIL PASS 1:24000					

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)..... Q 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 — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.1			
AL....		CR.....		MG...	0.4			
B.....		F.....	5.8	NA...	43.6	SIO2.	40.9	
BE....		FE(TOT).	0.05	NB...		SO4..	13.6	
CA....	2.5	HCO3....	80.	NO3..	N			
CL....	1.8							
CO....		K.....	0.7					

QUALIFICATION FIELD..... REPORTED TEMPERATURE MAY BE TOO HIGH. FIELD STUDY 6/20/78: TEMPERATURE 29 C: FLOW 114 L/MIN: CONDUCTANCE 253 UMHOS/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 SAMPLE FILE — GEOTHERM FILE ID: 0046048

NAME OF SAMPLE SOURCE... MEDICINE HOT SPRINGS

LOCATION
- COUNTRY..... UNITED STATES
- STATE..... MONTANA
- COUNTY..... RAVALLI
- GEOLOGIC PROVINCE.. 21
- MAP REFERENCE..... MEDICINE HOT SPRINGS 1:24000

TOWNSHIP-RANGE: 01N 020W 12 SE OF SW SW

COORDINATES
- LAT/LONG... 45-50.75 N 114-02.08 W
- UTM ZONE... +11
- NORTHING... 5081032.
- 730226.

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.	LI...	0.2	S....			
AL....	0.007	CR.....		MG...	L 0.1	SB...			
AS....		CS.....		MN...	L 0.02				
B.....	0.12	F.....	14.	NA...	80.	SIO2.	60.		
BE....		FE(TOT).	L 0.02	NB...		SO4..	33.		
CA....	1.9	HCO3....	120.						
CA+MG.		HG.....		PB...	L 0.1				
CO....		H2S.....	0.6						
CL....	6.7								
CO....		K.....	1.4	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 SAMPLE FILE — GEOTHERM FILE ID: 0027001

NAME OF SAMPLE SOURCE... MEDICINE HOT SPRINGS

WELL/SPRING NUMBER..... 01N-20W-12-CCD

LOCATION
- COUNTRY..... UNITED STATES
- STATE..... MONTANA
- COUNTY..... RAVALLI
- MAP REFERENCE..... MEDICINE HOT SPRINGS 1:62500

TOWNSHIP-RANGE: 01N 020W 12 SE OF SW SW

COORDINATES
- LAT/LONG... 45-50.75 N 114-02.08 W

OTHER LOCALITY INFORMATION: MEDICINE HOT SPRINGS 1:24000

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

								ISOTOPES (O/OO)
AG....		CO3.....	N	LI...	210.			
AL....		CR.....		MG...	0.4			
AS....		CS.....		MN...	N			
B.....		F.....	12.	NA...	77.	SIO2.	54.	
BE....		FE(TOT).	20.	NB...		SO4..	38.	
CA....	6.6	HCO3....	130.	NO3..	N			
CL....	7.3							
CO....		K.....	1.5					

OTHER ANALYTICAL DATA... OH = N; CO2 = 1.7
REFERENCE AND IDENTIFICATION
COMPILED BY..... FALLS, MARILYN I.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... LEONARD AND OTHERS, 1978

RECORD 00214

GEOTHERM SAMPLE FILE — GEOTHERM 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 020W 12 SE OF SW SW — LAT/LONG... 45-50.75 N 114-02.08 W
STATE..... MONTANA
COUNTY..... RAVALLI
MAP REFERENCE..... MEDICINE HOT SPRINGS 1:24000
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

								ISOTOPES (O/OO)
AG....		CO3.....	N					
AL....		CR.....		MG...	N			
B.....		F.....	9.6					
BA....		FE+3....		NA+K.	54.			
BE....		FE(TOT).	N	NB...		SO4..	22.	
CA....	6.0	HCO3....	110.	NO3..	N			
CL....	7.0							

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

GEOTHERM 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..... RAVALLI
MAP REFERENCE..... MEDICINE HOT SPRINGS 1:24000

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 — ISOTOPES (0/00)

B..... F..... 14. NA... SIO2. 51.
BE.... FE(TOT). L 0.02 NB... SO4.. 36.
CL.... 7.8

OTHER ANALYTICAL DATA... GROSSALPHA = 3 PICOCURIES/L. GROSSBETA = 10 PICOCURIES /L.

