UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

CENTRAL AND EASTERN UNITED STATES

Basic data for thermal springs and wells as recorded in GEOTHERM

By

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Open-File Report 83-440

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

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INTRODUCTION

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

This report on central and eastern United States 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.

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 INDEX

The index gives one line summaries of each GEOTHERM record describing the chemistry of geothermal springs and wells in the sample file for central and eastern United States. The index found in appendix A (p. 77-79) is sorted by state, county name and the name of the source. Records applicable to a given state will be grouped under that state name. Also given in each record are latitude, longitude (both use 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.

GEOTHERM SAMPLE FILE

GEOTHERM sample file contains 119 records for central and eastern United States (Table 1). This includes the following states with the record count of each:

ARKANSAS	21	NORTH CAROLINA	5
GEORGIA	22	PENNSYLVANIA	3
MASSACHUSETTS	3	SOUTH DAKOTA	4
NEBRASKA	6	VIRGINIA	44
NEW YORK	2	WEST VIRGINIA	9

The table is sorted by state, county, and name of source. Records may be present which are duplicates for the same analyses. 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 preceeds 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 central and eastern United States available as of December, 1981. However, no claim is made for completeness, and published sources have probably been missed. All records in this list contains information which was published 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 low-temperature 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 B (p. 80-82). 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.

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 central and eastern United States were prepared by the staff of the University of Nebraska, Gruy Federal Incorporated, and 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.

Swanson, J. R., 1977, GEOTHERM data file: Geothermal Resources Council Transactions, v. 1, p. 285.

TABLE 1

States of ARKANSAS, GEORGIA, MASSACHUSETTS, NEBRASKA, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, SOUTH DAKOTA, VIRGINIA, and WEST VIRGINIA: 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 state, 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. However, if the UTM Easting figure is present in the record, it will be found directly below the UTM 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 B.

RECORD 00001

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000306

NAME OF SAMPLE SOURCE... BRINE WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 17S 021W 33 — LAT/LONG... 33-13. N 093-17. W

STATE..... ARKANSAS

COUNTY..... COLUMBIA

MAP REFERENCE..... MACEDONIA 1:24000

OTHER LOCALITY INFORMATION: KERLIN BRINE FIELD

SAMPLE DESCRIPTION AND CONDITIONS

SAMPLE NUMBER..... 141

POINT OF COLLECTION.. WELL HEAD

TEMPERATURE (C)..... 107.2 AT (M).. 2534.8

WELL DEPTH (M)..... 2829.8

PERTINENT LITHOLOGY..... SABINE UPLIFT

OTHER SAMPLE INFORMATION.. ELEVATION 90.5M, PERFORATED INTERVAL 2534.8M TO 2829.8M, BOTTOM-HOLE PRESSURE 197 KG/CM2

WATER ANALYSIS

PH..... 6.0 AT(C) 25.

SPECIFIC GRAVITY..... 1.230

SPECIFIC CONDUCTANCE..... 25000.

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	331.		
AL....		CR.....		MG...	1860.		
AS....		CS.....		MN...	40.		
AU....		CU.....	1.				
B.....	300.	F.....		NA...	70700.		
BA....	40.						
BE....		FE(TOT).	12.	NB...		S04..	640.
BI....		GA.....		NH4..	220.	SR...	3440.
BR....	5670.						
CA....	46900.	HCO3....	224.				
CL....	219600.	I.....	11.				
CO....		K.....	5950.			ZN...	2.

OTHER ANALYTICAL DATA... ORGANIC ACID AS ACETIC = 85. MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... REED, MARSHALL

COMPILER AFFILIATION... USGS

REFERENCE..... COLLINS, 1974

RECORD 00002

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000305

NAME OF SAMPLE SOURCE... BRINE WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 18S 020W 04 — LAT/LONG... 33-13. N 093-11. W

STATE..... ARKANSAS

COUNTY..... COLUMBIA

MAP REFERENCE..... CALHOUN 1:24000

OTHER LOCALITY INFORMATION: KERLIN BRINE FIELD

SAMPLE DESCRIPTION AND CONDITIONS

SAMPLE NUMBER..... 67

POINT OF COLLECTION.. WELL HEAD

TEMPERATURE (C)..... 107.2 AT (M).. 2568.

WELL DEPTH (M)..... 2659.5

PERTINENT LITHOLOGY..... SABINE UPLIFT
OTHER SAMPLE INFORMATION.. ELEVATION 89.3M, PERFORATED INTERVAL 2568.2M TO 2659.5M, BOTTOM-HOLE PRESSURE 197 KG/CM2

WATER ANALYSIS

PH..... 5.9 AT(C) 25.
SPECIFIC GRAVITY..... 1.232
SPECIFIC CONDUCTANCE..... 25000.

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	391.		
AL....		CR.....		MG...	3840.		
AS....		CS.....		MN...	46.		
AU....		CU.....	1.				
B.....	230.	F.....		NA...	71000.		
BA....	20.						
BE....		FE(TOT).	10.	NB...		S04..	532.
BI....		GA.....		NH4..	170.	SR...	2470.
BR....	5250.						
CA....	45000.	HCO3....	191.				
CL....	211000.	I.....	10.				
CO....		K.....	6380.			ZN...	2.

OTHER ANALYTICAL DATA... ORGANIC ACID AS ACETIC = 80. MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... REED, MARSHALL
COMPILER AFFILIATION... USGS
REFERENCE..... COLLINS, 1974

RECORD 00003

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000310

NAME OF SAMPLE SOURCE... BSW 17 WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 33-13. N 093-12. W
STATE..... ARKANSAS
COUNTY..... COLUMBIA
MAP REFERENCE..... CALHOUN 1:24000
OTHER LOCALITY INFORMATION: KERLIN BRINE FIELD

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1974/01/09 TROUT, MICHAEL L.
SAMPLE NUMBER..... 8
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 100. AT (M).. 2560.
WELL DEPTH (M)..... 2560.
PERTINENT LITHOLOGY..... SABINE UPLIFT; UPPER JURASSIC SMACKOVER FORMATION

WATER ANALYSIS

SPECIFIC GRAVITY..... 1.229
TOTAL DISSOLVED SOLIDS... 347600.

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	312.		
AL....		CR.....		MG...	3490.		
AS....		CS.....		MN...	37.		
B.....		F.....		NA...	74600.		
BA....	38.						
BE....		FE(TOT).	5.	NB...		S04..	160.
BI....		GA.....		NH4..		SR...	2930.
BR....	6130.						
CA....	44200.						
CA+MG.		MG.....		PB...	L 0.5		

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    CO....              H2S.....   172.
    CL....   210900.
    CO....              K.......   5000.                    ZN...    0.4
REFERENCE AND IDENTIFICATION
  COMPILED BY............  REED, MARSHALL
  COMPILER AFFILIATION...  USGS
  REFERENCE..............  CARPENTER AND TROUT, 1978
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RECORD 00004

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GEOTHERM SAMPLE FILE                                                    GEOTHERM FILE ID:  0000309
  NAME OF SAMPLE SOURCE... LEWIS D1 WELL
LOCATION                          TOWNSHIP-RANGE                  COORDINATES
  COUNTRY............  UNITED STATES                                LAT/LONG...  33-17.   N 093-04.   W
  STATE..............  ARKANSAS
  COUNTY.............  COLUMBIA
  MAP REFERENCE......  VILLAGE 1:24000
  OTHER LOCALITY INFORMATION:  VILLAGE OIL FIELD
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1973/01/08 TROUT, MICHAEL L.
  SAMPLE NUMBER........  27
  POINT OF COLLECTION..  WELL HEAD
  TEMPERATURE (C)......    91.    AT (M)..   2245.
  WELL DEPTH (M)......     2245.
  PERTINENT LITHOLOGY....... SABINE UPLIFT: UPPER JURASSIC SMACKOVER FORMATION
WATER ANALYSIS
  SPECIFIC GRAVITY.........    1.196
  TOTAL DISSOLVED SOLIDS...    286500.
  ANALYSIS IN MG/L                                                  ISOTOPES (0/00)
    AG....              CO3.....            LI...    64.
    AL....              CR......            MG...    3700.
    AS....              CS......            MN...    2.
    B.....              F.......            NA...    65500.
    BA.... L 20.
    BE....              FE(TOT).   1.       NB...            SO4..    246.
    BI....              GA......            NH4..            SR...    1660.
    BR....   5030.
    CA....   32600.
    CA+MG.              HG......            PB...  L 1.
    CO....              H2S.....   12.
    CL....   176600.
    CO....              K.......   1250.                     ZN...  L 1.
REFERENCE AND IDENTIFICATION
  COMPILED BY............  REED, MARSHALL
  COMPILER AFFILIATION...  USGS
  REFERENCE..............  CARPENTER AND TROUT, 1978
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RECORD 00005

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GEOTHERM SAMPLE FILE                                                    GEOTHERM FILE ID:  0001456
  NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 23)
  WARING NUMBER........... 2
LOCATION                          TOWNSHIP-RANGE                  COORDINATES
  COUNTRY............  UNITED STATES                                LAT/LONG...  34-30.88 N 093-03.18 W
  STATE..............  ARKANSAS
  COUNTY.............  GARLAND
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MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: 45. M NORTH OF MAURICE HOT SPRING

WATER ANALYSIS

PH..... 7.52
SPECIFIC CONDUCTANCE..... 269.
ALKALINITY..... 159. AS HCO3
TOTAL DISSOLVED SOLIDS... 185.

ANALYSIS IN MG/L

AG....		CO3.....		LI...		S....		
AL....	N							
B.....		F.....	0.2	NA...	3.9			
BA....		FE+3....		NA+K.		SN...		
BE....		FE(TOT).		NB...		SO4..	8.2	
BI....		GA.....		NH4..		SR...	0.11	
CA....		HCO3....	159.	NO3..	0.2			
CD....		H2S.....		PO4..	0.09			
CL....	1.9							
CO....		K.....	1.5					

ISOTOPES (0/00)

DEL D OF WATER..... -28.
DEL C(13) OF CO2..... -14.2
TRITIUM (T.U.)..... 0.7 + OR - 0.8
C(14) CONTENT OF CO2. 35.1% + OR - 0.6% (% OF MODERN)

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... REDINGER AND OTHERS, 1979

RECORD 00006

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001455

NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 17)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 34-30.95 N 093-03.22 W
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: 50. M NORTH OF 80,000 GALLON RESERVOIR

WATER ANALYSIS

PH..... 7.70
SPECIFIC CONDUCTANCE..... 266.
ALKALINITY..... 160. AS HCO3
TOTAL DISSOLVED SOLIDS... 184.

ANALYSIS IN MG/L

AG....		CO3.....		LI...		S....		
AL....	N	CR.....		MG...		SB...		
B.....		F.....	0.2	NA...	3.9			
BA....		FE+3....		NA+K.		SN...		
BE....		FE(TOT).		NB...		SO4..	7.8	
BI....		GA.....		NH4..		SR...	0.11	
CA....		HCO3....	160.	NO3..	N			
CD....		H2S.....		PO4..	N			
CL....	1.8							
CO....		K.....	1.5					

ISOTOPES (0/00)

DEL D OF WATER..... -30.
DEL O(18) OF WATER... -5.4
DEL C(13) OF CO2..... -14.1
TRITIUM (T.U.)..... 3.0 + OR - 0.5
C(14) CONTENT OF CO2. 36.9% + OR - 0.5% (% OF MODERN)

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... REDINGER AND OTHERS, 1979

RECORD 00007

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001457

NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 33)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 34-30.85 N 093-03.15 W
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: 25. M NNE OF DISPLAY FOUNTAIN

WATER ANALYSIS

PH..... 7.13
SPECIFIC CONDUCTANCE..... 269.
ALKALINITY..... 164. AS HCO3
TOTAL DISSOLVED SOLIDS... 188.

ANALYSIS IN MG/L

AG....	CO3.....		LI...		S....		
AL.... N	CR.....		MG...		SB...		
B.....	F.....	0.2	NA...	4.0			
BA....	FE+3....		NA+K.		SN...		
BE....	FE(TOT).		NB...		SO4..	8.2	
BI....	GA.....		NH4..		SR...	0.11	
CA....	HCO3....	164.	NO3..	N			
CD....	H2S.....		PO4..	0.02			
CL....	1.9						
CO....	K.....	1.5					

ISOTOPES (0/00)

DEL D OF WATER..... -28.
DEL O(18) OF WATER... -5.4
DEL C(13) OF CO2..... -14.6
TRITIUM (T.U.)..... 0.9 + OR - 0.6

REFERENCE AND IDENTIFICATION

COMPILED BY..... FIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... BEDINGER AND OTHERS, 1979

RECORD 00008

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001459

NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 48)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 34-30.97 N 093-03.13 W
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: 85. M NE OF 80,000 GALLON RESERVOIR

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/01/25
TEMPERATURE (C)..... 60.
DISCHARGE..... 2400. L/MIN

WATER ANALYSIS

PH..... 7.27
SPECIFIC CONDUCTANCE..... 276.
ALKALINITY..... 165. AS HCO3
TOTAL DISSOLVED SOLIDS... 189.
CHARGE IMBALANCE (% DIFF)... 3.5

ANALYSIS IN MG/L

AG....	CO3.....	LI...	S....

ISOTOPES (0/00)

DEL D OF WATER..... -28.

AL....	N	CR.....		MG...	4.7	SB...		DEL O(18) OF WATER...	-5.7
AS....		CS.....		MN...	0.18				
B.....		F.....	0.2	NA...	4.0	SIO2.	42.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-14.3
BE....		FE(TOT).	0.02	NB...		SO4..	8.6	TRITIUM (T.U.).....	0.7 + OR - 0.4
BI....		GA.....		NH4..		SR...	0.12	C(14) CONTENT OF CO2.	38.7% + OR - 0.7% (% OF MODERN)
CA....	45.	HCO3....	165.	NO3..	0.1				
CD....		H2S.....		PO4..	N				
CL....	1.9								
CO....		K.....	1.5			ZN...	0.06		

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... BEDINGER AND OTHERS, 1979

RECORD 00009

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001461
NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 49)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 34-30.58 N 093-03.17 W
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: 30. M EAST OF 80,000 GALLON RESERVOIR

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1972/01/21
TEMPERATURE (C)..... 61.8
DISCHARGE..... 152. L/MIN

WATER ANALYSIS
PH..... 6.95
SPECIFIC CONDUCTANCE..... 268.
ALKALINITY..... 155. AS HCO3
TOTAL DISSOLVED SOLIDS... 184.
CHARGE IMBALANCE (% DIFF)... 0.8
ANALYSIS IN MG/L

AG....		CO3.....		LI...		S....		DEL D OF WATER.....	-28.
AL....	N	CR.....		MG...	4.8	SB...		DEL O(18) OF WATER...	-5.6
AS....		CS.....		MN...	0.25				
B.....		F.....	0.2	NA...	3.8	SIO2.	41.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-16.1
BE....		FE(TOT).	0.06	NB...		SO4..	8.2	TRITIUM (T.U.).....	9. + OR - 0.4
BI....		GA.....		NH4..		SR...	0.11	C(14) CONTENT OF CO2.	36.8% + OR - 0.9% (% OF MODERN)
CA....	44.	HCO3....	155.	NO3..	N				
CD....		H2S.....		PO4..	0.06				
CL....	1.9								
CO....		K.....	1.5			ZN...	0.06		

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... BEDINGER AND OTHERS, 1979

RECORD 00010

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001460

NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 42)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: IN SE PORTION OF QUAPAW BATHOUSE

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1972/01/19
TEMPERATURE (C)..... 61.3

WATER ANALYSIS

PH..... 6.93
SPECIFIC CONDUCTANCE..... 272.
ALKALINITY..... 159. AS HCO3
TOTAL DISSOLVED SOLIDS... 188.
CHARGE IMBALANCE (% DIFF)... 0.2

ANALYSIS IN MG/L

AG....		CO3.....		LI...		S....			
AL....	N	CR.....		MG...	4.8	SB...			
AS....		CS.....		MN...	0.23				
B.....		F.....	0.2	NA...	4.0	SIO2.	42.		
BE....		FE(TOT).	0.01	NB...		SO4..	8.6		
BI....		GA.....		NH4..		SR...	0.11		
CA....	45.	HCO3....	159.	NO3..	N				
CD....		H2S.....		PO4..	0.04				
CL....	1.9								
CO....		K.....	1.5			ZN...	0.02		

ISOTOPES (0/00)

DEL D OF WATER..... -28.
DEL O(18) OF WATER... -5.4

TRITIUM (T.U.)..... 2.7 + OR - 0.3

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... REDINGER AND OTHERS, 1979

RECORD 00011

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001458

NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 46)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 34-30.82 N 093-03.18 W
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: IN SW PORTION OF FORDYCE BATHHOUSE

WATER ANALYSIS

PH..... 7.01
SPECIFIC CONDUCTANCE..... 269.
ALKALINITY..... 164. AS HCO3
TOTAL DISSOLVED SOLIDS... 187.
CHARGE IMBALANCE (% DIFF)... 2.0

ANALYSIS IN MG/L

AG....		CO3.....		LI...		S....			

ISOTOPES (0/00)

DEL D OF WATER..... -29.

AL....	N	CR.....		MG...	4.8	SB...		DEL O(18) OF WATER...	-5.5
AS....		CS.....		MN...	0.25				
B.....		F.....	0.2	NA...	4.0				
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-14.8
BE....		FE(TOT).	0.33	NB...		SO4..	7.8	TRITIUM (T.U.).....	3.1 + OR - 0.6
BI....		GA.....		NH4..		SR...	0.11	C(14) CONTENT OF CO2.	35.6% + OR - 0.7% (% OF MODERN)
CA....	45.	HCO3....	164.	NO3..	N				
CD....		H2S.....		PO4..	0.04				
CL....	1.9								
CO....		K.....	1.5			ZN...	0.07		

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... REDINGER AND OTHERS, 1979

RECORD 00012

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000079

NAME OF SAMPLE SOURCE... HOT SPRINGS NATIONAL PARK (MAURICE HOT SPRING)
WARING NUMBER..... 2

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 34-30.85 N 093-03.18 W
STATE..... ARKANSAS
COUNTY..... GARLAND
MAP REFERENCE..... HOT SPRINGS NORTH 1:24000
OTHER LOCALITY INFORMATION: NE CORNER OF MAURICE BATHHOUSE

WATER ANALYSIS
PH..... 7.03
SPECIFIC CONDUCTANCE..... 269.
ALKALINITY..... 156. AS HCO3
TOTAL DISSOLVED SOLIDS... 189.
CHARGE IMBALANCE (% DIFF)... 0.5
ANALYSIS IN MG/L

								ISOTOPES (0/00)	
AG....		CO3.....		LI...		S....		DEL D OF WATER.....	-27.
AL....	N	CR.....		MG...		SB...		DEL O(18) OF WATER...	-3.9
B.....		F.....	0.2	NA...	4.0				
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-14.7
BE....		FE(TOT).		NB...		SO4..	9.0	TRITIUM (T.U.).....	1.2 + OR - 0.3
BI....		GA.....		NH4..		SR...	0.11		
CA....		HCO3....	156.	NO3..	N				
CD....		H2S.....		PO4..	0.04				
CL....	1.9								
CO....		K.....	1.5						

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... REDINGER AND OTHERS, 1979

RECORD 00013

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000308

NAME OF SAMPLE SOURCE... MCKEAN D6 WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 33-26. N 093-26. W
STATE..... ARKANSAS

COUNTY..... LAFAYETTE
MAP REFERENCE..... BUCKNER 1:24000
OTHER LOCALITY INFORMATION: BUCKNER OIL FIELD

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/01/09 TROUT, MICHAEL L.
SAMPLE NUMBER..... 4
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 90. AT (M).. 2200.
WELL DEPTH (M)..... 2200.
PERTINENT LITHOLOGY..... SABINE UPLIFT: UPPER JURASSIC SMACKOVER FORMATION

WATER ANALYSIS
SPECIFIC GRAVITY..... 1.212
TOTAL DISSOLVED SOLIDS... 313700.
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....	CO3.....	LI...	95.		
AL....	CR.....	MG...	4030.		
AS....	CS.....	MN...	14.		
B.....	F.....	NA...	64500.		
BA.... L 20.					
BE....	FE(TOT). 34.				
BI....	GA.....	NH4..		SR...	2030.
BR.... 6160.					
CA.... 44200.					
CA+MG.	HG.....	PB...	2.		
CO....	H2S..... L 2.				
CL.... 190800.					
CO....	K..... 1800.			ZN...	24.

REFERENCE AND IDENTIFICATION
COMPILED BY..... REED, MARSHALL
COMPILER AFFILIATION... USGS
REFERENCE..... CARPENTER AND TROUT, 1978

RECORD 00014

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000307
NAME OF SAMPLE SOURCE... OIL WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 15S 024W 11 — LAT/LONG... 33-28. N 093-34. W
STATE..... ARKANSAS
COUNTY..... LAFAYETTE
MAP REFERENCE..... OLD TOWN 1:24000
OTHER LOCALITY INFORMATION: LEWISVILLE OIL FIELD

SAMPLE DESCRIPTION AND CONDITIONS
SAMPLE NUMBER..... 197
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 89.4 AT (M).. 1889.
WELL DEPTH (M)..... 1924.2
PERTINENT LITHOLOGY..... SABINE UPLIFT
OTHER SAMPLE INFORMATION.. ELEVATION 80.2M, PERFORATED INTERVAL 1889.2M TO 1924.2M, BOTTOM-HOLE PRESSURE 197 KG/CM2

WATER ANALYSIS
PH..... 6.3
SPECIFIC GRAVITY..... 1.174
SPECIFIC CONDUCTANCE..... 22200.
ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....	CO3.....	LI...	62.
AL....	CR.....	MG...	4140.

AS....		CS.....		MN...	8.		
AU....		CU.....	1.				
B.....	94.	F.....		NA...	43900.		
BA....	15.						
BE....		FE(TOT).	6.	NB...		SO4..	156.
BI....		GA.....		NH4..	120.	SR...	371.
BR....	2320.						
CA....	27600.	HCO3....	48.				
CA+MG.		MG.....		PB...	14.		
CL....	143900.	I.....	22.				
CO....		K.....	1240.			ZN...	54.

OTHER ANALYTICAL DATA... ORGANIC ACID AS ACETIC = 200. MG/L

REFERENCE AND IDENTIFICATION

COMPILED BY..... REED, MARSHALL
COMPILER AFFILIATION... USGS
REFERENCE..... COLLINS, 1974

RECORD 00015

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0000299

NAME OF SAMPLE SOURCE... BARTONS SPRING (SOUTH)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 04S 025W 26 SW OF NW — LAT/LONG... 34-22.1 N 093-39.1 W
STATE..... ARKANSAS
COUNTY..... MONTGOMERY
MAP REFERENCE..... MGLENWOOD 1:62500
OTHER LOCALITY INFORMATION: 1/4 TO 1/2 MILE SOUTH OF BARTONS HOT SPRING

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1978/07/18
SAMPLE NUMBER..... 921
TEMPERATURE (C)..... 30.

WATER ANALYSIS

PH..... 6.4
SPECIFIC CONDUCTANCE..... 227.
ALKALINITY..... 130. AS CACO3

ANALYSIS IN PPM — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.0046		
AL....		CR.....		MG...	2.38	SB...	L 0.0005
AS....		CS.....		MN...	0.004		
AU....		CU.....	0.003				
B.....		F.....		NA...	3.83	SIO2.	10.5
BA....	L 0.01						
BE....		FE(TOT).	0.01	NB...		SO4..	3.2
BI....		GA.....		NH4..	0.01	SR...	0.1
BR....		GE.....		NI...	0.01		
CA....	50.41	HCO3....		NO3..	14.0		
CA+MG.		HG.....	0.001	PB...	0.012		
CD....		H2S.....		PO4..	0.37		
CL....	2.5						
CO....	0.005	K.....	1.1			ZN...	L 0.005

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... USGS
REFERENCE..... WAGNER AND STEELE, 1980

RECORD 00016

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015218

NAME OF SAMPLE SOURCE... CADDO GAP (NORTH)
WARING NUMBER..... 5

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 04S 024W 19 NE — LAT/LONG... 34-23.04 N 093-36.42 W
STATE..... ARKANSAS — B&M: FIFTH PRINCIPAL
COUNTY..... MONTGOMERY
GEOLOGIC PROVINCE.. OUACHITA
MAP REFERENCE..... GLENWOOD 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1915/00/00 MISER, H. D.
TEMPERATURE (C)..... 34.4
PERTINENT LITHOLOGY..... ARKANSAS NOVACULITE (WARING, 1965)

WATER ANALYSIS

ALKALINITY..... Q 112. AS CACO3

ANALYSIS — ISOTOPES (0/00)

AL....	CR.....	MG...	4.2		
B.....	F.....	NA...	3.4	SIO2.	18.7
BE....	FE(TOT).	NB...		SO4..	2.32
CA.... 41.7					
CL.... 7.1					
CO....	K..... N				

QUALIFICATION FIELD..... ALKALINITY ORIGINALLY REPORTED AS CO3

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... MISER AND PURDUE, 1929, USGS BULL 808

RECORD 00017

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015217

NAME OF SAMPLE SOURCE... CADDO GAP (SOUTH)
WARING NUMBER..... 5

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 04S 024W 19 NE — LAT/LONG... 34-23.04 N 093-36.42 W
STATE..... ARKANSAS — B&M: FIFTH PRINCIPAL
COUNTY..... MONTGOMERY
GEOLOGIC PROVINCE.. OUACHITA
MAP REFERENCE..... GLENWOOD 1:62500

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1915/00/00 MISER, H. D.
TEMPERATURE (C)..... 36.
PERTINENT LITHOLOGY..... ARKANSAS NOVACULITE (WARING, 1965)

WATER ANALYSIS

ALKALINITY..... Q 114. AS CACO3

ANALYSIS — ISOTOPES (0/00)

AL....	CR.....	MG...	2.2		
B.....	F.....	NA...	7.5	SIO2.	15.0
BE....	FE(TOT).	NB...		SO4..	1.42
CA.... 38.9					
CL.... 4.8					
CO....	K..... N				

QUALIFICATION FIELD..... ALKALINITY ORIGINALLY REPORTED AS CO3

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... MISER AND PURDUE, 1929, USGS BULL 808

RECORD 00018

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0001497
NAME OF SAMPLE SOURCE... CADDO RIVER SPRING
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 04S 024W 19 NW OF NE LAT/LONG... 34-23.1 N 093-36.4 W
STATE..... ARKANSAS
COUNTY..... MONTGOMERY
MAP REFERENCE..... GLENWOOD 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1978/07/18
SAMPLE NUMBER..... 915
TEMPERATURE (C)..... 35.0
WATER ANALYSIS
PH..... 5.7
SPECIFIC CONDUCTANCE..... 200.
ALKALINITY..... 122. AS CACO3
ANALYSIS IN PPM ISOTOPES (O/OO)

AG....		CO3.....		LI...	0.0115		
AL....		CR.....		MG...	2.45	SB...	L 0.0002
AS....		CS.....		MN...	0.007		
AU....		CU.....	0.004				
B.....		F.....		NA...	5.4	SIO2.	17.2
BA....	0.03						
BE....		FE(TOT).	0.08	NB...		SO4..	0.7
BI....		GA.....		NH4..	0.21	SR...	0.051
BR....		GE.....		NI...	0.012		
CA....	42.05	HCO3....		NO3..	0.73		
CA+MG.		HG.....	0.00028	PB...	0.018		
CD....		H2S.....		PO4..	0.25		
CL....	3.5						
CO....	0.008	K.....	1.0			ZN...	L 0.005

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... USGS
REFERENCE..... WAGNER AND STEELE, 1980

RECORD 00019

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015219
NAME OF SAMPLE SOURCE... REDLAND MOUNTAIN
WARING NUMBER..... 6
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 05S 026W 12 SW LAT/LONG... 34-19.26 N 093-44.34 W
STATE..... ARKANSAS B&M: FIFTH PRINCIPAL
COUNTY..... PIKE
GEOLOGIC PROVINCE.. OUACHITA
MAP REFERENCE..... GLENWOOD 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1915/00/00 MISER, H. D.
TEMPERATURE (C)..... 25.

PERTINENT LITHOLOGY..... ARKANSAS NOVACULITE (WARING, 1965)
REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... BRYAN, 1922

RECORD 00020

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001498
NAME OF SAMPLE SOURCE... REDLAND MTN SPRING
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 05S 026W 12 SW OF NW — LAT/LONG... 34-19.5 N 093-44.5 W
STATE..... ARKANSAS
COUNTY..... PIKE
MAP REFERENCE..... GLENWOOD 1:62500
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1979/03/04
SAMPLE NUMBER..... 924
TEMPERATURE (C)..... 25.0
WATER ANALYSIS
PH..... 7.2
SPECIFIC CONDUCTANCE..... 210.
ALKALINITY..... 144. AS CACO3
ANALYSIS IN PPM — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.007		
AL....		CR.....		MG...	23.70		
AS....		CS.....		MN...	0.345		
AU....		CU.....	L 0.001				
B.....		F.....		NA...	2.5	SIO2.	18.5
BA....	0.02						
BE....		FE(TOT).	0.226	NB...		SO4..	9.7
BI....		GA.....		NH4..	0.28	SR...	0.071
BR....		GE.....		NI...	0.024		
CA....	53.35	HCO3....		NO3..	16.6		
CA+MG.		HG.....	L 0.0002	PB...	0.03		
CD....		H2S.....		PO4..	0.25		
CL....	1.5						
CO....	0.022	K.....	0.95			ZN...	0.009

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... USGS
REFERENCE..... WAGNER AND STEELE, 1980

RECORD 00021

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015216
NAME OF SAMPLE SOURCE... WARM SPRINGS (RICE'S WARM SPRING)
WARING NUMBER..... 1
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 21N 001W 11 SW OF NW SW — LAT/LONG... 36-28.85 N 091-03.18 W
STATE..... ARKANSAS — B&M: FIFTH PRINCIPAL
COUNTY..... RANDOLF
GEOLOGIC PROVINCE.. OUACHITA
MAP REFERENCE..... WARM SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
TEMPERATURE (C)..... 28.

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... PEALE, 1886

RECORD 00022

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016001
NAME OF SAMPLE SOURCE... BARNES, B. JEWETT
WELL/SPRING NUMBER..... 908
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 32-54.40 N 084-43.27 W
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 27 M.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/12/10
SAMPLE NUMBER..... 908
TEMPERATURE (C)..... 17.6
WELL DEPTH (M)..... 30
DISCHARGE..... 132. L/MIN
PERTINENT LITHOLOGY..... SNELSON GRANITE
OTHER SAMPLE INFORMATION.. HOUSEHOLD USE.
WATER ANALYSIS
SPECIFIC CONDUCTANCE..... L 50.
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00023

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016000
NAME OF SAMPLE SOURCE... BAXLEY, ANDY
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 32-54.22 N 084-42.97 W
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 256 M.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/12/10
SAMPLE NUMBER..... 909
TEMPERATURE (C)..... 17.0
WELL DEPTH (M)..... 32.
PERTINENT LITHOLOGY..... CAROLINA GNEISS
WATER ANALYSIS
DATE/ANALYST..... 1975/12/10
PH..... 7.02
SPECIFIC CONDUCTANCE..... 158.
ALKALINITY..... 94. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.2
ANALYSIS IN MG/L ISOTOPES 10/001
AG.... CO3.... LI... N
AL.... L 0.001 CR..... MG... 3.4

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    AS....    0.0002    CS.......              MN...     0.07
    AU....              CU....... N           MO...               SE...   L 0.001
    B.....    0.02      F........    0.3       NA...     10.       SIO2.     31.
    BE....              FE(TOT).    0.1       NB...               SO4..     6.3
    BI....              GA......              NH4..     0.08      SR...     0.1
    BR....    0.017
    CA....    19.       HCO3....    94.       NO3..     0.1
    CD....              H2S..... L 0.02       PO4..     0.13
    CL....    1.8
    CO....              K........   3.5                           ZN...     0.03
GAS ANALYSIS
  ANALYSIS IN MG/L                                                          ISOTOPES (00/00)
    AR...     0.84
    CH4..   L 0.01
    C2H6.                                     N2...     25.
    CO2..     17.
    H2...                                     RN...     0.4
    HE...   L 0.0002
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977
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RECORD 00024

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016059

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  NAME OF SAMPLE SOURCE... BROWN'S SPRING
LOCATION                                  TOWNSHIP-RANGE                  COORDINATES
  COUNTRY............  UNITED STATES
  STATE..............  GEORGIA
  COUNTY.............  MERIWETHER
  MAP REFERENCE......  WARM SPRINGS 1:62500
  OTHER LOCALITY INFORMATION:  4 MILES ENE OF MANCHESTER, GA.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1935/06/14
  SAMPLE NUMBER........  3
  TEMPERATURE (C)......    20.
  DISCHARGE...........  R 85.    L/MIN
  OTHER SAMPLE INFORMATION.. 3 SOURCES OF WATER, MAIN, SOURCE IS 5FT DIAMETER POOL.
WATER ANALYSIS
  DATE/ANALYST.............              LAMAR, W.L.
  TOTAL DISSOLVED SOLIDS...    144.
  CHARGE IMBALANCE (% DIFF)... 0.0
  ANALYSIS IN PPM                                                           ISOTOPES (0/00)
    AL....              CR......              MG...     11.
    B.....              F........ N           NA...     3.1       SIO2.     28.
    BE....              FE(TOT).    0.03      NB...               SO4..     5.1
    CA....    27.       HCO3....    143.      NO3..     0.06
    CL....    1.8
    CO....              K........   4.4
QUALIFICATION FIELD..... DISCHARGE RANGES FROM 15-30 GPM
REFERENCE AND IDENTIFICATION
  COMPILED BY............  ORRIS, GRETA J
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HEWETT AND CRICKMAY, 1937
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RECORD 00025

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016058

NAME OF SAMPLE SOURCE... BROWN'S SPRING

LOCATION TOWNSHIP-RANGE COORDINATES

COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:62500

OTHER LOCALITY INFORMATION: 4 MILES ENE OF MANCHESTER, GA.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1933/12/08
SAMPLE NUMBER..... 3
TEMPERATURE (C)..... 21.
DISCHARGE..... R 85. L/MIN

OTHER SAMPLE INFORMATION.. 3 SOURCES OF WATER, MAIN SOURCE IS 5FT DIAMETER POOL.

WATER ANALYSIS

DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 144.
CHARGE IMBALANCE (% DIFF)... 4.5
ANALYSIS IN PPM ISOTOPES (0/00)

AL....		CR.....		MG...	10.		
B.....		F.....	N	NA...	2.8	SIO2.	25.
BE....		FE(TOT).	0.03	NB...		SO4..	4.9
CA....	27.	HCO3....	144.	NO3..	N		
CL....	1.8						
CO....		K.....	4.3				

QUALIFICATION FIELD,,,,. DISCHARGE RANGES FROM 15-30 GPM.

REFERENCE AND IDENTIFICATION

COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00026

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016002

NAME OF SAMPLE SOURCE... JAMES PHILLIPS WELL

LOCATION TOWNSHIP-RANGE COORDINATES
LAT/LONG... 32-53.13 N 084-43.12 W

COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000

OTHER LOCALITY INFORMATION: ALTITUDE 288 M, SPRING ON HILLSIDE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/12/10
SAMPLE NUMBER..... 907
TEMPERATURE (C)..... 33.8
WELL DEPTH (M)..... 73.
DISCHARGE..... 379. L/MIN
PERTINENT LITHOLOGY..... MANCHESTER SCHIST (?)

OTHER SAMPLE INFORMATION.. HOUSEHOLD USE.

WATER ANALYSIS

PH..... 6.42
SPECIFIC CONDUCTANCE..... 100.
ALKALINITY..... 64. AS HCO3

CHARGE IMBALANCE (% DIFF)... 17.5

ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				
AL....	L 0.001	CR.....		MG...	8.4	SB...			
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	N	F.....	0.1	NA...	1.0	SIO2.	21.		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	5.7		
BI....		GA.....		NH4..	0.05	SR...	N		
BR....	0.013								
CA....	12.	HCO3....	64.	NO3..	0.1				
CD....		H2S.....		PO4..	0.04				
CL....	1.2								
CO....		K.....	4.0			ZN...	N		

ISOTOPES (O/OO)

DEL O(18) OF WATER... -4.3

DEL C(13) OF CO2..... -16.4

TRITIUM (T.U.)..... -1.0 +/- 2.2

GAS ANALYSIS

ANALYSIS IN MG/L

AR...	0.58		
CH4..	L 0.01		
C2H6.		N2...	23.
CO2..	14.	O2...	7.0
HE....	L 0.0001		

ISOTOPES (OO/O)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00027

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016057

NAME OF SAMPLE SOURCE... PARKMAN SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 32-51.7 N 084-39.0 W

STATE..... GEORGIA

COUNTY..... MERIWETHER

MAP REFERENCE..... SHILOH 1:24000

OTHER LOCALITY INFORMATION: SPRING IS OFTEN FLOODED BY PARKMAN'S POND

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/12/10

TEMPERATURE (C)..... 25.

DISCHARGE..... R 284. L/MIN

PERTINENT LITHOLOGY..... SPARKS SCHIST

OTHER SAMPLE INFORMATION.. SAMPLE PROBABLY CONTAMINATED BY SURFACE WATER

WATER ANALYSIS

DATE/ANALYST..... LAMAR, W.L.

TOTAL DISSOLVED SOLIDS... 114.

CHARGE IMBALANCE (% DIFF)... 2.4

ANALYSIS IN PPM

AL....		CR.....		MG...	11.		
B.....		F.....	N	NA...	2.6	SIO2.	21.
BE....		FE(TOT).	0.03	NB...		SO4..	5.1
CA....	19.	HCO3....	111.	NO3..	0.05		
CL....	2.0						
CO....		K.....	2.5				

ISOTOPES (O/OO)

QUALIFICATION FIELD..... DISCHARGE 50-100 GPM.

REFERENCE AND IDENTIFICATION

COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00028

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016003

NAME OF SAMPLE SOURCE... SOUTH SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 32-52.93 N 084-40.38 W
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 268 M.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/12/08
SAMPLE NUMBER..... 905
TEMPERATURE (C)..... 17.7
DISCHARGE..... 1022. L/MIN
PERTINENT LITHOLOGY..... HOLLIS QUARTZITE
OTHER SAMPLE INFORMATION.. INDUSTRIAL USE.

WATER ANALYSIS

DATE/ANALYST..... 1975/12/08
PH..... 4.0
SPECIFIC CONDUCTANCE..... L 50.

ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				
AL....	0.015	CR.....		MG...	0.2	SB...			
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	N	F.....	N	NA...	0.9	SIO2.	7.5		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	0.4		
BI....		GA.....		NH4..	0.09	SR...	N		
BR....	0.011								
CA....	0.3	HCO3....		NO3..	0.2				
CD....		H2S.....		PO4..	N				
CL....	1.2								
CO....		K.....	0.6			ZN...	N		

ISOTOPES (0/00)

DEL O(18) OF WATER... -4.4
DEL C(13) OF CO2..... -30.1
TRITIUM (T.U.)..... 34.6

GAS ANALYSIS

ANALYSIS IN MG/L

AR...	0.58		
CH4..	L 0.005		
C2H6.		N2...	14.
CO2..	55.	O2...	8.2
HE...	0.0002		

ISOTOPES (00/0)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00029

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016049

NAME OF SAMPLE SOURCE... SOUTH SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000
LAT/LONG... 32-52.93 N 084-40.38 W
OTHER LOCALITY INFORMATION: ALTITUDE 268 M.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/05/05
TEMPERATURE (C)..... 17.8
DISCHARGE..... 927. L/MIN
PERTINENT LITHOLOGY..... HOLLIS QUARTZITE

WATER ANALYSIS
PH..... 4.9
SPECIFIC CONDUCTANCE..... L 50.
ALKALINITY..... 2. AS HCO3
CHARGE IMBALANCE (% DIFF)... 20.2

ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				
AL....	0.008	CR.....		MG...	0.1	SB...			
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....		MO...		SE...	L 0.001		
B.....	N	F.....	N	NA...	0.8	SIO2.	6.5		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	0.4		
BI....		GA.....		NH4..		SR...	N		
CA....	0.2	HCO3....	2.	NO3..	0.3				
CD....		H2S.....		PO4..	0.01				
CL....	1.4								
CO....		K.....	0.5			ZN...	N		

ISOTOPES (O/OO)

DEL O(18) OF WATER...	-5.2
DEL C(13) OF CO2.....	-24.3
TRITIUM (T.U.).....	30.

GAS ANALYSIS
ANALYSIS IN MG/L

AR...	0.44		
CH4..	L 0.02		
C2H6.		N2...	21.
CO2..	34.	O2...	9.2
HE...	L 0.0001		

ISOTOPES (OO/O)

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00030

GEOTHERM SAMPLE FILE
GEOTHERM FILE ID: 0016004
NAME OF SAMPLE SOURCE... WARM SPRINGS

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES
LAT/LONG... 32-53.55 N 084-41.40 W
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/05/05
SAMPLE NUMBER..... 901
TEMPERATURE (C)..... 31.6
DISCHARGE..... 3348. L/MIN
PERTINENT LITHOLOGY..... HOLLIS QUARTZITE

WATER ANALYSIS

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  PH.......................    6.95
  SPECIFIC CONDUCTANCE.....    210.
  ALKALINITY...............    118.      AS HCO3
  CHARGE IMBALANCE (% DIFF)... 3.6
  ANALYSIS IN MG/L                                                          ISOTOPES (O/OO)
    AG....              CO3.....              LI...  N
    AL....   0.003      CR......              MG...    11.     SB...          DEL O(18) OF WATER...    -5.0
    AS....   0.0002     CS......              MN...  N
    AU....              CU......              MO...              SE...  L 0.001
    B..... N            F.......   0.1        NA...    1.2      SIO2.    18.
    BA....              FE+3....              NA+K.              SN...          DEL C(13) OF CO2.....    -14.5
    BE....              FE(TOT).   0.01       NB...              SO4..    6.7   TRITIUM (T.U.).......  0.8 +/- 0.5
    BI....              GA......              NH4..              SR...    0.1
    CA....   20.        HCO3....   118.       NO3..    0.3
    CD....              H2S.....              PO4..    0.05
    CL....   1.7
    CO....              K.......   3.7                           ZN...    0.03
GAS ANALYSIS
  ANALYSIS IN MG/L                                                          ISOTOPES (OO/O)
    CO2..                                     O2...    6.5
QUALIFICATION FIELD..... FLOW MEASUREMENT TOO HIGH BECAUSE OF STORED WATER DRAINING FROM RESERVOIR.
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977
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RECORD 00031

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GEOTHERM SAMPLE FILE                                                        GEOTHERM FILE ID:  0016005
  NAME OF SAMPLE SOURCE... WARM SPRINGS
LOCATION                          TOWNSHIP-RANGE                    COORDINATES
  COUNTRY............  UNITED STATES                                  LAT/LONG...  32-53.55 N 084-41.40 W
  STATE..............  GEORGIA
  COUNTY.............  MERIWETHER
  MAP REFERENCE......  WARM SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1975/12/10
  SAMPLE NUMBER........  901
  TEMPERATURE (C)......    30.9
  DISCHARGE............    3350.  L/MIN
  PERTINENT LITHOLOGY..... HOLLIS QUARTZITE
WATER ANALYSIS
  PH.......................    7.40
  SPECIFIC CONDUCTANCE.....    182.
  ALKALINITY...............    122.      AS HCO3
  CHARGE IMBALANCE (% DIFF)... 5.1
  ANALYSIS IN MG/L                                                          ISOTOPES (O/OO)
    AG....              CO3.....              LI...  N
    AL.... L 0.001      CR......              MG...    13.     SB...          DEL O(18) OF WATER...    -4.5
    AS....   0.0002     CS......              MN...  N
    AU....              CU..... N             MO...              SE...  L 0.001
    B.....   0.02       F.......   0.1        NA...    1.2      SIO2.    20.
    BA....              FE+3....              NA+K.              SN...          DEL C(13) OF CO2.....    -13.7
    BE....              FE(TOT). N            NB...              SO4..    7.1   TRITIUM (T.U.).......  0.8 +/- 0.9
    BI....              GA......              NH4..    0.04      SR...    0.1
    BR....   0.004
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    CA....   22.        HCO3....   122.       NO3..    0.3
    CO....              H2S.....              PO4..    0.08
    CL....   1.9
    CO....              K.......   3.8                        ZN...  N
GAS ANALYSIS
  ANALYSIS IN MG/L                                                          ISOTOPES (00/00)
    AR...    0.81
    CH4..  L 0.005
    C2H6.                                     N2...    20.
    CO2..    11.                              O2...    7.0
    HE...  L 0.0001
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977
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RECORD 00032

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GEOTHERM SAMPLE FILE                                                        GEOTHERM FILE ID:  0016054
  NAME OF SAMPLE SOURCE... WARM SPRINGS-EAST SOURCE
LOCATION                          TOWNSHIP-RANGE                    COORDINATES
  COUNTRY............  UNITED STATES                                  LAT/LONG...  32-53.55 N 084-41.40 W
  STATE..............  GEORGIA
  COUNTY.............  MERIWETHER
  MAP REFERENCE......  WARM SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1935/06/13
  POINT OF COLLECTION..  OPEN FISSURE IN 7.3 M LONG COVERED CHAMBER JUST SOUTH OF THE ROW OF SIX CISTERNS
  TEMPERATURE (C)......    31.
  DISCHARGE...........     757.   L/MIN
  PERTINENT LITHOLOGY....... SPARKS SCHIST
WATER ANALYSIS
  DATE/ANALYST.............            LAMAR, W.L.
  TOTAL DISSOLVED SOLIDS...    123.
  CHARGE IMBALANCE (% DIFF)... 2.8
  ANALYSIS IN PPM                                                           ISOTOPES (0/00)
    AL....              CR......              MG...    12.
    B.....              F.......   0.1        NA...    2.1      SIO2.    25.
    BE....              FE(TOT).   0.01       NB...              SO4..    7.9
    CA....   21.        HCO3....   118.       NO3..    0.15
    CL....   1.8
    CO....              K.......   3.5
REFERENCE AND IDENTIFICATION
  COMPILED BY............  ORRIS, GRETA J
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HEWETT AND CRICKMAY, 1937
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RECORD 00033

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GEOTHERM SAMPLE FILE                                                        GEOTHERM FILE ID:  0016053
  NAME OF SAMPLE SOURCE... WARM SPRINGS-EAST SOURCE
LOCATION                          TOWNSHIP-RANGE                    COORDINATES
  COUNTRY............  UNITED STATES                                  LAT/LONG...  32-53.55 N 084-41.40 W
  STATE..............  GEORGIA
  COUNTY.............  MERIWETHER
  MAP REFERENCE......  WARM SPRINGS 1:24000
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SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1933/12/11
POINT OF COLLECTION.. OPEN FISSURE IN 7.3 M LONG COVERED CHAMBER JUST SOUTH OF THE ROW OF SIX CISTERNS
TEMPERATURE (C)..... 31.
DISCHARGE..... 757. L/MIN
PERTINENT LITHOLOGY..... SPARKS SCHIST
WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 121.
CHARGE IMBALANCE (% DIFF)... 2.5
ANALYSIS IN PPM

								ISOTOPES (0/00)
AL....		CR.....		MG...	12.			
B.....		F.....	0.1	NA...	1.6	SIO2.	23.	
BE....		FE(TOT).	0.01	NB...		SO4..	7.3	
CA....	21.	HCO3....	118.	NO3..	0.1			
CL....	1.8							
CO....		K.....	3.6					

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00034

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016055
NAME OF SAMPLE SOURCE... WARM SPRINGS-WEST SOURCE
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 32-53.55 N 084-41.40 W
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1933/12/11
POINT OF COLLECTION.. HOLE IN WALL OF THE WESTERN MOST OF THE SIX CISTERN-
TEMPERATURE (C)..... 31.
DISCHARGE..... 284. L/MIN
PERTINENT LITHOLOGY..... SPARKS SCHIST
WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 117.
CHARGE IMBALANCE (% DIFF)... 0.2
ANALYSIS IN PPM

								ISOTOPES (0/00)
AL....		CR.....		MG...	11.			
B.....		F.....	0.1	NA...	1.7	SIO2.	21.	
BE....		FE(TOT).	0.02	NB...		SO4..	7.0	
CA....	20.	HCO3....	114.	NO3..	0.15			
CL....	1.8							
CO....		K.....	3.5					

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00035

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016056

NAME OF SAMPLE SOURCE... WARM SPRINGS-WEST SOURCE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 32-53.55 N 084-41.40 W
STATE..... GEORGIA
COUNTY..... MERIWETHER
MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1935/06/13
POINT OF COLLECTION.. HOLE IN WALL OF THE WESTERN MOST OF THE SIX CISTERN-
TEMPERATURE (C)..... 31.
DISCHARGE..... 284. L/MIN
PERTINENT LITHOLOGY..... SPARKS SCHIST

WATER ANALYSIS

DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 120.
CHARGE IMBALANCE (% DIFF)... 0.7
ANALYSIS IN PPM — ISOTOPES (0/00)

AL....		CR.....		MG...	11.		
B.....		F.....	0.1	NA...	2.1	SIO2.	24.
BE....		FE(TOT).	0.01	NB...		SO4..	7.4
CA....	20.	HCO3....	115.	NO3..	0.15		
CL....	1.8						
CO....		K.....	3.4				

REFERENCE AND IDENTIFICATION

COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00036

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015215

NAME OF SAMPLE SOURCE... LIFSEY WARM SPRING
WARING NUMBER..... 1

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 33-02.22 N 084-22.44 W
STATE..... GEORGIA
COUNTY..... PIKE
GEOLOGIC PROVINCE.. PIEDMONT
MAP REFERENCE..... ZEBALON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1935/06/12
POINT OF COLLECTION.. CONCRETE POOL
TEMPERATURE (C)..... 26.
DISCHARGE..... 314. L/MIN

WATER ANALYSIS

DATE/ANALYST..... LAMAR, W. L.
TOTAL DISSOLVED SOLIDS... 141.
CHARGE IMBALANCE (% DIFF)... 1.6
ANALYSIS IN PPM — ISOTOPES (0/00)

AL....		CR.....		MG...	11.		
B.....		F.....	0.1	NA...	7.4	SIO2.	30.
BE....		FE(TOT).	0.01	NB...		SO4..	5.6
CA....	23.	HCO3....	137.	NO3..	0.15		
CL....	1.8						
CO....		K.....	3.2				

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HEWETT AND CRICKWAY, 1937

RECORD 00037

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015214
NAME OF SAMPLE SOURCE... TAYLOR
WARING NUMBER..... 7

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 33-01.08 N 084-19.62 W
STATE..... GEORGIA
COUNTY..... PIKE
GEOLOGIC PROVINCE.. PIEDMONT
MAP REFERENCE..... ZEBALON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1935/06/15
SAMPLE NUMBER..... 7
TEMPERATURE (C)..... 24.
DISCHARGE..... 1457. L/MIN

WATER ANALYSIS
DATE/ANALYST..... LAMAR, W. L.
ALKALINITY..... 111. AS HCO3
TOTAL DISSOLVED SOLIDS... 105.
CHARGE IMBALANCE (% DIFF)... 2.8
ANALYSIS IN PPM ISOTOPES (0/00)

AL....		CR.....		MG...	10.		
B.....		F.....	N	NA...	2.9	SIO2.	20.
BE....		FE(TOT).	0.01	NB...		SO4..	4.1
CA....	18.	HCO3....	111.	NO3..	N		
CL....	1.6						
CO....		K.....	1.9				

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HEWETT AND CRICKWAY, 1937

RECORD 00038

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016064
NAME OF SAMPLE SOURCE... BARKER SPRING

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 32-55.2 N 084-26.0 W
STATE..... GEORGIA
COUNTY..... UPSON
MAP REFERENCE..... SUNSET VILLAGE 1:24000
OTHER LOCALITY INFORMATION: ON STATE HWY 74, 7 MILES WNW OF THOMASTON, GA.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1934/03/23
SAMPLE NUMBER..... 5
TEMPERATURE (C)..... 23.
OTHER SAMPLE INFORMATION.. SPRING ISSUES IN A SWIMMING POOL.

WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 107.
CHARGE IMBALANCE (% DIFF)... 2.1

ANALYSIS IN PPM

ISOTOPES (O/OO)

AL....		CR.....		MG...	11.		
B.....		F.....	N	NA...	2.4	SIO2.	16.
BE....		FE(TOT).	0.02	NB...		SO4..	4.4
CA....	19.	HCO3....	114.	NO3..	N		
CL....	1.5						
CO....		K.....	3.4				

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00039

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016065

NAME OF SAMPLE SOURCE... BARKER SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 32-26.0 N 084-26.0 W
STATE..... GEORGIA
COUNTY..... UPSON
OTHER LOCALITY INFORMATION: SUNSET VILLAGE 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1935/06/12
SAMPLE NUMBER..... 5
TEMPERATURE (C)..... 23.
OTHER SAMPLE INFORMATION.. SPRING ISSUES IN A SWIMMING POOL.

WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 112.
CHARGE IMBALANCE (% DIFF)... 0.1

ANALYSIS IN PPM

ISOTOPES (O/OO)

AL....		CR.....		MG...	11.		
B.....		F.....	N	NA...	2.8	SIO2.	23.
BE....		FE(TOT).	0.01	NB...		SO4..	4.9
CA....	19.	HCO3....	116.	NO3..	N		
CL....	1.6						
CO....		K.....	3.0				

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00040

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016060

NAME OF SAMPLE SOURCE... THUNDERING SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... UPSON
OTHER LOCALITY INFORMATION: 5.1 MILES ESE OF WOODBURY, GA.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1934/04/02
SAMPLE NUMBER..... 4
TEMPERATURE (C)..... 23.
OTHER SAMPLE INFORMATION.. SAMPLE FROM SMALL POND ALSO FED BY CREEK. MULTIPLE SPRINGS.

WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 66.
CHARGE IMBALANCE (% DIFF)... 0.7
ANALYSIS IN PPM

ISOTOPES (0/00)

AL....		CR.....		MG...	5.7		
B.....		F.....	N	NA...	2.1	SIO2.	14.
BE....		FE(TOT).	0.03	NB...		SO4..	3.0
CA....	9.9	HCO3....	61.	NO3..	N		
CL....	1.8						
CO....		K.....	2.0				

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00041

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016061
NAME OF SAMPLE SOURCE... THUNDERING SPRING
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... UPSON
OTHER LOCALITY INFORMATION: 5.1 MILES ESE OF WOODBURY, GA.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1935/06/12
SAMPLE NUMBER..... 4
TEMPERATURE (C)..... 23.
DISCHARGE..... Q 1438. L/MIN
OTHER SAMPLE INFORMATION.. SAMPLE FROM SMALL POND ALSO FED BY CREEK. MULTIPLE SPRINGS.
WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 67.
CHARGE IMBALANCE (% DIFF)... 1.4
ANALYSIS IN PPM

ISOTOPES (0/00)

AL....		CR.....		MG...	5.9		
B.....		F.....	N	NA...	2.3	SIO2.	16.
BE....		FE(TOT).	0.02	NB...		SO4..	3.0
CA....	10.	HCO3....	63.	NO3..	0.05		
CL....	1.8						
CO....		K.....	1.8				

QUALIFICATION FIELD..... DISCHARGE IS TOTAL FOR GROUP OF SPRINGS.
REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00042

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016063
NAME OF SAMPLE SOURCE... TRIBUTARY SPRING TO THUNDERING SPRING
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... UPSON

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1935/06/12
SAMPLE NUMBER..... 4A
TEMPERATURE (C)..... 22.
WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
TOTAL DISSOLVED SOLIDS... 83.
CHARGE IMBALANCE (% DIFF)... 0.8
ANALYSIS IN PPM ISOTOPES (0/00)

AL....		CR.....		MG...	7.6		
B.....		F.....	N	NA...	2.4	SIO2.	18.
BE....		FE(TOT).	0.02	NB...		SO4..	4.0
CA....	14.	HCO3....	82.	NO3..	0.05		
CL....	1.8						
CO....		K.....	2.4				

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00043

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016062
NAME OF SAMPLE SOURCE... TRIBUTARY SPRING TO THUNDERING SPRING
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES
STATE..... GEORGIA
COUNTY..... UPSON
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1934/04/02
SAMPLE NUMBER..... 4A
TEMPERATURE (C)..... 23.
WATER ANALYSIS
DATE/ANALYST..... LAMAR, W.L.
ANALYSIS IN PPM ISOTOPES (0/00)

BE....		FE(TOT).		NB...		SO4..	3.
CA....		HCO3....	84.	NO3..	N		
CL....	2.						