REFERENCE AND IDENTIFICATION

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

RECORD 00216

GEOTHERM 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..... RAVALLI
MAP REFERENCE..... DEER MOUNTAIN, MONT. 1:24000

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 — ISOTOPES (0/00)

AG.... CO3..... 6.
AL.... CR..... MG... N
B..... F..... 16.
BA.... FE+3.... NA+K. 108.
BE.... FE(TOT). N NB... SO4.. 88.
CA.... 8.0 HCO3.... 170. NO3.. N
CL.... 5.0

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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027003
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..... RAVALLI
MAP REFERENCE..... DEER MOUNTAIN, MONT. 1:24000
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 — ISOTOPES (O/OO)

AG....		CO3.....	N	LI...	0.210			
AL....		CR.....		MG...	0.2			
AS....		CS.....		MN...	0.010			
B.....		F.....	14.	NA...	120.	SIO2.	69.	
BE....		FE(TOT).	0.030	NB...		SO4..	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

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0027005
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..... RAVALLI
MAP REFERENCE..... DEER MOUNTAIN, MONT. 1:24000
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
BE.... FE(TOT). NB... SO4.. 82.
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

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 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..... RAVALLI NORTHING... 5107465.
GEOLOGIC PROVINCE.. 21 731951.
MAP REFERENCE..... DEER MOUNTAIN, MONT. 1:24000
OTHER LOCALITY INFORMATION: SPRING UP CREEK NORTHEAST OF POOL.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1974/08/15 MARINER
TEMPERATURE (C)..... 43.0
DISCHARGE..... G 2000. L/MIN
PERTINENT LITHOLOGY..... GNEISS BEDROCK.
OTHER SAMPLE INFORMATION.. TWO SPRINGS 150 M APART. USED FOR SWIMMING POOL.
WATER ANALYSIS
PH..... 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....		ISOTOPES 10/001	
AL....		CR.....		MG...	0.2	SB...		DEL D OF WATER.....	-149.9
AS....		CS.....		MN...	L 0.02			DEL O(18) OF WATER...	-19.30
B.....	0.33	F.....	14.	NA...	110.	SIO2.	60.		
BE....		FE(TOT).		NB...		SO4..	81.		
CA....	6.2	HCO3....	162.						
CD....		H2S.....	L 1.0						
CL....	8.8								
CO....		K.....	2.6	RB...	0.03	ZN...	L 0.01		

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	LAT/LONG...	47-36.93 N 114-39.98 W
STATE.....	MONTANA				UTM ZONE...	+11
COUNTY.....	SANDERS				NORTHING...	5275986.
GEOLOGIC PROVINCE..	21				675372.	
MAP REFERENCE.....	HOT SPRINGS 1:24000					

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/07/03
TEMPERATURE (C)..... 45.0
AMBIENT TEMP (C)..... 7.5
DISCHARGE..... G 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. AS HCO3
TOTAL DISSOLVED SOLIDS... 399.
CHARGE IMBALANCE (% DIFF)... 15.4

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.04	S....		ISOTOPES (0/00)	
AL....	0.021	CR.....		MG...	L 0.1	SB...		DEL D OF WATER.....	-141.3
AS....		CS.....		MN...	L 0.02			DEL O(18) OF WATER...	-18.72
B.....	0.34	F.....	5.6	NA...	85.	SIO2.	70.		
BE....		FE(TOT).		NB...		SO4..	38.		
CA....	0.9	HCO3....	189.						
CD....		H2S.....	7.4						
CL....	8.5								
CO....		K.....	1.7	RB...	L 0.02	ZN...	L 0.01		

GAS ANALYSIS

ANALYSIS IN VOLUME %

				ISOTOPES (00/00)
CH4...	8.2			
C2H6.		N2...	90.	
CO2..	L 0.1			

OTHER ANALYTICAL DATA... O2 PLUS AR = 1.9; 78/07/03 ; TEMP. = 48.8 C., FLOW = 91. L/MIN; SP. COND. = 247.; PH = 9.11

QUALIFICATION FIELD..... FLOW, TEMPERATURE, CONDUCTANCE, AND PH DATA FROM A. BOETTCHER, MBMG FIELD STUDY, 78/07/03; TEMPERATURE = 48.85; FLOW = 91 L/MIN; CONDUCTANCE = 247; PH = 9.11.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
COMPILER CROSS INDEX... NEH-460
REFERENCE..... MARINER AND OTHERS, 1976B; SONDEREGGER 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	LAT/LONG...	47-27.08 N 114-38.87 W
STATE.....	MONTANA				UTM ZONE...	+11

COUNTY..... SANDERS
GEOLOGIC PROVINCE.. 21
MAP REFFRENCE..... PERMA 1:62500
NORTHING... 5257784.
677315.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1965/01/05
SAMPLE NUMBER..... MSBM 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.

WATER ANALYSIS
TOTAL DISSOLVED SOLIDS... 162.
ANALYSIS IN MG/L

AG....		CO3.....	12.				
B.....		F.....	2.2				
BA....		FE+3....		NA+K.	61.		
BE....		FE(TOT).	0.14	NB...		SO4..	18.
CA....		HCO3....	101.				
CL....	5.						

ISOTOPES (O/OO)

OTHER ANALYTICAL DATA... 78/06/18: TEMP. = 26.4 C., FLOW = 303. L/MIN; SP. COND. = 372. UMHOS/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

GEOTHERM SAMPLE FILE
GEOTHERM FILE ID: 0046056

NAME OF SAMPLE SOURCE... QUINN'S HOT SPRINGS (PARADISE)

LOCATION
COUNTRY..... UNITED STATES
STATE..... MONTANA
COUNTY..... SANDERS
GEOLOGIC PROVINCE..
MAP REFERENCE..... PLAINS 1:62500

TOWNSHIP-RANGE
18N 025W 09 NE OF SE SW

COORDINATES
LAT/LONG... 47-19.77 N 114-47.32 W
UTM ZONE... +11
NORTHING... 5243934.
667083.

OTHER LOCALITY INFORMATION: 2560 FEET ELEVETION.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1972/08/09
SAMPLE NUMBER..... MBMG NO. 72M0870
TEMPERATURE (C)..... 42.8
AMBIENT TEMP (C)..... 8.1
DISCHARGE..... 76. L/MIN
PERTINENT LITHOLOGY..... SPRINGS NEAR CONTACT OF DIABASE DIKE WITH PRITCHARN FORMATION (PRECAMBRIAN).
OTHER SAMPLE INFORMATION.. CHEMISTRY NOT IN REFERENCE. DATA NOT VERIFIED.

WATER ANALYSIS
PH..... 7.91
SPECIFIC CONDUCTANCE..... @ 25C. 205.
TOTAL DISSOLVED SOLIDS... 227.
CHARGE IMBALANCE (% DIFF)... 1.7
ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	0.01		
AL....		CR.....		MG...	0.2		
B.....		F.....	2.1	NA...	39.	SIO2.	77.
BE....		FE(TOT).		NB...		SO4..	29.
CA....	3.6	HCO3....	71.	NO3..	N		

ISOTOPES (O/OO)

CL.... 3.1
CO.... K..... 1.5
QUALIFICATION FIELD..... MBMG FIELD STUDY, 1978/06/18; TEMPERATURE 43.4 C; FLOW 64 L/MIN; CONDUCTANCE 169 UMHOS/CM; PH 8.92,
REFERENCE AND IDENTIFICATION
COMPILED BY..... SONDEREGGER, JOHN L.
COMPILER AFFILIATION... MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE..... SONDEREGGER AND OTHERS, 1977