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HEWETT AND CRICKMAY, 1937

RECORD 00044

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015222
NAME OF SAMPLE SOURCE... FREDERICK GEORGE
WARING NUMBER..... 1
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 42-44.12 N 073-12.05 W
STATE..... MASSACHUSETTS
COUNTY..... BERKSHIRE
GEOLOGIC PROVINCE.. NORTHERN APPALACHIANS
MAP REFERENCE..... WILLIAMSTOWN 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1969/08/12

SAMPLE NUMBER..... WILLIAMSTOWN S-7
TEMPERATURE (C)..... 22.
DISCHARGE..... R 66. L/MIN
WATER ANALYSIS
PH..... 8.1
SPECIFIC CONDUCTANCE..... 199.
ALKALINITY..... 114. AS HCO3
TOTAL DISSOLVED SOLIDS... 114.
CHARGE IMBALANCE (% DIFF)... 0.5
ANALYSIS IN MG/L — ISOTOPES (D/DW)

AG....		CO3.....	N				
AL....		CR.....		MG...	8.9		
AS....		CS.....		MN...	N		
B.....		F.....	0.1	NA...	2.0	SIO2.	12.
BE....		FE(TOT).	0.02	NB...		SO4..	8.1
CA....	25.	HCO3....	114.	NO3..	0.4		
CL....	1.3						
CO....		K.....	0.9				

QUALIFICATION FIELD..... RANGE IS 57. - 76. L/MIN
REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HANSEN AND OTHERS, 1974

RECORD 00045

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015221
NAME OF SAMPLE SOURCE... SAND SPRING
WARING NUMBER..... 1
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 42-44.13 N 073-12.02 W
STATE..... MASSACHUSETTS
COUNTY..... BERKSHIRE
GEOLOGIC PROVINCE.. NORTHERN APPALACHIANS
MAP REFERENCE..... WILLIAMSTOWN 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1969/08/12
SAMPLE NUMBER..... WILLIAMSTOWN S-2
TEMPERATURE (C)..... 22.
DISCHARGE..... 15. L/MIN
WATER ANALYSIS
PH..... 7.8
SPECIFIC CONDUCTANCE..... 199.
ALKALINITY..... 118. AS HCO3
TOTAL DISSOLVED SOLIDS... 116.
CHARGE IMBALANCE (% DIFF)... 7.5
ANALYSIS IN MG/L — ISOTOPES (D/DW)

AG....		CO3.....	N				
AL....		CR.....		MG...	8.8		
AS....		CS.....		MN...	N		
B.....		F.....	0.1	NA...	2.0	SIO2.	12.
BE....		FE(TOT).	0.02	NB...		SO4..	8.1
CA....	23.	HCO3....	118.	NO3..	1.0		
CL....	1.0						
CO....		K.....	0.9				

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HANSEN AND OTHERS, 1974

RECORD 00046

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015220
NAME OF SAMPLE SOURCE... SAND SPRING
WARING NUMBER..... 1

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 42-44.13 N 073-12.02 W
STATE..... MASSACHUSETTS
COUNTY..... BERKSHIRE
GEOLOGIC PROVINCE.. NORTHERN APPALACHIANS
MAP REFERENCE..... WILLIAMSTOWN 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1963/10/24
SAMPLE NUMBER..... WILLIAMSTOWN S-2
TEMPERATURE (C)..... 21.0

WATER ANALYSIS
PH..... 8.2
SPECIFIC CONDUCTANCE..... 197.
ALKALINITY..... 116. AS HCO3
TOTAL DISSOLVED SOLIDS... 110.
CHARGE IMBALANCE (% DIFF)... 0.6

ANALYSIS IN MG/L ISOTOPES (O/OO)

AG....		CO3.....	N					
AL....		CR.....		MG...	11.			
AS....		CS.....		MN...	N			
B.....		F.....	0.1	NA...	3.3	SIO2.	13.	
BE....		FE(TOT).	0.02	NB...		SO4..	8.6	
CA....	21.	HCO3....	116.	NO3..	0.4			
CL....	2.							
CO....		K.....	1.3					

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HANSEN AND OTHERS, 1974

RECORD 00047

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0004005
NAME OF SAMPLE SOURCE... UNNAMED STOCK WELL
WELL/SPRING NUMBER..... 35N-13W-29-AC

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 35N 013W 29 SW OF NE LAT/LONG... 42-59.00 N 098-52.33 W
STATE..... NEBRASKA
COUNTY..... BOYD

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1971/01/30
POINT OF COLLECTION.. AT WELL DISCHARGE
TEMPERATURE (C)..... 21.
AMBIENT TEMP (C)..... 10.
WELL DEPTH (M)..... 370.
DISCHARGE..... 19. L/MIN

WATER ANALYSIS

PH..... 7.6 AT(C) 25.
SPECIFIC CONDUCTANCE..... 1583.
TOTAL DISSOLVED SOLIDS... 1177.
CHARGE IMBALANCE (% DIFF)... 0.3
ANALYSIS IN MG/L

ISOTOPES (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	46.		
AS....		CS.....		MN...	0.23		
B.....	0.15	F.....	1.9	NA...	70.	SIO2.	10.
BE....		FE(TOT).	7.4	NB...		SO4..	655.
BI....		GA.....		NH4..		SR...	5.0
CA....	214.	HCO3....	98.				
CL....	97.						
CO....		K.....	20.				

REFERENCE AND IDENTIFICATION
COMPILED BY..... EVERSOLL, DUANE A.
COMPILER AFFILIATION... NEBRASKA GEOLOGICAL SURVEY
REFERENCE..... SOUDERS, VERNON L. N.W.S.P. #42 - 1976

RECORD 00048

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0004004
NAME OF SAMPLE SOURCE... UNNAMED STOCK WELL
WELL/SPRING NUMBER..... 35N-10W-32-BA
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES 35N 010W 32 NE OF NW LAT/LONG... 42-57.79 N 098-31.00 W
STATE..... NEBRASKA
COUNTY..... BOYD
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1970/02/14
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 28.
AMBIENT TEMP (C)..... 10.
WELL DEPTH (M)..... 309.
DISCHARGE..... 19. L/MIN
WATER ANALYSIS
PH..... 7.5 AT(C) 25.
SPECIFIC CONDUCTANCE..... 1627.
TOTAL DISSOLVED SOLIDS... 1237.
CHARGE IMBALANCE (% DIFF)... 0.6
ANALYSIS IN MG/L

ISOTOPES (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	45.		
AS....		CS.....		MN...	0.21		
B.....	0.09	F.....	2.0	NA...	69.	SIO2.	14.
BE....		FE(TOT).	1.2	NB...		SO4..	675.
BI....		GA.....		NH4..		SR...	4.8
CA....	240.	HCO3....	143.				
CL....	95.						
CO....		K.....	20.				

REFERENCE AND IDENTIFICATION
COMPILED BY..... EVERSOLL, DUANE A.
COMPILER AFFILIATION... NEBRASKA GEOLOGICAL SURVEY
REFERENCE..... SOUDERS, VERNON L. N.W.S.P. #42 - 1976

RECORD 00049

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0004003

NAME OF SAMPLE SOURCE... UNNAMED STOCK WELL
WELL/SPRING NUMBER..... 33N-11W-30-AD

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 33N 011W 30 SE OF NE — LAT/LONG... 42-48.95 N 098-38.55 W
STATE..... NEBRASKA
COUNTY..... BOYD

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1970/01/31
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 28.
AMBIENT TEMP (C)..... 10.
WELL DEPTH (M)..... 294.
DISCHARGE..... 19. L/MIN

WATER ANALYSIS

PH..... 7.7 AT(C) 25.
SPECIFIC CONDUCTANCE..... 1456.
TOTAL DISSOLVED SOLIDS... 1081.
CHARGE IMBALANCE (% DIFF)... 0.6

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	N						
AL....		CR.....		MG...	39.				
AS....		CS.....		MN...	0.25				
B.....	0.43	F.....	2.1	NA...	83.	SIO2.	13.		
BE....		FE(TOT).	3.8	NB...		SO4..	610.		
BI....		GA.....		NH4..		SR...	4.5		
CA....	185.	HCO3....	153.						
CL....	45.								
CO....		K.....	21.						

REFERENCE AND IDENTIFICATION

COMPILED BY..... EVERSOLL, DUANE A.
COMPILER AFFILIATION... NEBRASKA GEOLOGICAL SURVEY
REFERENCE..... SOUDERS, VERNON L. N.W.S.P. #42 - 1976

RECORD 00050

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0004002

NAME OF SAMPLE SOURCE... UNNAMED STOCK WELL
WELL/SPRING NUMBER..... 33N-11W-15-DD

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 33N 011W 15 SE OF SE — LAT/LONG... 42-49.79 N 098-35.50 W
STATE..... NEBRASKA
COUNTY..... BOYD

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1970/02/14 SOUDERS, VERNON L.
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 28.
AMBIENT TEMP (C)..... 10.
WELL DEPTH (M)..... 332.
DISCHARGE..... 19. L/MIN

WATER ANALYSIS

PH..... 7.5 AT(C) 25.
SPECIFIC CONDUCTANCE..... 1525.

TOTAL DISSOLVED SOLIDS... 1138.
CHARGE IMBALANCE (% DIFF)... 2.1
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N				
AL....		CR.....		MG...	43.		
AS....		CS.....		MN...	0.24		
B.....	0.28	F.....	2.0	NA...	73.	SIO2.	14.
BE....		FE(TOT).	2.8	NB...		SO4..	635.
BI....		GA.....		NH4..		SR...	4.4
CA....	210.	HCO3....	139.				
CL....	65.						
CO....		K.....	20.				

REFERENCE AND IDENTIFICATION
COMPILED BY..... EVERSOLL, DUANE A.
COMPILER AFFILIATION... NEBRASKA GEOLOGICAL SURVEY
REFERENCE..... SOUDERS, VERNON L. - N.W.S.P. #42 - 1976

RECORD 00051

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0004001
NAME OF SAMPLE SOURCE... UNNAMED STOCK WELL
WELL/SPRING NUMBER..... 33N-10W-31-CCD

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — 33N 010W 31 SE OF SE SW — LAT/LONG... 42-47.30 N 098-31.96 W
STATE..... NEBRASKA
COUNTY..... BOYD
MAP REFERENCE..... BRISTOW 1:24,000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1953/12/01 SOUDERS, VERNON L.
POINT OF COLLECTION.. WELL HEAD
TEMPERATURE (C)..... 27.
AMBIENT TEMP (C)..... 10.
WELL DEPTH (M)..... 270.
DISCHARGE..... 19. L/MIN

WATER ANALYSIS
PH..... 7.2 AT(C) 25.
SPECIFIC CONDUCTANCE..... 1570.
TOTAL DISSOLVED SOLIDS... 1120.
CHARGE IMBALANCE (% DIFF)... 2.5
ANALYSIS IN MG/L — ISOTOPES (O/OO)

AG....		CO3.....	N				
AL....		CR.....		MG...	42.		
B.....	0.79	F.....	2.4	NA...	135.	SIO2.	12.
BE....		FE(TOT).	3.3	NB...		SO4..	575.
CA....	161.	HCO3....	224.				
CL....	60.						
CO....		K.....	21.				

REFERENCE AND IDENTIFICATION
COMPILED BY..... EVERSOLL, DUANE A.
COMPILER AFFILIATION... NEBRASKA GEOLOGICAL SURVEY
REFERENCE..... SOUDERS, VERNON L., N.W.S.P. #42 - 1976

RECORD 00052

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0004000
NAME OF SAMPLE SOURCE... UNNAMED WATER WELL

WELL/SPRING NUMBER..... 33N-10W-14-CC

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 33N 010W 14 SW OF SW — LAT/LONG... 42-49.75 N 098-27.95 W
STATE..... NEBRASKA
COUNTY..... BOYD
MAP REFERENCE..... LYNCH 1:24,000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1970/01/31 SOUDERS, VERNON L.
POINT OF COLLECTION.. AT WELL HEAD
TEMPERATURE (C)..... 28.
AMBIENT TEMP (C)..... 10.
WELL DEPTH (M)..... 292.
DISCHARGE..... 57. L/MIN

WATER ANALYSIS

PH..... 7.8
SPECIFIC CONDUCTANCE..... 1592.
ALKALINITY..... 162. AS HCO3
TOTAL DISSOLVED SOLIDS... 1194.
CHARGE IMBALANCE (% DIFF)... 0.7

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....	N				
AL....		CR.....		MG...	42.		
AS....		CS.....		MN...	0.16		
B.....	0.19	F.....	1.4	NA...	75.	SIO2.	14.
BE....		FE(TOT).	1.4	NB...		SO4..	650.
BI....		GA.....		NH4..		SR...	4.3
CA....	228.	HCO3....	162.				
CL....	80.						
CO....		K.....	18.				

REFERENCE AND IDENTIFICATION

COMPILED BY..... EVERSOLL, DUANE A.
COMPILER AFFILIATION... NEBRASKA GEOLOGICAL SURVEY
REFERENCE..... SOUDERS, VERNON L., N.W.S.P. #42 - 1976

RECORD 00053

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015224

NAME OF SAMPLE SOURCE... LEBANON SPRING
WARING NUMBER..... 1

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 42-28.83 N 073-22.20 W
STATE..... NEW YORK
COUNTY..... COLUMBIA
GEOLOGIC PROVINCE.. NORTHERN APPALACHIANS
MAP REFERENCE..... PITTSFIELD WEST 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/20
TEMPERATURE (C)..... 18.7
DISCHARGE..... 549. L/MIN
PERTINENT LITHOLOGY..... STOCKBRIDGE LIMESTONE

WATER ANALYSIS

PH..... 7.72
SPECIFIC CONDUCTANCE..... 290.
ALKALINITY..... 170. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.7

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.01				
AL....	L 0.001	CR.....		MG...	14.	SB...		DEL O(18) OF WATER...	-10.7
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	0.01	F.....	0.2	NA...	5.5	SIO2.	9.0		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-11.9
BE....		FE(TOT).	N	NB...		SO4..	20.	TRITIUM (T.U.).....	19.9 + OR - 1.3
BI....		GA.....		NH4..		SR...	0.2		
CA....	40.	HCO3....	170.	NO3..	1.2				
CD....		H2S.....		PO4..	0.04				
CL....	5.2								
CO....		K.....	1.0			ZN...	N		

GAS ANALYSIS

ANALYSIS IN MG/L — ISOTOPES (00/00)

AR...	1.04				
C2H6.	L 0.03	N2...	27.		
CO2..	7.1	O2...	5.2		
HE...	0.001				

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00054

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015223

NAME OF SAMPLE SOURCE... LEBANON SPRING
WARING NUMBER..... 1

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 42-28.83 N 073-22.20 W
STATE..... NEW YORK
COUNTY..... COLUMBIA
GEOLOGIC PROVINCE.. NORTHERN APPALACHIANS
MAP REFERENCE..... PITTSFIELD WEST 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/10/04
TEMPERATURE (C)..... 21.9
DISCHARGE..... 397. L/MIN

WATER ANALYSIS

PH..... 7.6
SPECIFIC CONDUCTANCE..... 260.
ALKALINITY..... 166. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.0

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	N				
AL....	0.014	CR.....		MG...	16.	SB...		DEL O(18) OF WATER...	-9.9
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	0.02	F.....	0.3	NA...	6.9	SIO2.	12.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-11.9
BE....		FE(TOT).	N	NB...		SO4..	25.	TRITIUM (T.U.).....	11.6 + OR - 1.0
BI....		GA.....		NH4..	0.05	SR...	0.4		
BR....	0.056								
CA....	35.	HCO3....	166.	NO3..	1.1				
CD....		H2S.....		PO4..	0.03				
CL....	6.5								

CO.... K..... 1.2 ZN... N

GAS ANALYSIS

ANALYSIS IN MG/L — ISOTOPES (00/01)

AR... 0.96
C2H6. L 0.01 N2... 24.
CO2.. 6.4 O2... 4.5
HE... L 0.002

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00055

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016008

NAME OF SAMPLE SOURCE... CITY WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 35-53.28 N 082-49.80 W
STATE..... NORTH CAROLINA
COUNTY..... MADISON
MAP REFERENCE..... HOT SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 421 M, SPRING ON TERRACE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/12/06
SAMPLE NUMBER..... 803
TEMPERATURE (C)..... 15.2
WELL DEPTH (M)..... 117.
DISCHARGE..... 189. L/MIN
PERTINENT LITHOLOGY..... MURRAY SHALE
OTHER SAMPLE INFORMATION.. PUBLIC WATER SUPPLY.

WATER ANALYSIS

DATE/ANALYST..... 1975/12/06
PH..... 6.7
SPECIFIC CONDUCTANCE..... 200.
ALKALINITY..... 114. AS HCO3
CHARGE IMBALANCE (% DIFF)... 17.2

ANALYSIS IN MG/L — ISOTOPES (0/001)

AG....		CO3.....		LI...	0.02				
AL....	L 0.001	CR.....		MG...	10.	SB...		DEL O(18) OF WATER...	-6.2
AS....	L 0.0002	CS.....		MN...	0.62				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	0.01	F.....	0.2	NA...	6.6	SIO2.	25.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-19.3
BE....		FE(TOT).	12.	NB...		SO4..	9.3	TRITIUM (T.U.).....	41.
BI....		GA.....		NH4..	0.1	SR...	0.1		
BR....	0.047								
CA....	13.	HCO3....	114.	NO3..	0.1				
CD....		H2S.....		PO4..	0.38				
CL....	5.9								
CO....		K.....	4.5			ZN...	0.25		

GAS ANALYSIS

ANALYSIS IN MG/L — ISOTOPES (00/01)

AR... 0.84
CH4.. 0.06
C2H6. N2... 25.
CO2.. 38. O2... 1.4

HF.... L 0.0001

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00056

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016007

NAME OF SAMPLE SOURCE... CITY WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 35-53.28 N 082-49.80 W
STATE..... NORTH CAROLINA
COUNTY..... MADISON
MAP REFERENCE..... HOT SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/05/03
SAMPLE NUMBER..... 803
TEMPERATURE (C)..... 15.2
WELL DEPTH (M)..... 117.
PERTINENT LITHOLOGY..... MURRAY SHALE

WATER ANALYSIS
PH..... 6.88
SPECIFIC CONDUCTANCE..... 220.
ALKALINITY..... 109. AS HCO3
CHARGE IMBALANCE (% DIFF)... 25.1

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.01				
AL....	L 0.001	CR.....		MG...	8.8	SB...			
AS....	L 0.0002	CS.....		MN...	0.61				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	N	F.....	0.1	NA...	6.6	SIO2.	27.		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	11.	NB...		SO4..	9.1		
BI....		GA.....		NH4..		SR...	0.1		
CA....	11.	HCO3....	109.	NO3..	N				
CD....		H2S.....	L 0.02	PO4..	0.31				
CL....	6.1								
CO....		K.....	4.3			ZN...	0.54		

ISOTOPES (0/00)

DEL O(18) OF WATER...	-7.0
DEL C(13) OF CO2.....	-19.2
TRITIUM (T.U.).....	33.

GAS ANALYSIS
ANALYSIS IN MG/L

AR...	0.96		
CH4..	0.06		
C2H6.		N2...	28.
CO2..	41.	O2...	L 0.1
HE...	0.0001		

ISOTOPES (00/00)

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00057

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016010

NAME OF SAMPLE SOURCE... HOT SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES LAT/LONG... 35-53.83 N 082-49.55 W
STATE..... NORTH CAROLINA
COUNTY..... MADISON
MAP REFERENCE..... HOT SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/05/03
TEMPERATURE (C)..... 41.4
DISCHARGE..... 26. L/MIN
PERTINENT LITHOLOGY..... SHADY DOLOMITE

WATER ANALYSIS

PH..... 7.50
SPECIFIC CONDUCTANCE..... 830.
ALKALINITY..... 119. AS HCO3
CHARGE IMBALANCE (% DIFF)... 2.0

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.06				
AL....	L 0.001	CR.....		MG...	25.	SB...			
AS....	0.0005	CS.....		MN...	N				
AU....		CU.....	0.01	MO...		SE...	L 0.001		
B.....	0.05	F.....	1.3	NA...	9.6	SIO2.	33.		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	369.		
BI....		GA.....		NH4..		SR...	3.9		
CA....	144.	HCO3....	119.	NO3..	N				
CD....		H2S.....		PO4..	0.04				
CL....	3.9								
CO....		K.....	9.8			ZN...	N		

ISOTOPES (O/00)

DEL O(18) OF WATER... -6.4
DEL C(13) OF CO2..... -9.2
TRITIUM (T.U.)..... -0.5 +/- 0.7

GAS ANALYSIS

ANALYSIS IN MG/L

AR...	0.86		
CH4..	L 0.02		
C2H6.		N2...	32.
CO2..	4.5	O2...	3.5
HE...	0.0004		

ISOTOPES (00/0)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00058

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016009

NAME OF SAMPLE SOURCE... HOT SPRING

LOCATION TOWNSHIP-RANGE COORDINATES
LAT/LONG... 35-53.83 N 082-49.55 W

COUNTRY..... UNITED STATES
STATE..... NORTH CAROLINA
COUNTY..... MADISON
MAP REFERENCE..... HOT SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 401 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/12/06
TEMPERATURE (C)..... 39.3
DISCHARGE..... 32. L/MIN
PERTINENT LITHOLOGY..... SHADY DOLOMITE
OTHER SAMPLE INFORMATION.. UNUSED.