RECORD 00223

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0046086
NAME OF SAMPLE SOURCE... QUINN'S HOT SPRINGS WELL
WELL/SPRING NUMBER..... 18N-25W-09-DCBB
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 18N 025W 09 NW OF NW SW SE LAT/LONG... 47-19.80 N 114-47.23 W
STATE..... MONTANA
COUNTY..... SANDERS
GEOLOGIC PROVINCE.. 21
MAP REFERENCE..... PLAINS 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1981/01/16 DONOVAN, JOSEPH J.
SAMPLE NUMBER..... 8100011
POINT OF COLLECTION.. WELL 50 FT. FROM SPRING.
TEMPERATURE (C)..... 46.4 AT (M).. 44.
WELL DEPTH (M)..... 44.2
DISCHARGE..... R 283.7 L/MIN
PERTINENT LITHOLOGY..... NEAR CONTACT BETWEEN PRICHARD FM. AND DIABASE SILL.
WATER ANALYSIS
DATE/ANALYST..... 1981/03/30 ABERCROMBIE, FRANK N.
PH..... 8.7 AT(C) 25.
SPECIFIC CONDUCTANCE..... 206.1
ALKALINITY..... 58.7 AS CACO3
TOTAL DISSOLVED SOLIDS... 185.7
CHARGE IMBALANCE (% DIFF)... 5.5
ANALYSIS IN MG/L ISOTOPES (0/00)

AG....	L 0.002	CO3.....	10.	LI...	L 0.002		
AL....	L 0.03	CR.....	L 0.002	MG...	L 0.1		
AS....	0.0006	CS.....		MN...	L 0.001		
AU....		CU.....	L 0.002	MO...	L 0.02		
B.....	0.25	F.....	2.25	NA...	39.3	SIO2.	73.5
BE....		FE(TOT).	0.030	NB...		SO4..	28.8
BI....		GA.....		NH4..		SR...	0.018
BR....		GE.....		NI...	L 0.01		
CA....	2.7	HCO3....	51.	NO3..	1.2	TI...	L 0.001
CA+MG.		HG.....		PB...	0.04		
CD....	L 0.002	H2S.....	51.2	PO4..		V....	L 0.001
CL....	2.3						
CO....		K.....	1.3			ZN...	0.030

OTHER ANALYTICAL DATA... STRONG H2S SMELL AND TASTE. DEGASSES STRONGLY. FIELD PH = 9.21, SC = 196., ALKALINITY = 77.6
QUALIFICATION FIELD..... RANGE FOR DISCHARGE = 189. TO 378.5
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 00224

GEOTHERM SAMPLE FILE — GEOTHERM 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	LAT/LONG...	47-36.98 N 114-40.58 W
STATE.....	MONTANA			UTM ZONE...	+11
COUNTY.....	SANDERS			NORTHING...	5276056.
GEOLOGIC PROVINCE..	21				674618.
MAP REFERENCE.....	HOT SPRINGS 1:24000				

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR.....	1972/08/09
SAMPLE NUMBER.....	MBMG 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

PH.....	8.4
SPECIFIC CONDUCTANCE.....	394.
TOTAL DISSOLVED SOLIDS...	366.6
CHARGE IMBALANCE (% DIFF)...	2.3

ANALYSIS IN MG/L

								ISOTOPES (0/00)	
AG....		CO3.....	8.	LI...	0.05				
AL....		CR.....		MG...	0.2				
B.....		F.....	5.8	NA...	90.5	SIO2.	68.		
BE....		FE(TOT).	0.1	NB...		SO4..	40.		
CA....	1.2	HCO3....	142.	NO3..	N				
CL....	9.3								
CO....		K.....	1.7						

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.
COMPILER AFFILIATION...	MONTANA BUREAU OF MINES AND GEOLOGY
REFERENCE.....	SONDEREGGER AND OTHERS, 1977

RECORD 00225

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0046003

NAME OF SAMPLE SOURCE... ANDERSONS HOT SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY.....	UNITED STATES	03S 013E 29	NE OF NW NE	LAT/LONG...	45-33.18 N 110-08.52 W
STATE.....	MONTANA			UTM ZONE...	+12
COUNTY.....	SWEET GRASS			NORTHING...	5044525.
GEOLOGIC PROVINCE..					566972.
MAP REFERENCE.....	MCLEOD BASIN 1:24000				
OTHER LOCALITY INFORMATION:	ELEVATION 5540 FEET.				

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR.....	1972/07/25 HANSEN, M.
SAMPLE NUMBER.....	MBMG W.Q. 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. AS CACO3
TOTAL DISSOLVED SOLIDS... 313.
CHARGE IMBALANCE (% DIFF)... 0.7

ANALYSIS IN MG/L

AG....		CO3.....	N	LI...	L 0.01		
AL....		CR.....		MG...	23.		
AS....		CS.....		MN...	L 0.01		
B.....		F.....	0.4	NA...	1.6	SIO2.	12.
BA....		FE+3....	L 0.01				
BE....		FE(TOT).		NB...		SO4..	139.
CA....	47.	HCO3....	88.	NO3..	0.3		
CL....	0.5						
CO....		K.....	1.3				

ISOTOPES (O/OO).

QUALIFICATION FIELD..... 1978/05/22: 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 trucated 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	114-22.85 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	Q 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 B

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. ^{o}C). See Table 1 for explanation of alphabetic qualifiers proceeding temperature.

County	TNS	RNG	Sect.	Name of Source	I.D.	Temp.
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	Q 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	GALLATIN	0046015	50.0
45-22.03 N 111-44.85 W ENNIS HOT SPRINGS (THEXTON)	MADISON	0027101	
45-22.03 N 111-44.85 W ENNIS HOT SPRINGS (THEXTON).	MADISON	0046026	83.2
45-34.22 N 111-41.35 W HOT SPRINGS CREEK AT NORRIS	MADISON	0027103	17.5
45-22.02 N 111-43.77 W NELSON - R. LEE WELL	MADISON	0027100	16.0
45-34.50 N 111-41.00 W NORRIS HOT SPRING (HAPGOOD, BEARTRAP)	MADISON	0027058	
45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	MADISON	0002910	52.5
45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	MADISON	0027059	45.
45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	MADISON	0027057	41.
45-34.50 N 111-41.00 W NORRIS HOT SPRINGS (HAPGOOD, BEARTRAP)	MADISON	0027060	50.
45-34.32 N 111-41.08 W NORRIS WARM WELL - 2 (HAPGOOD, BEARTRAP)	MADISON	0027104	21.
45-35.40 N 111-53.90 W POTOSI DRAIN NORTH	MADISON	0027095	25.0
45-35.32 N 111-53.88 W POTOSI DRAIN SOUTH	MADISON	0027056	17.
45-35.32 N 111-53.88 W POTOSI DRAIN SOUTH	MADISON	0027055	23.
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS	MADISON	0027089	50.0
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS	MADISON	0027090	51.0
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS	MADISON	0027088	
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS	MADISON	0027087	51.
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS	MADISON	0027086	38.
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS (CLARK)	MADISON	0046055	49.5
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS VENT 17	MADISON	0027091	
45-35.35 N 111-53.92 W POTOSI HOT SPRINGS VENT 17	MADISON	0027092	49.
45-35.33 N 111-53.87 W POTOSI HOT SPRINGS VENT 37	MADISON	0027085	52.
45-35.37 N 111-53.93 W POTOSI WARM SPRINGS VENT 15	MADISON	0027093	24.
45-35.37 N 111-53.93 W POTOSI WARM SPRINGS VENT 15	MADISON	0027094	39.0
45-22.12 N 111-43.62 W THEXTON HOT WELL	MADISON	0027102	72.2
45-02.27 N 111-57.13 W VIGILANTE HOT SPRINGS	MADISON	0046069	23.5