WATER ANALYSIS

```
  PH.......................    7.50
  SPECIFIC CONDUCTANCE.....    710.
  ALKALINITY...............    126.      AS HCO3
  CHARGE IMBALANCE (% DIFF)... 0.2
  ANALYSIS IN MG/L                                                          ISOTOPES (0/00)
    AG....              CO3.....              LI...    0.07
    AL....    0.023     CR......              MG...    29.      SB...          DEL O(18) OF WATER...    -6.3
    AS....    0.0002    CS......              MN...  N
    AU....              CU..... N             MO...             SE...  L 0.001
    B.....    0.02      F.......    1.4       NA...    10.      SIO2.    31.
    BA....              FE+3....              NA+K.             SN...          DEL C(13) OF CO2.....    -9.5
    BE....              FE(TOT). N            NB...             SO4..    369.  TRITIUM (T.U.)........  -0.2 +/- 2.0
    BI....              GA......              NH4..    0.07     SR...    3.8
    BR....    0.049
    CA....    135.      HCO3....    126.      NO3..    0.1
    CD....              H2S.....              PO4..    0.03
    CL....    3.8
    CO....              K.......    10.                        ZN...    0.05
GAS ANALYSIS
  DATE/ANALYST.....  1975/12/06
  ANALYSIS IN MG/L                                                          ISOTOPES (00/01)
    AR...     0.61
    CH4..   L 0.005
    C2H6.                                     N2...    15.
    CO2..     7.9                             O2...    3.2
    HE...     0.0007
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977
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RECORD 00059

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GEOTHERM SAMPLE FILE                                                    GEOTHERM FILE ID:  0016006
  NAME OF SAMPLE SOURCE... LOVIN, PAUL
LOCATION                          TOWNSHIP-RANGE                  COORDINATES
  COUNTRY.............  UNITED STATES                              LAT/LONG...  35-53.95 N 082-51.77 W
  STATE...............  NORTH CAROLINA
  COUNTY..............  MADISON
  MAP REFERENCE.......  HOT SPRINGS 1:24000
  OTHER LOCALITY INFORMATION:  ALTITUDE 497 M, SPRING ON HILLSIDE.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1976/05/03
  SAMPLE NUMBER........  810
  TEMPERATURE (C)......    15.0
  WELL DEPTH (M)......     75.
  DISCHARGE...........     45.    L/MIN
  PERTINENT LITHOLOGY....... SHADY DOLOMITE
  OTHER SAMPLE INFORMATION.. IRRIGATION USE.
WATER ANALYSIS
  DATE/ANALYST.............  1976/05/03
  PH.......................    8.1
  SPECIFIC CONDUCTANCE.....    245.
  ALKALINITY...............    136.      AS HCO3
  CHARGE IMBALANCE (% DIFF)... 1.3
  ANALYSIS IN MG/L                                                          ISOTOPES (0/00)
```

AG....		CO3.....		LI...	N				
AL....	0.002	CR.....		MG...		14.	SB...	DEL O(18) OF WATER...	-6.8
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....		MO...			SE...	L 0.001	
B.....	0.06	F.....	N	NA...		1.8	SIO2.	5.2	
BA....		FE+3....		NA+K.			SN...	DEL C(13) OF CO2.....	-12.4
BE....		FE(TOT).	N	NB...			SO4..	4.2	TRITIUM (T.U.)..... 48.9
BI....		GA.....		NH4..			SR...	N	
CA....	23.	HCO3....	136.	NO3..		7.8			
CD....		H2S.....		PO4..	N				
CL....	2.2								
CO....		K.....	1.3				ZN...	0.25	

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00060

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016045

NAME OF SAMPLE SOURCE... KRETZING, MAX

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 40-19.50 N 077-15.13 W
STATE..... PENNSYLVANIA
COUNTY..... PERRY
MAP REFERENCE..... SHERMAN'S DALE 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 140 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/09/11
SAMPLE NUMBER..... 203
TEMPERATURE (C)..... 15.1
WELL DEPTH (M)..... 37.
PERTINENT LITHOLOGY..... ORISKANY FORMATION
OTHER SAMPLE INFORMATION.. UNUSED.

WATER ANALYSIS
DATE/ANALYST..... 1975/09/11
PH..... 6.2
SPECIFIC CONDUCTANCE..... 170.

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00061

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016052

NAME OF SAMPLE SOURCE... PERRY COUNTY WARM SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 40-19.72 N 077-14.78 W
STATE..... PENNSYLVANIA
COUNTY..... PERRY
MAP REFERENCE..... SHERMAN'S DALE 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/05/19
TEMPERATURE (C)..... 17.7
DISCHARGE..... 625. L/MIN

PERTINENT LITHOLOGY..... ORISKANY FORMATION

WATER ANALYSIS

PH..... 7.62
SPECIFIC CONDUCTANCE..... 200.
ALKALINITY..... 133. AS HCO3
CHARGE IMBALANCE (% DIFF)... 0.8

ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				
AL....	L 0.001	CR.....		MG...	2.8	SB...			
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	N	F.....	0.1	NA...	1.8	SIO2.	7.4		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	6.3		
BI....		GA.....		NH4..		SR...	0.2		
CA....	46.	HCO3....	133.	NO3..	0.1				
CD....		H2S.....		PO4..	0.1				
CL....	0.9								
CO....		K.....	0.5			ZN...	0.01		

ISOTOPES (O/OO)

DEL O(18) OF WATER... -8.2
DEL C(13) OF CO2..... -12.6
TRITIUM (T.U.)..... 8.3 +/- 0.6

GAS ANALYSIS

ANALYSIS IN MG/L

CH4.. L 0.03
CO2.. 7.4
HE... L 0.0005
O2... 4.0

ISOTOPES (OO/O)

REFERENCE AND IDENTIFICATION

COMPILED BY..... ORRIS, GRETA J.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00062

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016044

NAME OF SAMPLE SOURCE... PERRY COUNTY WARM SPRINGS

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES
STATE..... PENNSYLVANIA
COUNTY..... PERRY
MAP REFERENCE..... SHERMAN'S DALE 1:24000
LAT/LONG... 40-19.72 N 077-14.78 W
OTHER LOCALITY INFORMATION: SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/10/06
TEMPERATURE (C)..... 17.8
PERTINENT LITHOLOGY..... ORISKANY FORMATION
OTHER SAMPLE INFORMATION.. COMMERCIAL USE.

WATER ANALYSIS

PH..... 7.2
SPECIFIC CONDUCTANCE..... 190.
ALKALINITY..... 135. AS HCO3
CHARGE IMBALANCE (% DIFF)... 6.5

ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				
AL....	L 0.001	CR.....		MG...	3.3	SB...			
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	N	F.....	0.1	NA...	1.6	SIO2.	9.0		
BA....		FE+3....		NA+K.		SN...			

ISOTOPES (O/OO)

DEL O(18) OF WATER... -7.7
DEL C(13) OF CO2..... -13.4

HE....		FE(TOT).	0.01	NB...		SO4..	8.3	TRITIUM (T.U.).....	6.0 +/- 1.0
HI....		GA.....		NH4..	0.08	SR...	0.3		
HR....	0.012								
CA....	38.	HCO3....	135.	NO3..	0.1				
CD....		H2S.....		PO4..	0.1				
CL....	0.8								
CO....		K.....	0.5			ZN...	N		

GAS ANALYSIS

ANALYSIS IN MG/L — ISOTOPES (00/01)

AR...	0.91		
CH4..	L 0.01		
C2H6.		N2...	23.
CO2..	9.0	O2...	6.0
HE....	L 0.002		

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00063

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001465

NAME OF SAMPLE SOURCE... CASCADE SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 08S 005E 20 SE OF SW — LAT/LONG... 43-20.1 N 103-33.05 W
STATE..... SOUTH DAKOTA
COUNTY..... FALL RIVER
MAP REFERENCE..... CASCADE SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1957/11/01 WOLCOTT, D. E. AND C. E. PRICE
SAMPLE NUMBER..... 2250
TEMPERATURE (C)..... 22.
DISCHARGE..... 42500. L/MIN

WATER ANALYSIS

DATE/ANALYST..... ROBINSON, B. P.
PH..... 7.0
SPECIFIC CONDUCTANCE..... 2700.
ALKALINITY..... 235. AS HCO3
TOTAL DISSOLVED SOLIDS... 2530.

ANALYSIS IN PPM — ISOTOPES (0/001)

AG....		CO3.....	N	LI...	N				
AL....	0.2	CR.....		MG...	92.				
AS....		CS.....		MN...	N				
B.....	0.19	F.....	0.9	NA...	54.	SIO2.	22.		
BE....		FE(TOT).	0.03	NB...		SO4..	1540.		
CA....	568.	HCO3....	235.	NO3..	0.6				
CA+MG.		HG.....		PB...		U....	5.7		
CD....		H2S.....		PO4..	N				
CL....	62.								
CO....		K.....	6.2						

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... POST, 1967

RECORD 00064

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001464

NAME OF SAMPLE SOURCE... EVANS PLUNGE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 07S 005E 13 SW OF SW SW NW — LAT/LONG... 43-26.51 N 103-28.82 W
STATE..... SOUTH DAKOTA
COUNTY..... FALL RIVER
MAP REFERENCE..... HOT SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1957/11
SAMPLE NUMBER..... 2247
TEMPERATURE (C)..... 32.

WATER ANALYSIS

PH..... 7.0
ALKALINITY..... 232. AS HCO3
CHARGE IMBALANCE (% DIFF)... 2.2

ANALYSIS IN PPM — ISOTOPES (0/00)

AG....		CO3.....	N	LI...	0.05				
AL....	0.1	CR.....		MG...	51.				
AS....		CS.....		MN...	N				
B.....	0.24	F.....	0.8	NA...	86.	SIO2.	27.		
BE....		FE(TOT).	N	NB...		SO4..	639.		
CA....	252.	HCO3....	232.	NO3..	1.				
CA+MG.		HG.....		PB...		U....	0.0075		
CD....		H2S.....		PO4..	N				
CL....	112.								
CO....		K.....	9.8						

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... GOTT AND SCHNABEL, 1963

RECORD 00065

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001463

NAME OF SAMPLE SOURCE... EVANS PLUNGE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 07S 005E 13 SW OF SW SW NW — LAT/LONG... 43-26.51 N 103-28.82 W
STATE..... SOUTH DAKOTA
COUNTY..... FALL RIVER
MAP REFERENCE..... HOT SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

TEMPERATURE (C)..... 30.

WATER ANALYSIS

TOTAL DISSOLVED SOLIDS... 1553.

ANALYSIS IN PPM? — ISOTOPES (0/00)

AG....		CO3.....	123.						
AL....		CR.....		MG...	49.				
B.....		F.....		NA...	99.	SIO2.	16.		
BA....		FE+3....	1.1						
BE....		FE(TOT).		NB...		SO4..	736.		
CA....	295.								
CL....	129.								

REFERENCE AND IDENTIFICATION

COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... RAHN AND GRIES, 1973

RECORD 00066

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0001462

NAME OF SAMPLE SOURCE... HOT BROOK CANYON HOT SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — 07S 005E 14 — LAT/LONG... 43-27.12 N 103-30.48 W
STATE..... SOUTH DAKOTA
COUNTY..... FALL RIVER
MAP REFERENCE..... MINNEKHATA NE 1:24000
OTHER LOCALITY INFORMATION: 8700. FT ABOVE ROUTE 87

SAMPLE DESCRIPTION AND CONDITIONS
TEMPERATURE (C)..... 24.

REFERENCE AND IDENTIFICATION
COMPILED BY..... LIEB, RANDY
COMPILER AFFILIATION... US GEOLOGICAL SURVEY
REFERENCE..... RAHN AND GRIES, 1973

RECORD 00067

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016012

NAME OF SAMPLE SOURCE... FALLING SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 37-52.15 N 079-56.00 W
STATE..... VIRGINIA
COUNTY..... ALLEGHANY
MAP REFERENCE..... COVINGTON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/06/11
TEMPERATURE (C)..... 20.8
DISCHARGE..... 17564. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS
PH..... 7.32
SPECIFIC CONDUCTANCE..... 530.
ALKALINITY..... 250. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.7

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.11				
AL....	0.004	CR.....		MG...	21.	SB...		DEL O(18) OF WATER...	-7.8
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N						
B.....	0.02	F.....	0.9	NA...	3.1	SIO2.	12.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-8.4
BE....		FE(TOT).	N	NB...		SO4..	189.	TRITIUM (T.U.).....	32.6 +/- 1.9
BI....		GA.....		NH4..		SR...	1.7		
CA....	117.	HCO3....	250.	NO3..	2.4				
CD....		H2S.....		PO4..	0.04				
CL....	2.4								
CO....		K.....	10.			ZN...	0.01		

GAS ANALYSIS
DATE/ANALYST..... 1976/06/11
ANALYSIS — ISOTOPES (00/00)

AR... 0.7
CH4.. L 0.015
C2H6. N2... 18.
CO2.. 30. O2... 8.0
HE... L 0.0003

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00068

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015237
NAME OF SAMPLE SOURCE... FALLING SPRING
WARING NUMBER..... 13

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-52.15 N 079-56.00 W
STATE..... VIRGINIA
COUNTY..... ALLEGHANY
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... COVINGTON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 134
TEMPERATURE (C)..... 22.2
DISCHARGE..... Q 26500. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS
PH..... 7.00
SPECIFIC CONDUCTANCE..... 823.
ALKALINITY..... 274. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.0
ANALYSIS IN MG/L ISOTOPES (0/00)

AL....		CR.....		MG...	26.6		
AU....		CU.....	0.0019				
B.....		F.....		NA...	3.5		
BE....		FE(TOT).	0.0396	NB...		SO4..	230.
BI....		GA.....		NH4..		SR...	1.5
CA....	134.	HCO3....	274.				
CD....	0.0004						
CL....	5.0						
CO....		K.....	10.3			ZN...	0.0074

QUALIFICATION FIELD..... FROM WARING, 1965

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00069

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016013
NAME OF SAMPLE SOURCE... FALLING SPRING

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-52.15 N 079-56.00 W
STATE..... VIRGINIA
COUNTY..... ALLEGHANY

MAP REFERENCE..... COVINGTON 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 669 M, SPRING IN STREAM CHANNEL.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/12/15
TEMPERATURE (C)..... 25.0
DISCHARGE..... 12264. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. UNUSED.

WATER ANALYSIS
PH..... 7.32
SPECIFIC CONDUCTANCE..... 800.
ALKALINITY..... 315. AS HCO3
CHARGE IMBALANCE (% DIFF)... 2.2

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.17				
AL....	L 0.001	CR.....		MG...	30.	SB...			
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	0.02	F.....	1.2	NA...	3.8	SIO2.	18.		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	289.		
BI....		GA.....		NH4..	10.	SR...	2.4		
BR....	0.028								
CA....	158.	HCO3....	315.	NO3..	1.3				
CD....		H2S.....		PO4..	0.07				
CL....	2.5								
CO....		K.....	16.			ZN...	N		

ISOTOPES (O/OO)
DEL O(18) OF WATER... -7.7
DEL C(13) OF CO2..... -6.8
TRITIUM (T.U.)..... 24.4 +/- 2.2

GAS ANALYSIS
ANALYSIS IN MG/L

AR...	0.66		
CH4..	L 0.005		
C2H6.		N2...	15.
CO2..	33.	O2...	7.0
HE...	L 0.0003		

ISOTOPES (OO/O)

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00070

GEOTHERM SAMPLE FILE
GEOTHERM FILE ID: 0015234
NAME OF SAMPLE SOURCE... MRS. JENNIE LAYTON SPRING
WARING NUMBER..... 12

LOCATION
COUNTRY..... UNITED STATES
STATE..... VIRGINIA
COUNTY..... ALLEGHANY
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... COVINGTON 1:24000
OTHER LOCALITY INFORMATION: EAST BANK OF JACKSON RIVER, 1/4 MILE BELOW MOUTH OF INDIAN DRAFT

TOWNSHIP-RANGE

COORDINATES
LAT/LONG... 37-51.85 N 079-59.40 W

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1928/03/29
SAMPLE NUMBER..... 281
TEMPERATURE (C)..... 21.6
DISCHARGE..... 379. L/MIN

PERTINENT LITHOLOGY..... ORISKANY SANDSTONE
WATER ANALYSIS
ALKALINITY..... 190. AS HCO3
TOTAL DISSOLVED SOLIDS... 200.
ANALYSIS IN PPM

ISOTOPES (0/00)

B.....		F.....		NA...	14.		
BE....		FE(TOT).		NB...		SO4..	28.
CA....	64.	HCO3....	190.	NO3..	0.35		
CL....	1.3						

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... COLLINS AND OTHERS, 1930

RECORD 00071

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015241
NAME OF SAMPLE SOURCE... SWEET CHALYBEATE
WARING NUMBER..... 15
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-38.53 N 080-14.32 W
STATE..... VIRGINIA
COUNTY..... ALLEGHANY
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... ALLEGHANY 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 177
TEMPERATURE (C)..... 22.5
DISCHARGE..... Q 3786. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
WATER ANALYSIS
PH..... 6.33
SPECIFIC CONDUCTANCE..... 1580.
ALKALINITY..... 706. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.3
ANALYSIS IN MG/L

ISOTOPES (0/00)

AL....		CR.....		MG...	57.7		
AU....		CU.....	0.0018				
B.....		F.....		NA...	17.9		
BE....		FE(TOT).	0.274	NB...		SO4..	383.
BI....		GA.....		NH4..		SR...	3.7
CA....	288.	HCO3....	706.				
CD....	0.0014						
CL....	28.4						
CO....		K.....	24.5			ZN...	0.0081

QUALIFICATION FIELD..... FROM WARING, 1965
REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00072

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016011
NAME OF SAMPLE SOURCE... WEBB, H.D.