DILLION 1:250,000

45-25.20 N 112-41.50 W APEX HOT SPRINGS (BIRCH CREEK)	BEAVERHEAD	0046005	25.0
45-36.62 N 112-33.28 W AVON WARM SPRING	POWELL	0046006	25.5
45-23.38 N 112-27.07 W BEAVERHEAD ROCK	MADISON	0046010	27.
45-06.27 N 112-45.07 W BROWNS HOT SPRING	BEAVERHEAD	0046019	23.7
45-47.47 N 112-07.58 W JEFFERSON RIVER AT RENOVA HOT SPRINGS	JEFFERSON	0027037	21.
45-06.65 N 112-42.85 W LOVELLS HOT SPRING	BEAVERHEAD	0046044	19.4
45-01.72 N 112-50.73 W MC MENOMEY RANCH	BEAVERHEAD	0046047	19.6
45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)	MADISON	0027021	54.
45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)	MADISON	0027020	
45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)	MADISON	0027019	
45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)	MADISON	0046050	53.0
45-27.72 N 112-28.47 W NEW BILTMORE HOT SPRINGS (ZIEGLER)	MADISON	0027022	53.9
45-27.72 N 112-28.50 W NEW BILTMORE HOT SPRINGS (ZIEGLER)	MADISON	0027018	52.
45-53.7 N 112-13.70 W PIPESTONE HOT SPRING	JEFFERSON	0027045	60.
45-53.7 N 112-13.70 W PIPESTONE HOT SPRING	JEFFERSON	0027043	61.0
45-53.7 N 112-13.70 W PIPESTONE HOT SPRINGS	JEFFERSON	0027042	61.0
45-53.78 N 112-14.57 W PIPESTONE HOT SPRINGS	JEFFERSON	0002908	57.0
45-53.7 N 112-13.70 W PIPESTONE HOT SPRINGS	JEFFERSON	0027044	60.0
45-53.78 N 112-14.57 W PIPESTONE HOT SPRINGS	JEFFERSON	0027041	57.0
45-53.7 N 112-13.70 W PIPESTONE HOT SPRINGS	JEFFERSON	0027040	38.8
45-10.30 N 112-09.12 W PULLER HOT SPRINGS	MADISON	0027030	44.4
45-10.28 N 112-09.12 W PULLER WARM SPRINGS	MADISON	0027029	41.
45-10.28 N 112-09.12 W PULLER WARM SPRINGS	MADISON	0027028	43.0
45-47.50 N 112-07.58 W RENOVA HOT SPRINGS	JEFFERSON	0027039	48.9

45-47.50 N 112-07.58 W	RENOVA HOT SPRINGS	JEFFERSON	0027038	50.
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS	MADISON	0027031	72.2
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS	MADISON	0027035	
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS	MADISON	0027034	67.0
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS	MADISON	0027036	71.0
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS	MADISON	0027033	69.
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS	MADISON	0027032	72.7
45-41.12 N 112-17.70 W	SILVER STAR HOT SPRINGS (BARKELLS)	MADISON	0046060	71.5
45-14.18 N 112-08.07 W	TRUDAU HOT SPRINGS	MADISON	0046068	22.7
45-27.47 N 113-06.52 W	ELKHORN (POLARIS) HOT SPRINGS	BEAVERHEAD	0027025	49.
45-27.47 N 113-06.52 W	ELKHORN (POLARIS) HOT SPRINGS	BEAVERHEAD	0027023	46.
45-27.47 N 113-06.52 W	ELKHORN (POLARIS) HOT SPRINGS	BEAVERHEAD	0027026	
45-27.47 N 113-06.52 W	ELKHORN (POLARIS) HOT SPRINGS	BEAVERHEAD	0027024	
45-27.47 N 113-06.52 W	ELKHORN (POLARIS) HOT SPRINGS	BEAVERHEAD	0027027	47.8
45-27.47 N 113-06.52 W	ELKHORN HOT SPRINGS	BEAVERHEAD	0046025	48.5
45-44.97 N 113-56.37 W	GALLOGLY (LOST TRAIL) HOT SPRINGS	RAVALLI	0046028	Q 48.9
45-22.07 N 113-24.18 W	JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027015	58.3
45-22.07 N 113-24.18 W	JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027017	58.3
45-22.07 N 113-24.18 W	JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027081	58.
45-22.07 N 113-24.18 W	JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027084	60.
45-22.07 N 113-24.18 W	JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027083	59.
45-22.07 N 113-24.18 W	JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027080	57.
45-21.58 N 113-23.18 W	JACKSON (JARDINE, BIG HOLE) RANGER STATION	BEAVERHEAD	0027079	14.5
45-21.58 N 113-23.18 W	JACKSON (JARDINE, BIG HOLE) RANGER STATION	BEAVERHEAD	0027078	14.5
45-22.07 N 113-24.18 W	JACKSON HOT SPRINGS (JARDINE, BIG HOLE)	BEAVERHEAD	0046036	58.0

ELK CITY 1:250,000

45-41.83 N 114-22.85 W	BLUE JOINT CREEK- HOT SPRING 1	RAVALLI	0046012	28.8
45-41.78 N 114-21.80 W	BLUE JOINT CREEK- HOT SPRING 2	RAVALLI	0046013	29.4
45-50.75 N 114-02.08 W	MEDICINE HOT SPRINGS	RAVALLI	0046048	45.0
45-50.75 N 114-02.08 W	MEDICINE HOT SPRINGS	RAVALLI	0027001	
45-50.75 N 114-02.08 W	MEDICINE HOT SPRINGS	RAVALLI	0027002	47.2
45-50.75 N 114-02.08 W	MEDICINE HOT SPRINGS	RAVALLI	0027000	49.

ROUNDUP 1:250,000

46-47.55 N 108-52.52 W	DURFEE CREEK SPRINGS (NO. 2)	FERGUS	0046024	21.1

WHITE SULPHUR SPRINGS 1:250,000

46-21.50 N 110-40.68 W	LUCAS FLOWING WELL	MEAGHER	0046045	42.2
46-20.37 N 110-47.18 W	RINGLING FLOWING WELL	MEAGHER	0046058	48.0
46-32.35 N 110-53.75 W	WHITE SULPHUR (BREWERS) SPRINGS	MEAGHER	0027138	45.5
46-32.35 N 110-53.75 W	WHITE SULPHUR (BREWERS) SPRINGS	MEAGHER	0027137	
46-32.35 N 110-53.75 W	WHITE SULPHUR (BREWERS) SPRINGS	MEAGHER	0046073	46.0
46-26.98 N 111-58.83 W	ALHAMBRA HOT SPRINGS (NORTH)	JEFFERSON	0027111	53.0
46-26.98 N 111-58.83 W	ALHAMBRA HOT SPRINGS (NORTH)	JEFFERSON	0046000	56.5
46-26.98 N 111-58.83 W	ALHAMBRA HOT SPRINGS (NORTH)	JEFFERSON	0027114	59.4
46-26.98 N 111-58.83 W	ALHAMBRA HOT SPRINGS (NORTH)	JEFFERSON	0027113	59.0
46-26.98 N 111-58.83 W	ALHAMBRA HOT SPRINGS (NORTH)	JEFFERSON	0027112	50.0
46-26.78 N 111-58.97 W	ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027106	54.4
46-26.78 N 111-58.97 W	ALHAMBRA HOT SPRINGS (SOUTH)	JEFFERSON	0027068	51.
46-26.78 N 111-58.97 W	ALHAMBRA HOT SPRINGS (SOUTH)	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	Q	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)	DEER LODGE	0027011	70.
46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)	DEER LODGE	0027010	73.
46-02.62 N 112-48.63 W GREGSON HOT SPRINGS (FAIRMONT)	DEER LODGE	0027009	71.
46-45.23 N 112-22.55 W MARYSVILLE DEEP WELL	LEWIS AND CLARK	0027136	39.0
46-45.23 N 112-22.55 W MARYSVILLE TEST WELL	LEWIS AND CLARK	0046046	Q 96.5
46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)	DEER LODGE	0027013	78.
46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)	DEER LODGE	0046070	77.0
46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)	DEER LODGE	0027012	71.
46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)	DEER LODGE	0027014	78.
46-10.67 N 112-47.67 W WARM SPRINGS (STATE HOSPITAL)	DEER LODGE	0027075	78.