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 37-52.48 N 079-55.65 W
STATE..... VIRGINIA
COUNTY..... ALLEGHANY
MAP REFERENCE..... COVINGTON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/11/26
TEMPERATURE (C)..... 27.2
WELL DEPTH (M)..... 51.
DISCHARGE..... 0
PERTINENT LITHOLOGY..... BEEKMANTOWN GROUP

WATER ANALYSIS

PH..... 7.15
SPECIFIC CONDUCTANCE..... 1050.
ALKALINITY..... 423. AS HCO3
CHARGE IMBALANCE (% DIFF)... 6.1

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.3				
AL....	L 0.001	CR.....		MG...	55.	SB...			
AS....	0.0002	CS.....		MN...	0.02				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	0.04	F.....	2.4	NA...	6.6	SIO2.	24.		
BA....		FE+3....		NA+K.		SN...			
BE....	0.044	FE(TOT).	0.16	NB...		SO4..	507.		
BI....		GA.....		NH4..	0.08	SR...	3.5		
CA....	234.	HCO3....	423.	NO3..	0.1				
CD....		H2S.....	L 0.02	PO4..	N				
CL....	4.3								
CO....		K.....	2.5			ZN...	0.3		

ISOTOPES (0/00)

DEL O(18) OF WATER... -7.9
DEL C(13) OF CO2..... -8.0
TRITIUM (T.U.)..... 10.9 +/- 1.0

GAS ANALYSIS

ANALYSIS IN MG/L

CH4..	L 0.03		
CO2..	140.	O2...	0.1
HE...	0.0020		

ISOTOPES (00/0)

QUALIFICATION FIELD..... DISCHARGE DESCRIBED AS "GOOD".

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00073

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016030

NAME OF SAMPLE SOURCE... COLD MAGNESIA SPRING
WELL/SPRING NUMBER..... 605

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 37-59.82 N 079-49.67 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 703 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/11/26
SAMPLE NUMBER..... 605
TEMPERATURE (C)..... 15.2
DISCHARGE..... 511. L/MIN

PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS

DATE/ANALYST..... 1975/11/21
PH..... 7.20
SPECIFIC CONDUCTANCE..... 330.
ALKALINITY..... 174. AS HCO3

ANALYSIS IN MG/L

AL....		CR.....		MG...	9.7	SB...			
B.....		F.....	0.3	NA...	1.7	SIO2.	8.2		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).		NB...		SO4..	9.5		
BI....		GA.....		NH4..		SR...	0.3		
CA....	60.	HCO3....	174.	NO3..	0.8				
CO....		K.....	2.9						

ISOTOPES (0/00)

DEL O(18) OF WATER... -7.9
DEL C(13) OF CO2..... -8.8
TRITIUM (T.U.)..... 41.

GAS ANALYSIS

ANALYSIS IN MG/L

AR...	0.72		
CH4..	L 0.01		
C2H6.		N2...	19.
CO2..	14.	O2...	9.2
HE...	L 0.0001		

ISOTOPES (00/0)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00074

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016024

NAME OF SAMPLE SOURCE... DUNN, M.

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... APPALACHIAN VALLEY 1:250000
LAT/LONG... 38-01.25 N 079-48.72 W

OTHER LOCALITY INFORMATION: ALTITUDE 698 M, SPRING IN STREAM CHANNEL.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/11/24
SAMPLE NUMBER..... 619
TEMPERATURE (C)..... 15.8
DISCHARGE..... 3880. L/MIN
PERTINENT LITHOLOGY..... TRENTON AND BLACK RIVER GROUPS
OTHER SAMPLE INFORMATION.. HOUSEHOLD USE.

WATER ANALYSIS

DATE/ANALYST..... 1975/11/24
PH..... 7.32
SPECIFIC CONDUCTANCE..... 410.
ALKALINITY..... 196. AS HCO3
CHARGE IMBALANCE (% DIFF)... 4.8

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.02				
AL....	L 0.001	CR.....		MG...	14.	SB...			
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 1.0		
B.....	0.02	F.....	0.5	NA...	2.1	SIO2.	8.9		
BA....		FE+3....		NA+K.		SN...			

ISOTOPES (0/00)

DEL O(18) OF WATER... -7.7
DEL C(13) OF CO2..... -10.4

```
    HE....              FE(TOT). N          NB...               SO4..    85.       TRITIUM (T.U.).......    36.
    HI....              GA......            NH4..     0.05      SR...    0.5
    BR....   0.018
    CA....   80.        HCO3....   196.     NO3..     2.4
    CD....              H2S.....            PO4..     0.04
    CL....   2.2
    CO....              K.......   2.6                           ZN...    0.04
GAS ANALYSIS
  DATE/ANALYST.....  1975/11/24
  ANALYSIS IN MG/L                                                          ISOTOPES (00/0)
    AR...    0.74
    CH4..  L 0.007
    C2H6.                           N2...     19.
    CO2..    13.                    O2...     8.0
    HE...    0.0002
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977

                                                                                                  RECORD 00075
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GEOTHERM SAMPLE FILE                                                                   GEOTHERM FILE ID:  0016050
  NAME OF SAMPLE SOURCE... DUNN, M.
LOCATION                          TOWNSHIP-RANGE                    COORDINATES
  COUNTRY............  UNITED STATES                                  LAT/LONG...  38-01.25 N 079-48.72 W
  STATE..............  VIRGINIA
  COUNTY.............  BATH
  MAP REFERENCE......  APPALACHIAN VALLEY 1:250000
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1976/06/10
  SAMPLE NUMBER........  619
  TEMPERATURE (C)......    14.4
  PERTINENT LITHOLOGY....... TRENTON AND BLACK RIVER GROUPS
WATER ANALYSIS
  PH.......................    7.4
  SPECIFIC CONDUCTANCE.....    395.
  ALKALINITY...............    179.     AS HCO3
  CHARGE IMBALANCE (% DIFF)... 4.4
  ANALYSIS                                                                 ISOTOPES (0/00)
    AG....              CO3.....            LI...     0.01
    AL....   0.003      CR......            MG...     9.2       SB...          DEL O(18) OF WATER...    -8.3
    AS....              CS......            MN...  N
    B.....   0.02       F.......   0.4      NA...     1.8       SIO2.    7.2
    BA....              FE+3....            NA+K.               SN...          DEL C(13) OF CO2.....    -7.4
    BE....              FE(TOT). N          NB...               SO4..    64.   TRITIUM (T.U.).......    34.
    BI....              GA......            NH4..               SR...    0.7
    CA....   73.        HCO3....   179.     NO3..     2.3
    CD....              H2S.....            PO4..  N
    CL....   2.4
    CO....              K.......   2.1                           ZN...    0.01
GAS ANALYSIS
  ANALYSIS IN MG/L                                                          ISOTOPES (00/0)
    AR...    0.63
    CH4..  L 0.015
    C2H6.                           N2...     14.
```

CO2.. 12. O2... 6.0
HF... L 0.0003
REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00076

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016021
NAME OF SAMPLE SOURCE... GARDNER, G.
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 38-02.70 N 079-46.98 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... WARM SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 750 M, SPRING ON HILLSIDE.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/09/04
SAMPLE NUMBER..... 629
TEMPERATURE (C)..... 16.4
DISCHARGE..... 49. L/MIN
PERTINENT LITHOLOGY..... TRENTON AND BLACK RIVER GROUPS
OTHER SAMPLE INFORMATION.. HOUSEHOLD USE.
WATER ANALYSIS
PH..... 7.4
SPECIFIC CONDUCTANCE..... 275.
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00077

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015231
NAME OF SAMPLE SOURCE... HEALING SPRINGS
WARING NUMBER..... 9
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-57.78 N 079-51.66 W
STATE..... VIRGINIA
COUNTY..... BATH
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... HEALING SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 131
TEMPERATURE (C)..... 27.5
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. SAMPLE PROBABLY CONTAMINATED BY IRON FROM WELLS AROUND SPRING
WATER ANALYSIS
PH..... 6.84
SPECIFIC CONDUCTANCE..... 935.
ALKALINITY..... 460. AS HCO3
CHARGE IMBALANCE (% DIFF)... 5.1
ANALYSIS IN MG/L ISOTOPES (0/00)
AL.... CR..... MG... 36.9

```
AU....              CU.......   0.0017
B.....              F........              NA...    6.9
BE....              FE(TOT).    1.3        NB...              SO4..    128.
BI....              GA.......              NH4..              SR...    1.2
CA....   123.       HCO3....    460.
CD....   0.0001
CL....   6.
CO....              K........   13.9                          ZN...    0.0083
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REFERENCE AND IDENTIFICATION

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COMPILED BY............  RENNER, J. L.
COMPILER AFFILIATION...  GRUY FEDERAL, INC
REFERENCE..............  HELZ AND SINEX, 1974
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RECORD 00078

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016029

NAME OF SAMPLE SOURCE... HOMESTEAD HOT WELL

LOCATION — TOWNSHIP-RANGE — COORDINATES

```
COUNTRY............  UNITED STATES                    LAT/LONG...  37-59.93 N 079-49.35 W
STATE..............  VIRGINIA
COUNTY.............  BATH
MAP REFERENCE......  HEALING SPRINGS 1:24000
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OTHER LOCALITY INFORMATION: ALTITUDE 744 M, SPRING ON HILLSIDE.

SAMPLE DESCRIPTION AND CONDITIONS

```
DATE/COLLECTOR.......  1975/11/20
SAMPLE NUMBER........  607A
TEMPERATURE (C)......   19.6
WELL DEPTH (M).......   230.
DISCHARGE............  Q 833.   L/MIN
PERTINENT LITHOLOGY.......  BEEKMANTOWN GROUP
```

OTHER SAMPLE INFORMATION.. WATER UNUSED. SAMPLE COLLECTED AT 65.5 M DEPTH WITH SAMPLING TUBE ON LOGGER.

WATER ANALYSIS

```
PH......................   7.15
SPECIFIC CONDUCTANCE.....  420.
ALKALINITY...............  364.      AS HCO3
CHARGE IMBALANCE (% DIFF)... 3.5
ANALYSIS IN MG/L
```

ISOTOPES (0/00)

```
AG....              CO3.....            LI...    0.03
AL.... L 0.001      CR......            MG...    34.      SB...              DEL O(18) OF WATER...    -7.8
AS....   0.0015     CS......            MN...    0.08
AU....              CU....... N         MO...             SE...  L 0.001
B.....   0.02       F........   0.6     NA...    2.9      SIO2.    15.
BA....              FE+3....            NA+K.             SN...              DEL C(13) OF CO2.....    -7.5
BE....              FE(TOT).    0.16    NB...             SO4..    114.      TRITIUM (T.U.).......  2.4 +/- 2.3
BI....              GA......            NH4..    0.08     SR...    1.1
BR....   0.024
CA....   113.       HCO3....    364.    NO3..    0.1
CD....              H2S..... L 0.02     PO4..    0.13
CL....   2.4
CO....              K........   5.8                       ZN...    0.39
```

GAS ANALYSIS

```
DATE/ANALYST.....  1975/11/20
ANALYSIS IN MG/L
```

ISOTOPES (00/00)

```
AR...    0.96
CH4..  L 0.01
C2H6.                           N2...    25.
```

```
    CO2..    115.                          O2...    0.5
    HE...    0.0010
QUALIFICATION FIELD..... PUMPED
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  REFERENCE..............  HOBBA AND OTHERS, 1977

                                                                                                                    RECORD 00079
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GEOTHERM SAMPLE FILE                                                                                GEOTHERM FILE ID:  0016028
  NAME OF SAMPLE SOURCE... HOMESTEAD HOT WELL
LOCATION                                  TOWNSHIP-RANGE                          COORDINATES
  COUNTRY............  UNITED STATES                                                 LAT/LONG...  37-59.93 N 079-49.35 W
  STATE..............  VIRGINIA
  COUNTY.............  BATH
  MAP REFERENCE......  HEALING SPRINGS 1:24000
  OTHER LOCALITY INFORMATION:  ALTITUDE 744 M, SPRING ON HILLSIDE.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1976/02
  SAMPLE NUMBER........  6078
  TEMPERATURE (C)......    17.9
  WELL DEPTH (M)......     230.
  DISCHARGE...........  Q 833.   L/MIN
  PERTINENT LITHOLOGY.......  BEEKMANTOWN GROUP
  OTHER SAMPLE INFORMATION.. WATER UNUSED.  SAMPLE COLLECTED AT 102 M DEPTH WITH SAMPLING TUBE ON LOGGER.
WATER ANALYSIS
  PH.........................    7.6
  ALKALINITY................    192.      AS HCO3
  CHARGE IMBALANCE (% DIFF)... 7.4
  ANALYSIS IN MG/L                                                                          ISOTOPES (0/00)
    AG....              CO3.....              LI...    0.01
    AL....              CR......              MG...    18.
    AS....              CS......              MN...    0.14
    AU....              CU..... N
    B.....   0.04       F.......   0.4        NA...    2.6      SIO2.    7.2
    BE....              FE(TOT).              NB...              SO4..    37.
    BI....              GA......              NH4..              SR...    0.4
    BR....   0.024
    CA....   53.        HCO3....   192.       NO3..    0.4
    CD....              H2S.....              PO4..    0.13
    CL....   2.8
    CO....              K.......   3.0                           ZN...    0.07
QUALIFICATION FIELD..... PUMPED
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977

                                                                                                                    RECORD 00080
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GEOTHERM SAMPLE FILE                                                                                GEOTHERM FILE ID:  0016027
  NAME OF SAMPLE SOURCE... HOMESTEAD HOT WELL
LOCATION                                  TOWNSHIP-RANGE                          COORDINATES
  COUNTRY............  UNITED STATES                                                 LAT/LONG...  37-59.93 N 079-49.35 W
  STATE..............  VIRGINIA
  COUNTY.............  BATH
```

MAP REFERENCE..... HEALING SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 744 M, SPRING ON HILLSIDE.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/02
SAMPLE NUMBER..... 607C
TEMPERATURE (C)..... 19.5
WELL DEPTH (M)..... 230.
DISCHARGE..... Q 833. L/MIN
PERTINENT LITHOLOGY..... BEEKMANTOWN GROUP
OTHER SAMPLE INFORMATION.. WATER UNUSED. SAMPLE COLLECTED AT 122 M DEPTH WITH SAMPLING TUBE ON LOGGER.
WATER ANALYSIS
PH..... 6.9
ALKALINITY..... 392. AS HCO3
CHARGE IMBALANCE (% DIFF)... 4.3
ANALYSIS IN MG/L ISOTOPES (0/00)

AG....		CO3.....		LI...	0.04		
AL....	0.018	CR.....		MG...	35.		
AS....		CS.....		MN...	0.27		
AU....		CU..... N					
B.....	0.04	F.....	0.9	NA...	4.9	SIO2.	14.
BE....		FE(TOT).	0.34	NB...		SO4..	116.
BI....		GA.....		NH4..		SR...	1.1
BR....	0.028						
CA....	119.	HCO3....	392.	NO3..	0.1		
CD....		H2S.....		PO4..	0.11		
CL....	2.3						
CO....		K.....	11.			ZN...	1.0

QUALIFICATION FIELD..... PUMPED
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOHBA AND OTHERS, 1977

RECORD 00081

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016026
NAME OF SAMPLE SOURCE... HOMESTEAD HOT WELL
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-59.93 N 079-49.35 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 744 M, SPRING ON HILLSIDE.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/02
SAMPLE NUMBER..... 607D
TEMPERATURE (C)..... 32.2
WELL DEPTH (M)..... 230.
DISCHARGE..... Q 833. L/MIN
PERTINENT LITHOLOGY..... BEEKMANTOWN GROUP
OTHER SAMPLE INFORMATION.. WATER UNUSED. SAMPLE COLLECTED AT 227 M DEPTH WITH SAMPLING TUBE ON LOGGER. WELL DRILLED IN 1974.
WATER ANALYSIS
ALKALINITY..... 400. AS HCO3
CHARGE IMBALANCE (% DIFF)... 3.9
ANALYSIS IN MG/L ISOTOPES (0/00)

AG....		CO3.....		LI...	0.04		
AL....	0.029	CR.....		MG...	37.		
AS....		CS.....		MN...	0.14		
AU....		CU.....	N				
B.....	0.02	F.....	1.0	NA...	5.6	SIO2.	19.
BE....		FE(TOT).	0.04	NB...		SO4..	132.
BI....		GA.....		NH4..		SR...	1.4
BR....	0.025						
CA....	123.	HCO3....	400.	NO3..	0.1		
CD....		H2S.....		PO4..	0.13		
CL....	2.4						
CO....		K.....	13.			ZN...	0.07

QUALIFICATION FIELD..... PUMPED

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00082

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016036

NAME OF SAMPLE SOURCE... HOT SPRINGS (BOILER SPRING)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 37-59.87 N 079-49.80 W

STATE..... VIRGINIA

COUNTY..... BATH

MAP REFERENCE..... HEALING SPRINGS 1:24000

OTHER LOCALITY INFORMATION: ALTITUDE 693 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/11/21

TEMPERATURE (C)..... 39.9

DISCHARGE..... 227. L/MIN

PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

OTHER SAMPLE INFORMATION.. RECREATIONAL USE.

WATER ANALYSIS

PH..... 6.65

SPECIFIC CONDUCTANCE..... 700.

ALKALINITY..... 454. AS HCO3

CHARGE IMBALANCE (% DIFF)... 2.7

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.05				
AL....	L 0.001	CR.....		MG...	40.	SB...			
AS....	0.0005	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 1.		
B.....	0.03	F.....	1.1	NA...	7.0	SIO2.	21.		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	0.17	NB...		SO4..	130.		
BI....		GA.....		NH4..	0.09	SR...	1.3		
BR....	0.029								
CA....	132.	HCO3....	454.	NO3..	0.1				
CD....		H2S.....		PO4..	0.02				
CL....	2.6								
CO....		K.....	13.			ZN...	0.05		

ISOTOPES (0/00)

DEL O(18) OF WATER... -7.4

DEL C(13) OF CO2..... -5.6

TRITIUM (T.U.)..... -3.1 +/- 1.8

GAS ANALYSIS

ANALYSIS IN MG/L

ISOTOPES (00/0)

AR... 0.72

CH4.. L 0.006
C2H6.
CO2.. 136.
HE... 0.0007
N2... 17.
O2... 2.0

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00083

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015240
NAME OF SAMPLE SOURCE... HOT SPRINGS (BOILER SPRING)
WARING NUMBER..... A

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-59.87 N 079-49.80 W
STATE..... VIRGINIA
COUNTY..... BATH
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... HEALING SPRINGS 1:24000 A

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 123
TEMPERATURE (C)..... 39.0
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS
PH..... 6.6
SPECIFIC CONDUCTANCE..... 850.
ALKALINITY..... 446. AS HCO3
CHARGE IMBALANCE (% DIFF)... 0.7
ANALYSIS IN MG/L — ISOTOPES (0/00)

AL....		CR.....		MG...	36.4		
AU....		CU.....	0.0028				
B.....		F.....		NA...	7.0		
BE....		FE(TOT).	0.345	NB...		SO4..	131.
BI....		GA.....		NH4..		SR...	1.2
CA....	129.	HCO3....	446.				
CD....	0.0004						
CL....	5.0						
CO....		K.....	13.5			ZN...	0.0075

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00084

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016035
NAME OF SAMPLE SOURCE... HOT SPRINGS (BOILER SPRING)

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-59.87 N 079-49.80 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/06/10

TEMPERATURE (C)..... 40.0
DISCHARGE..... 227. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS

PH..... 6.55
SPECIFIC CONDUCTANCE..... 645.
ALKALINITY..... 452. AS HCO3
CHARGE IMBALANCE (% DIFF)... 3.4

ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.04				
AL....	0.002	CR.....		MG...	35.	SB...		DEL O(18) OF WATER...	-8.3
AS....	0.0005	CS.....		MN...	N				
B.....	0.04	F.....	1.1	NA...	6.9	SIO2.	20.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-5.8
BE....		FE(TOT).	0.17	NB...		SO4..	128.	TRITIUM (T.U.).....	0.7 +/- 0.5
BI....		GA.....		NH4..		SR...	1.4		
CA....	126.	HCO3....	452.	NO3..	0.1				
CD....		H2S.....	L 0.02	PO4..	0.03				
CL....	2.7								
CO....		K.....	14.			ZN...	0.02		

ISOTOPES (O/OO)

GAS ANALYSIS

ANALYSIS IN MG/L

CH4..	L 0.03		
CO2..	114.	O2...	0.4
HE...	0.0003		

ISOTOPES (OO/OO)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00085

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015239

NAME OF SAMPLE SOURCE... HOT SPRINGS (HOT SULPHUR SPRING)
WARING NUMBER..... B

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 37-59.87 N 079-49.78 W
STATE..... VIRGINIA
COUNTY..... BATH
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... HEALING SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 124
TEMPERATURE (C)..... 36.0
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS

PH..... 6.66
SPECIFIC CONDUCTANCE..... 922.
ALKALINITY..... 439. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.2

ANALYSIS IN MG/L

ISOTOPES (O/OO)

AL....		CR.....		MG...	36.4		
AU....		CU.....	0.0019				
B.....		F.....		NA...	7.0		
BE....		FE(TOT).	0.146	NB...		SO4..	132.