46-12.33 N 112-53.00 W WARM SPRINGS STATE HOSPITAL WELL	DEER LODGE	0046088	67.
46-43.03 N 113-19.32 W BEARMOUTH WARM SPRINGS #1	GRANITE	0046008	20.2
46-43.08 N 113-18.33 W BEARMOUTH WARM SPRINGS #2	GRANITE	0046009	15.0
46-22.07 N 113-24.18 W JACKSON (JARDINE) HOT SPRINGS	BEAVERHEAD	0027082	58.
46-42.33 N 113-27.43 W NIMROD SPRINGS	GRANITE	0046051	19.0
HAMILTON 1:250,000			
46-43.82 N 114-32.05 W GRANITE HOT SPRINGS	MISSOULA	0046031	50.6
46-43.56 N 114-31.97 W LOLO HOT SPRINGS	MISSOULA	0046900	46.4
46-43.56 N 114-31.97 W LOLO HOT SPRINGS	MISSOULA	0027006	46.
46-43.56 N 114-31.97 W LOLO HOT SPRINGS	MISSOULA	0027007	
46-45.13 N 114-31.97 W LOLO HOT SPRINGS (GRANITE)	MISSOULA	0046043	44.0
46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS	RAVALLI	0027005	50.
46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS	RAVALLI	0027003	
46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS	RAVALLI	0027004	435.
46-06.29 N 114-00.25 W SLEEPING CHILD HOT SPRINGS-B	RAVALLI	0002923	43.0
LEWISTOWN 1:250,000			
47-52.58 N 108-39.37 W LANDUSKY #1	PHILLIPS	0046038	21.1
47-50.57 N 108-35.88 W LANDUSKY PLUNGE	PHILLIPS	0046039	24.4
47-59.58 N 108-26.75 W LODGEPOLE 1	BLAINE	0046042	26.0
47-13.14 N 109-28.27 W BROOKS HOT SPRINGS	FERGUS	0046018	19.5
GREAT FALLS 1:250,000			
47-27.01 N 111-58.83 W ALHAMBRA HOT WELL (NORTH)	JEFFERSON	0027116	52.0
47-32.05 N 111-13.73 W GIANT SPRINGS	CASCADE	0046030	12.
CHOTEAU 1:250,000			
47-37.92 N 112-51.28 W SUN RIVER SPRINGS	LEWIS AND CLARK	0046065	30.4
WALLACE 1:250,000			
47-36.93 N 114-39.98 W CAMAS HOT SPRINGS	SANDERS	0046020	45.0
47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL	LAKE	0046084	44.9
47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL	LAKE	0046083	47.2
47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL	LAKE	0046081	49.3
47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL	LAKE	0046082	47.2
47-38.53 N 114-34.28 W CAMP AQUA AREA TEST WELL	LAKE	0046080	49.2
47-27.08 N 114-38.87 W GREEN SPRINGS	SANDERS	0046032	18.9
47-19.77 N 114-47.32 W QUINN'S HOT SPRINGS (PARADISE)	SANDERS	0046056	42.8

47-19.80 N 114-47.23 W QUINN'S HOT SPRINGS WELL	SANDERS	0046086	46.4
47-36.98 N 114-40.58 W SYMES HOT SPRINGS (DEVELOPED WELL)	SANDERS	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 MIDTLYNG, 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.