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  BI....              GA.....              NH4..              SR...    1.2
  CA....   131.       HCO3....   439.
  CD....   0.0003
  CL....   5.0
  CO....              K.....     13.4                        ZN...    0.0063
REFERENCE AND IDENTIFICATION
  COMPILED BY............  RENNER, J. L.
  COMPILER AFFILIATION...  GRUY FEDERAL, INC
  REFERENCE..............  HELZ AND SINEX, 1974
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RECORD 00086

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GEOTHERM SAMPLE FILE                                                    GEOTHERM FILE ID:  0016034
  NAME OF SAMPLE SOURCE... HOT SPRINGS (HOT SULPHUR SPRING)
LOCATION                          TOWNSHIP-RANGE                  COORDINATES
  COUNTRY............  UNITED STATES                                LAT/LONG...  37-59.87 N 079-49.78 W
  STATE..............  VIRGINIA
  COUNTY.............  BATH
  MAP REFERENCE......  HEALING SPRINGS 1:24000
  OTHER LOCALITY INFORMATION:  ALTITUDE 695 M, SPRING IN VALLEY.
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1975/11/21
  SAMPLE NUMBER........  603
  TEMPERATURE (C)......    36.5
  PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977
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RECORD 00087

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GEOTHERM SAMPLE FILE                                                    GEOTHERM FILE ID:  0016033
  NAME OF SAMPLE SOURCE... HOT SPRINGS (HOT SULPHUR SPRING)
LOCATION                          TOWNSHIP-RANGE                  COORDINATES
  COUNTRY............  UNITED STATES                                LAT/LONG...  37-59.87 N 079-49.78 W
  STATE..............  VIRGINIA
  COUNTY.............  BATH
  MAP REFERENCE......  HEALING SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1976/06/10
  SAMPLE NUMBER........  603
  TEMPERATURE (C)......    35.2
  PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977
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RECORD 00088

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GEOTHERM SAMPLE FILE                                                    GEOTHERM FILE ID:  0015238
  NAME OF SAMPLE SOURCE... HOT SPRINGS (MAGNESIA SPRING)
  WARING NUMBER........... 8
LOCATION                          TOWNSHIP-RANGE                  COORDINATES
  COUNTRY............  UNITED STATES                                LAT/LONG...  37-59.83 N 079-49.72 W
```

STATE..... VIRGINIA
COUNTY..... BATH
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... HEALING SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 125
TEMPERATURE (C)..... 30.2
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS
PH..... 6.78
SPECIFIC CONDUCTANCE..... 880.
ALKALINITY..... 436. AS HCO3
CHARGE IMBALANCE (% DIFF)... 0.9
ANALYSIS IN MG/L

ISOTOPES (0/00)

AL....		CR.....		MG...	36.4		
AU....		CU.....	0.0057				
B.....		F.....		NA...	6.5		
BE....		FE(TOT).	0.0134	NB...		SO4..	132.
BI....		GA.....		NH4..		SR...	1.2
CA....	127.	HCO3....	436.				
CD....	0.0015						
CL....	5.7						
CO....		K.....	12.7			ZN...	0.0163

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00089

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016037
NAME OF SAMPLE SOURCE... HOT SPRINGS (OCTAGON SPRING)

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-59.90 N 079-49.83 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 693 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/06/10
SAMPLE NUMBER..... 601
TEMPERATURE (C)..... 36.8
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00090

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016038
NAME OF SAMPLE SOURCE... HOT SPRINGS (OCTAGON SPRING)

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-59.90 N 079-49.83 W
STATE..... VIRGINIA

COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 686 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/11/21
SAMPLE NUMBER..... 601
TEMPERATURE (C)..... 36.5
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION,, RECREATIONAL USE.

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00091

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015236
NAME OF SAMPLE SOURCE... HOT SPRINGS (OCTAGON)
WARING NUMBER..... 8

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-59.90 N 079-49.98 W
STATE..... VIRGINIA
COUNTY..... BATH
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... HEALING SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 122
TEMPERATURE (C)..... 37.0
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS
PH..... 6.72
SPECIFIC CONDUCTANCE..... 837.
ALKALINITY..... 439. AS HCO3
CHARGE IMBALANCE (% DIFF)... 2.4
ANALYSIS IN MG/L — ISOTOPES (0/00)

AL....		CR.....		MG...	36.4		
AU....		CU.....	0.0023				
B.....		F.....		NA...	7.0		
BE....		FE(TOT).	0.352	NB...		SO4..	132.
BI....		GA.....		NH4..		SR...	1.1
CA....	134.	HCO3....	439.				
CD....	0.0002						
CL....	5.7						
CO....		K.....	13.3			ZN...	0.0075

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00092

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016032
NAME OF SAMPLE SOURCE... MAGNESIA SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-59.83 N 079-49.68 W

STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 703 M, SPRING IN VALLEY.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/11/21
SAMPLE NUMBER..... 604
TEMPERATURE (C)..... 16.2
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00093

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016031
NAME OF SAMPLE SOURCE... MAGNESIA SPRING
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-59.83 N 079-49.68 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... HEALING SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/06/10
SAMPLE NUMBER..... 604
TEMPERATURE (C)..... 28.4
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00094

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016019
NAME OF SAMPLE SOURCE... WARM SPRING (CHILDREN'S POOL)
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 38-03.22 N 079-46.87 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... WARM SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 709 M, SPRING IN VALLEY.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/11/20
TEMPERATURE (C)..... 35.3
DISCHARGE..... 3102. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. MEDICINAL USE.
WATER ANALYSIS
PH..... 7.32
SPECIFIC CONDUCTANCE..... 640.
ALKALINITY..... 197. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.5
ANALYSIS IN MG/L ISOTOPES (0/00)
AG.... CO3..... LI... 0.04

AL....	L 0.001	CR.....		MG...	28.	SB...		DEL O(18) OF WATER...	-7.9
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		
B.....	0.02	F.....	1.4	NA...	3.7	SIO2.	21.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-8.2
BE....		FE(TOT).	N	NB...		SO4..	232.	TRITIUM (T.U.).....	0.9 +/- 0.9
BI....		GA.....		NH4..	0.08	SR...	1.9		
BR....	0.016								
CA....	112.	HCO3....	197.	NO3..	0.1				
CD....		H2S.....	0.75	PO4..	0.01				
CL....	1.5								
CO....		K.....	7.4			ZN...	0.05		

GAS ANALYSIS

ANALYSIS IN MG/L — ISOTOPES (00/00)

AR...	0.79		
CH4..	L 0.006		
C2H6.		N2...	16.
CO2..	21.	O2...	0.1
HE...	0.0001		

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00095

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016017

NAME OF SAMPLE SOURCE... WARM SPRING (CHILDREN'S POOL)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 38-03.22 N 079-46.87 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/06/10
TEMPERATURE (C)..... 35.4
DISCHARGE..... 700. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

WATER ANALYSIS

PH..... 7.20
SPECIFIC CONDUCTANCE..... 580.
ALKALINITY..... 194. AS HCO3
CHARGE IMBALANCE (% DIFF)... 4.3

ANALYSIS IN MG/L — ISOTOPES (0/00)

AG....		CO3.....		LI...	0.04				
AL....	0.010	CR.....		MG...	25.	SB...		DEL O(18) OF WATER...	-8.5
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	0.01						
B.....	0.02	F.....	1.4	NA...	3.7	SIO2.	20.		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-8.8
BE....		FE(TOT).	N	NB...		SO4..	227.	TRITIUM (T.U.).....	1.6 +/- 0.6
BI....		GA.....		NH4..		SR...	1.9		
CA....	119.	HCO3....	194.	NO3..	N				
CD....		H2S.....	0.75	PO4..	0.02				
CL....	1.6								
CO....		K.....	6.9			ZN...	0.01		

GAS ANALYSIS
ANALYSIS IN MG/L

ISOTOPES (00/01)

AR... 0.81
CH4.. L 0.03
C2H6.
N2... 16.
CO2.. 20.
O2... 0.2
HE... L 0.0003

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00096

GEOTHERM SAMPLE FILE
GEOTHERM FILE ID: 0016023
NAME OF SAMPLE SOURCE... WARM SPRING (LADIES' POOL)
LOCATION
TOWNSHIP-RANGE
COORDINATES
LAT/LONG... 38-03.22 N 079-46.87 W
COUNTRY..... UNITED STATES
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... WARM SPRINGS 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/11/25
TEMPERATURE (C)..... 34.8
DISCHARGE..... 700. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00097

GEOTHERM SAMPLE FILE
GEOTHERM FILE ID: 0016022
NAME OF SAMPLE SOURCE... WARM SPRING (LADIES' POOL)
LOCATION
TOWNSHIP-RANGE
COORDINATES
LAT/LONG... 38-03.22 N 079-46.87 W
COUNTRY..... UNITED STATES
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... WARM SPRINGS 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 709 M, SPRING IN VALLEY.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/09/03
TEMPERATURE (C)..... 34.9
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. MEDICINAL USE.
WATER ANALYSIS
PH..... 7.1
SPECIFIC CONDUCTANCE..... 600.
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00098

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016020

NAME OF SAMPLE SOURCE... WARM SPRING (LADIES' POOL)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 38-03.22 N 079-46.87 W

STATE..... VIRGINIA

COUNTY..... BATH

MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/06/10

TEMPERATURE (C)..... 35.1

DISCHARGE..... 1552. L/MIN

PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00099

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016015

NAME OF SAMPLE SOURCE... WARM SPRING (MEN'S POOL)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 38-03.22 N 079-46.85 W

STATE..... VIRGINIA

COUNTY..... BATH

MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/11/25

TEMPERATURE (C)..... 35.0

DISCHARGE..... 1703. L/MIN

PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00100

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016014

NAME OF SAMPLE SOURCE... WARM SPRING (MEN'S POOL)

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 38-03.22 N 079-46.85 W

STATE..... VIRGINIA

COUNTY..... BATH

MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1976/06/10

TEMPERATURE (C)..... 35.4

DISCHARGE..... 1552. L/MIN

PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00101

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016016

NAME OF SAMPLE SOURCE... WARM SPRING (MEN'S POOL)

LOCATION TOWNSHIP-RANGE COORDINATES

COUNTRY..... UNITED STATES LAT/LONG... 38-03.22 N 079-46.85 W

STATE..... VIRGINIA

COUNTY..... BATH

MAP REFERENCE..... WARM SPRINGS 1:24000

OTHER LOCALITY INFORMATION: ALTITUDE 709 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/09/03

TEMPERATURE (C)..... 35.2

PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE

OTHER SAMPLE INFORMATION.. MEDICINAL USE.

WATER ANALYSIS

PH..... 7.2

SPECIFIC CONDUCTANCE..... 600.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.

COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY

REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00102

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015235

NAME OF SAMPLE SOURCE... WARM SPRINGS (GENTLEMANS POOL)

WARING NUMBER..... 7

LOCATION TOWNSHIP-RANGE COORDINATES

COUNTRY..... UNITED STATES LAT/LONG... 38-03.22 N 079-46.85 W

STATE..... VIRGINIA

COUNTY..... BATH

GEOLOGIC PROVINCE.. FOLDED APPALACHIANS

MAP REFERENCE..... WARM SPRINGS 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1973/07/00

SAMPLE NUMBER..... 96

TEMPERATURE (C)..... 35.

WATER ANALYSIS

PH..... 7.2

SPECIFIC CONDUCTANCE..... 680.

ALKALINITY..... 184. AS HCO3

CHARGE IMBALANCE (% DIFF)... 7.6

ANALYSIS IN MG/L ISOTOPES (O/OO)

AL....		CR.....		MG...	27.7		
AU....		CU.....	0.0038				
B.....		F.....		NA...	4.0		
BE....		FE(TOT).	0.0105	NB...		SO4..	230.
BI....		GA.....		NH4..		SR...	1.6
CA....	117.	HCO3....	184.				
CD....	0.0012						
CL....	2.8						
CO....		K.....	7.1			ZN...	0.0122

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00103

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016025

NAME OF SAMPLE SOURCE... WESTERN AUTO STORE

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 38-00.77 N 079-48.68 W
STATE..... VIRGINIA
COUNTY..... BATH
MAP REFERENCE..... APPALACHIAN VALLEY 1:250000
OTHER LOCALITY INFORMATION: ALTITUDE 747 M, SPRING ON HILLSIDE.

SAMPLE DESCRIPTION AND CONDITIONS

DATE/COLLECTOR..... 1975/09/04
SAMPLE NUMBER..... 612
TEMPERATURE (C)..... 17.2
WELL DEPTH (M)..... 72.
DISCHARGE..... 34. L/MIN
PERTINENT LITHOLOGY..... BEEKMANTOWN GROUP
OTHER SAMPLE INFORMATION.. COMMERCIAL USE.

WATER ANALYSIS

PH..... 7.0
SPECIFIC CONDUCTANCE..... 640.

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00104

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015233

NAME OF SAMPLE SOURCE... NEW RIVER WHITE SULPHUR SPRINGS
WARING NUMBER..... 18

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 37-17.40 N 080-37.14 W
STATE..... VIRGINIA
COUNTY..... GILES
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... EGGLESTON 1:24000

SAMPLE DESCRIPTION AND CONDITIONS

TEMPERATURE (C)..... 29.4
DISCHARGE..... 568. L/MIN

REFERENCE AND IDENTIFICATION

COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... PEALE, 1886

RECORD 00105

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016040

NAME OF SAMPLE SOURCE... BOLAR SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES

COUNTRY..... UNITED STATES — LAT/LONG... 38-12.97 N 079-40.43 W
STATE..... VIRGINIA

COUNTY..... HIGHLAND
MAP REFERENCE..... BURNSVILLE 1:24000
OTHER LOCALITY INFORMATION: ON COUNTY LINE BETWEEN BATH AND HIGHLAND

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/12/16
TEMPERATURE (C)..... 22.2
DISCHARGE..... 7817. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. RECREATIONAL USE.

WATER ANALYSIS
PH..... 7.48
SPECIFIC CONDUCTANCE..... 325.
ALKALINITY..... 205. AS HCO3
CHARGE IMBALANCE (% DIFF)... 4.6
ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.01				
AL....	L 1.0	CR.....		MG...	14.	SB...			
AS....	L 0.2	CS.....		MN...	N				
AU....		CU.....	0.02	MO...		SE...	L 1.		
B.....	0.03	F.....	0.3	NA...	1.6	SIO2.	11.		
BA....		FE+3....		NA+K.		SN...			
BE....		FE(TOT).	N	NB...		SO4..	29.		
BI....		GA.....		NH4..	0.12	SR...	0.3		
BR....	0.011								
CA....	58.	HCO3....	205.	NO3..	0.9				
CD....		H2S.....		PO4..	0.03				
CL....	0.8								
CO....		K.....	2.3			ZN...	N		

ISOTOPES (O/OO)
DEL O(18) OF WATER... -8.0
DEL C(13) OF CO2..... -9.2
TRITIUM (T.U.)..... 24.4 +/- 2.0

GAS ANALYSIS
DATE/ANALYST..... 1975/12/16
ANALYSIS IN MG/L

AR...	0.82		
CH4..	L 0.005		
C2H6.		N2...	22.
CO2..	16.	O2...	5.0
HE...	L 0.0002		

ISOTOPES (OO/O)

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLGOICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00106

GEOTHERM SAMPLE FILE
GEOTHERM FILE ID: 0015232
NAME OF SAMPLE SOURCE... BOLAR SPRING
WARING NUMBER..... 6

LOCATION
COUNTRY..... UNITED STATES
STATE..... VIRGINIA
COUNTY..... HIGHLAND
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... BURNSVILLE 1:24000
OTHER LOCALITY INFORMATION: ON COUNTY LINE BETWEEN HIGHLAND AND BATH

TOWNSHIP-RANGE

COORDINATES
LAT/LONG... 38-12.97 N 079-40.43 W

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 78

TEMPERATURE (C)..... 21.
DISCHARGE..... Q 5678. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
WATER ANALYSIS
PH..... 7.3
SPECIFIC CONDUCTANCE..... 359.
ALKALINITY..... 191. AS HCO3
CHARGE IMBALANCE (% DIFF)... 5.9
ANALYSIS IN MG/L

								ISOTOPES (0/00)
AL....		CR.....		MG...	12.2			
AU....		CU.....	0.0035					
B.....		F.....		NA...	1.9			
BE....		FE(TOT).	0.0065	NB...		SO4..	25.	
BI....		GA.....		NH4..		SR...	0.2	
CA....	55.9	HCO3....	191.					
CD....	0.0009							
CL....	2.1							
CO....		K.....	2.2			ZN...	0.0015	

QUALIFICATION FIELD..... FROM WARING, 1965
REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00107

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016039
NAME OF SAMPLE SOURCE... BOLAR SPRING
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 38-12.97 N 079-40.43 W
STATE..... VIRGINIA
COUNTY..... HIGHLAND
MAP REFERENCE..... BURNSVILLE 1:24000
OTHER LOCALITY INFORMATION: ON COUNTY LINE BETWEEN BATH AND HIGHLAND
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/06/09
TEMPERATURE (C)..... 20.2
DISCHARGE..... 9842. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
WATER ANALYSIS
PH..... 7.42
SPECIFIC CONDUCTANCE..... 335.
ALKALINITY..... 185. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.9
ANALYSIS IN MG/L

								ISOTOPES (0/00)	
AG....		CO3.....		LI...	N				
AL....	0.004	CR.....		MG...	10.	SB...		DEL O(18) OF WATER...	-8.1
AS....	L 0.0002	CS.....		MN...	N				
B.....	0.01	F.....	0.3	NA...	1.6	SIO2.	8.1		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-10.1
BE....		FE(TOT).	N	NB...		SO4..	24.	TRITIUM (T.U.).....	27.2 +/- 1.6
BI....		GA.....		NH4..		SR...	0.3		
CA....	54.	HCO3....	185.	NO3..	1.1				
CD....		H2S.....		PO4..	0.05				
CL....	1.0								
CO....		K.....	2.0			ZN...	0.02		

GAS ANALYSIS
ANALYSIS IN MG/L — ISOTOPES (00/00)
CH4.. L 0.03
CO2.. 11. O2... 6.0
HE... L 0.0003
REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00108

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015242
NAME OF SAMPLE SOURCE... BRAGG SPRING
WARING NUMBER..... 5
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 38-14.28 N 079-39.00 W
STATE..... VIRGINIA
COUNTY..... HIGHLAND
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... BURNSVILLE 1:24000
OTHER LOCALITY INFORMATION: UP CREEK FROM BOLAR POST OFFICE, 2.2 MILES NE OF BOLAR
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1928/02/23
TEMPERATURE (C)..... 23.
DISCHARGE..... 227. L/MIN
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. REEVES, 1932 MEASURED 24. DEG C AND 113. L/MIN
WATER ANALYSIS
DATE/ANALYST..... FOSTER, M. D.
ALKALINITY..... 189. AS HCO3
TOTAL DISSOLVED SOLIDS... 168.
ANALYSIS IN PPM — ISOTOPES (0/00)
B..... F..... NA... 10.
HE.... FE(TOT). NB... SO4.. 7.
CA.... 48. HCO3.... 189. NO3.. 0.21
CL.... 0.5
REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... COLLINS AND OTHERS, 1930

RECORD 00109

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015230
NAME OF SAMPLE SOURCE... ROCKBRIDGE BATHS (LITHIA SPRING)
WARING NUMBER..... 11
LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 37-53.9 N 079-24.4 W
STATE..... VIRGINIA
COUNTY..... ROCKBRIDGE
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... GOSHEN 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1928/02/25
SAMPLE NUMBER..... 421

TEMPERATURE (C)..... 22.
DISCHARGE..... 946. L/MIN
PERTINENT LITHOLOGY..... COPPER RIDGE DOLOMITE
WATER ANALYSIS
ALKALINITY..... 281. AS HCO3
TOTAL DISSOLVED SOLIDS... 263.
ANALYSIS IN PPM

B.....		F.....		NA...	16.				
BE....		FE(TOT).		NB...		SO4..	18.		
CA....	65.	HCO3....	281.	NO3..	1.2				
CL....	1.3								

ISOTOPES (O/OO)

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... COLLINS AND OTHERS, 1930

RECORD 00110

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015229
NAME OF SAMPLE SOURCE... ROCKBRIDGE BATHS (MAGNESIA SPRING)
WARING NUMBER..... 11
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-53.9 N 079-24.4 W
STATE..... VIRGINIA
COUNTY..... ROCKBRIDGE
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... GOSHEN 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1928/02/25
SAMPLE NUMBER..... 423
TEMPERATURE (C)..... 22.
DISCHARGE..... 2271. L/MIN
PERTINENT LITHOLOGY..... COPPER RIDGE DOLOMITE
WATER ANALYSIS
ALKALINITY..... 295. AS HCO3
TOTAL DISSOLVED SOLIDS... 289.
ANALYSIS IN PPM

B.....		F.....		NA...	13.				
BE....		FE(TOT).		NB...		SO4..	28.		
CA....	50.	HCO3....	295.	NO3..	1.5				
CL....	1.1								

ISOTOPES (O/OO)

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... COLLINS AND OTHERS, 1930

RECORD 00111

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015228
NAME OF SAMPLE SOURCE... SWAN POND SPRING
WARING NUMBER..... 4
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 39-28.17 N 077-52.62 W
STATE..... WEST VIRGINIA
COUNTY..... BERKELEY
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS

MAP REFERENCE..... MARTINSBURG 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1945/07/21
SAMPLE NUMBER..... 2-18
TEMPERATURE (C)..... 22.
AMBIENT TEMP (C)..... 11.
DISCHARGE..... 379. L/MIN
REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... ERSKINE, 1948

RECORD 00112

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015227
NAME OF SAMPLE SOURCE... OLD SWEET SPRING
WARING NUMBER..... 27
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-37.79 N 080-14.44 W
STATE..... WEST VIRGINIA
COUNTY..... MONROE
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... ALLEGHANY 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1973/07/00
SAMPLE NUMBER..... 21
TEMPERATURE (C)..... 23.
PERTINENT LITHOLOGY..... LOWVILLE LIMESTONE
OTHER SAMPLE INFORMATION.. FLOW IS LARGE - WARING, 1965
WATER ANALYSIS
PH..... 6.46
SPECIFIC CONDUCTANCE..... 1580.
ALKALINITY..... 691. AS HCO3
CHARGE IMBALANCE (% DIFF)... 1.0
ANALYSIS IN MG/L ISOTOPES (0/00)

AL....		CR.....		MG...	58.4		
AU....		CU.....	0.0012				
B.....		F.....		NA...	17.5		
BE....		FE(TOT).	0.0231	NB...		SO4..	387.
BI....		GA.....		NH4..		SR...	3.6
CA....	276.	HCO3....	691.				
CD....	0.0007						
CL....	29.5						
CO....		K.....	23.			ZN...	0.0077

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... HELZ AND SINEX, 1974

RECORD 00113

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0015226
NAME OF SAMPLE SOURCE... OLD SWEET SPRING
WARING NUMBER..... 27
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 37-37.79 N 080-14.44 W

STATE..... WEST VIRGINIA
COUNTY..... MONROE
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... ALLEGHANY 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1935/06/03
SAMPLE NUMBER..... 52
TEMPERATURE (C)..... 23.
AMBIENT TEMP (C)..... 10.
DISCHARGE..... 3.7 L/MIN
PERTINENT LITHOLOGY..... STONES RIVER LIMESTONE
OTHER SAMPLE INFORMATION.. WARING, 1965 REPORTS SPRING AS LARGE
WATER ANALYSIS
DATE/ANALYST..... HASKINS, H. A.
ALKALINITY..... 715. AS HCO3
TOTAL DISSOLVED SOLIDS... 813.
ANALYSIS IN PPM

AL....		CR.....		MG...	58.				
AS....		CS.....		MN...	N				
B.....		F.....		NA...		SIO2.	18.		
BA....		FE+3....		NA+K.	36.				
BE....		FE(TOT).		NB...		SO4..	435.		
CA....	298.	HCO3....	715.	NO3..	N				
CD....		H2S.....	N						
CL....	27.								

ISOTOPES (O/OO)

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... PRICE AND OTHERS, 1936

RECORD 00114

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016046
NAME OF SAMPLE SOURCE... BERKELEY SPRINGS
LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 39-37.62 N 078-13.78 W
STATE..... WEST VIRGINIA
COUNTY..... MORGAN
MAP REFERENCE..... HANCOCK 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 189 M, SPRING IN VALLEY.
SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/10/02
TEMPERATURE (C)..... 22.2
DISCHARGE..... 6189. L/MIN
PERTINENT LITHOLOGY..... ORISKANY FORMATION
OTHER SAMPLE INFORMATION.. PUBLIC WATER SUPPLY.
WATER ANALYSIS
PH..... 6.99
SPECIFIC CONDUCTANCE..... 0 235.
ALKALINITY..... 168. AS HCO3
CHARGE IMBALANCE (% DIFF)... 11.9
ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				
AL....	0.024	CR.....		MG...	5.6	SB...			
AS....	0.0002	CS.....		MN...	N				
AU....		CU.....	N	MO...		SE...	L 0.001		

ISOTOPES (O/OO)
DEL O(18) OF WATER... -8.7

```
    B.....   0.02      F........   0.1      NA...    4.1      SIO2.    9.5
    BA....              FE+3....            NA+K.             SN...              DEL C(13) OF CO2.....    -15.2
    BE....              FE(TOT). N          NB...             SO4..    17.       TRITIUM (T.U.).......  2.7 +/- 0.8
    BI....              GA......            NH4..    0.03     SR...    0.5
    BR....   0.023
    CA....   45.        HCO3....   168.     NO3..    0.5
    CD....              H2S.....            PO4..    0.13
    CL....   6.4
    CO....              K........   1.0                       ZN...  N
GAS ANALYSIS
  ANALYSIS IN MG/L                                                                    ISOTOPES (00/0)
    CH4..  L 0.01
    C2H6.                                   N2...    22.
    CO2..    25.                            O2...    4.5
    HE...  L 0.002
QUALIFICATION FIELD..... SPECIFIC CONDUCTANCE QUERIED IN PUBLICATION
REFERENCE AND IDENTIFICATION
  COMPILED BY............  SILVA, CHRISTOPHER L.
  COMPILER AFFILIATION...  U.S. GEOLOGICAL SURVEY
  REFERENCE..............  HOBBA AND OTHERS, 1977

                                                                                                                  RECORD 00115
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GEOTHERM SAMPLE FILE                                                                                GEOTHERM FILE ID:  0016051
  NAME OF SAMPLE SOURCE... BERKELEY SPRINGS
LOCATION                                TOWNSHIP-RANGE                    COORDINATES
  COUNTRY............  UNITED STATES                                        LAT/LONG...  39-37.62 N 078-13.78 W
  STATE..............  WEST VIRGINIA
  COUNTY.............  MORGAN
  MAP REFERENCE......  HANCOCK 1:24000
SAMPLE DESCRIPTION AND CONDITIONS
  DATE/COLLECTOR.......  1976/05/18
  TEMPERATURE (C)......    21.9
  DISCHARGE...........    6492.  L/MIN
  PERTINENT LITHOLOGY....... ORISKANY FORMATION
WATER ANALYSIS
  PH......................    7.46
  SPECIFIC CONDUCTANCE.....   250.
  ALKALINITY..............    165.     AS HCO3
  CHARGE IMBALANCE (% DIFF)... 3.8
  ANALYSIS IN MG/L                                                                    ISOTOPES (0/00)
    AG....              CO3.....            LI...  N
    AL.... L 0.001      CR......            MG...    4.8      SB...              DEL O(18) OF WATER...    -8.6
    AS....   0.0002     CS......            MN...  N
    AU....              CU...... N          MO...            SE...  L 0.001
    B.....   0.02       F........   0.1      NA...    4.3      SIO2.    9.0
    BA....              FE+3....            NA+K.             SN...              DEL C(13) OF CO2.....    -13.9
    BE....              FE(TOT). N          NB...             SO4..    15.       TRITIUM (T.U.).......  2.6 +/- 0.6
    BI....              GA......            NH4..            SR...    0.4
    CA....   47.        HCO3....   165.     NO3..    0.1
    CD....              H2S.....            PO4..    0.14
    CL....   1.8
    CO....              K........   0.9                       ZN...    0.01
GAS ANALYSIS
  ANALYSIS IN MG/L                                                                    ISOTOPES (00/0)
    CH4..  L 0.03
```

CO2.. 29. O2... 5.0
HE... L 0.0005

REFERENCE AND IDENTIFICATION
COMPILED BY..... ORRIS, GRETA J.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00116

GEOTHERM SAMPLE FILE GEOTHERM FILE ID: 0016043
NAME OF SAMPLE SOURCE... HOVERMALE, H.

LOCATION TOWNSHIP-RANGE COORDINATES
COUNTRY..... UNITED STATES LAT/LONG... 39-36.38 N 078-14.82 W
STATE..... WEST VIRGINIA
COUNTY..... MORGAN
MAP REFERENCE..... STOTLERS CROSS RDS. 1:24000
OTHER LOCALITY INFORMATION: ALTITUDE 256 M, SPRING ON HILLSIDE.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/10/01
SAMPLE NUMBER..... 307
TEMPERATURE (C)..... 16.6
WELL DEPTH (M)..... 53.
DISCHARGE..... 15. L/MIN
PERTINENT LITHOLOGY..... TONOLOWAY FORMATION
OTHER SAMPLE INFORMATION.. HOUSEHOLD USE.

WATER ANALYSIS
DATE/ANALYST..... 1975/10/01
PH..... 6.97
SPECIFIC CONDUCTANCE..... ? 500.
ALKALINITY..... 410. AS HCO3

ANALYSIS IN MG/L — ISOTOPES (D/00)

AG....		CO3.....		LI...	N				
AL....	0.007	CR.....		MG...	24.	SB...		DEL O(18) OF WATER...	-7.8
AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	0.05	MO...		SE...	L 0.001		
B.....		F.....	0.2	NA...	3.8	SIO2.	7.8		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-15.2
BE....		FE(TOT).		NB...		SO4..		TRITIUM (T.U.).....	72.
BI....		GA.....		NH4..	0.05	SR...	1.7		
BR....	0.063								
CA....	106.	HCO3....	410.	NO3..	6.5				
CD....		H2S.....		PO4..	0.02				
CL....	10.								
CO....		K.....	0.7			ZN...	N		

GAS ANALYSIS
DATE/ANALYST..... 1975/10/01

ANALYSIS IN MG/L — ISOTOPES (D0/D)

CH4.. L 0.01
CO2.. O2... 6.2
HE... L 0.002

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00117

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0015225

NAME OF SAMPLE SOURCE... THORN SPRING
WARING NUMBER..... 16

LOCATION — TOWNSHIP-RANGE — COORDINATES
LAT/LONG... 38-36.30 N 079-21.18 W

COUNTRY..... UNITED STATES
STATE..... WEST VIRGINIA
COUNTY..... PENDLETON
GEOLOGIC PROVINCE.. FOLDED APPALACHIANS
MAP REFERENCE..... SUGAR GROVE 1:24000
OTHER LOCALITY INFORMATION: NEAR MOUTH OF THORN CREEK

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1935/05/18
SAMPLE NUMBER..... 32
TEMPERATURE (C)..... 22.
DISCHARGE..... 3785. L/MIN
PERTINENT LITHOLOGY..... LOWER HELDERBERG LIMESTONE

WATER ANALYSIS
DATE/ANALYST..... 1935/00/00 MCCUE, J. B.
ALKALINITY..... 124. AS HCO3
TOTAL DISSOLVED SOLIDS... 117.
CHARGE IMBALANCE (% DIFF)... 3.8
ANALYSIS IN PPM

AL....		CR.....		MG...	3.6				
AS....		CS.....		MN...	N				
B.....		F.....		NA...	0.95	SIO2.	7.2		
BE....		FE(TOT).	0.38	NB...		SO4..	5.8		
CA....	38.	HCO3....	124.	NO3..	1.				
CD....		H2S.....	N						
CL....	0.65								
CO....		K.....	0.88						

ISOTOPES (0/00)

REFERENCE AND IDENTIFICATION
COMPILED BY..... RENNER, J. L.
COMPILER AFFILIATION... GRUY FEDERAL, INC
REFERENCE..... PRICE AND OTHERS, 1936

RECORD 00118

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016042

NAME OF SAMPLE SOURCE... MINNEHAHA SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
LAT/LONG... 38-09.83 N 079-58.48 W

COUNTRY..... UNITED STATES
STATE..... WEST VIRGINIA
COUNTY..... POCAHONTAS
MAP REFERENCE..... WARM SPRINGS 1:62500
OTHER LOCALITY INFORMATION: ALTITUDE 704 M, SPRING IN VALLEY.

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1975/11/18
SAMPLE NUMBER..... 401
TEMPERATURE (C)..... 20.4
DISCHARGE..... 833. L/MIN
PERTINENT LITHOLOGY..... ORISKANY FORMATION
OTHER SAMPLE INFORMATION.. RECREATIONAL USE.

WATER ANALYSIS

DATE/ANALYST..... 1975/11/18
PH..... 7.88
SPECIFIC CONDUCTANCE..... 240.
ALKALINITY..... 116. AS HCO3
CHARGE IMBALANCE (% DIFF)... 6.0
ANALYSIS IN MG/L

AG....		CO3.....		LI...	N				ISOTOPES (0/00)		
AL....	L 0.001	CR.....		MG...	6.0	SB...			DEL O(18) OF WATER...	-8.5
AS....	0.0002	CS.....		MN...	N					
AU....		CU.....	N	MO...		SE...	L	1.0		
B.....	0.01	F.....	0.2	NA...	2.2	SIO2.		8.4		
BA....		FE+3....		NA+K.		SN...			DEL C(13) OF CO2.....	-11.4
BE....		FE(TOT).	N	NB...		SO4..		38.	TRITIUM (T.U.).....	2.5
BI....		GA.....		NH4..	0.04	SR...		0.4		
BR....	0.006									
CA....	39.	HCO3....	116.	NO3..	0.1					
CD....		H2S.....		PO4..	0.24					
CL....	0.8									
CO....		K.....	0.8			ZN...	N			

GAS ANALYSIS
DATE/ANALYST..... 1975/11/18
ANALYSIS IN MG/L

AR...	0.8				ISOTOPES (00/0)
CH4..	L 0.01				
C2H6.		N2...	19.		
CO2..	2.7	O2...	3.5		
HE...	L 0.0001				

REFERENCE AND IDENTIFICATION
COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

RECORD 00119

GEOTHERM SAMPLE FILE — GEOTHERM FILE ID: 0016041

NAME OF SAMPLE SOURCE... MINNEHAHA SPRING

LOCATION — TOWNSHIP-RANGE — COORDINATES
COUNTRY..... UNITED STATES — LAT/LONG... 38-09.83 N 079-58.48 W
STATE..... WEST VIRGINIA
COUNTY..... POCAHONTAS
MAP REFERENCE..... WARM SPRINGS 1:62500

SAMPLE DESCRIPTION AND CONDITIONS
DATE/COLLECTOR..... 1976/06/09
SAMPLE NUMBER..... 401
TEMPERATURE (C)..... 20.3
DISCHARGE..... 1817. L/MIN
PERTINENT LITHOLOGY..... ORISKANY FORMATION

WATER ANALYSIS
DATE/ANALYST..... 1976/06/09
PH..... 7.9
SPECIFIC CONDUCTANCE..... 285.
ALKALINITY..... 114. AS HCO3
CHARGE IMBALANCE (% DIFF)... 8.9
ANALYSIS IN MG/L

AG....		CO3.....		LI...	0.01				ISOTOPES (0/00)	
AL....	0.017	CR.....		MG...	5.3	SB...			DEL O(18) OF WATER...	-8.1

AS....	L 0.0002	CS.....		MN...	N				
AU....		CU.....	N						
B.....	0.02	F.....	0.1	NA...	2.2	SIO2.	8.1		
BA....		FE+3....		NA+K.		SN...		DEL C(13) OF CO2.....	-14.4
BE....		FE(TOT).	N	NB...		SO4..	38.	TRITIUM (T.U.).....	41.
BI....		GA.....		NH4..		SR...	0.4		
CA....	38.	HCO3....	114.	NO3..	0.1				
CD....		H2S.....		PO4..	0.07				
CL....	0.8								
CO....		K.....	0.8			ZN...	0.01		

GAS ANALYSIS

ANALYSIS IN MG/L

AR...	1.1			
CH4..	0.006			
C2H6.		N2...	28.	
CO2..	17.	O2...	L 0.1	
HE....	L 0.0003			

ISOTOPES (00700)

REFERENCE AND IDENTIFICATION

COMPILED BY..... SILVA, CHRISTOPHER L.
COMPILER AFFILIATION... U.S. GEOLOGICAL SURVEY
REFERENCE..... HOBBA AND OTHERS, 1977

APPENDIX A

Index to GEOTHERM'S sample file for the states in the central and eastern United States. This computer generated appendix contains some trucated fields. The index is sorted by state, county, and name of the source. I.D. - GEOTHERM record identifier, Temp. - temperature °C (see Table 1 for explanation of alphabetic qualifiers preceding temperature.)

State	County	Name of Source	Latitude	Longitude	I.D.	Temp.
ARKANSAS	COLUMBIA	BRINE WELL	33-13.	N 093-17.	W 0000306	107.
ARKANSAS	COLUMBIA	BRINE WELL	33-13.	N 093-11.	W 0000305	107.
ARKANSAS	COLUMBIA	BSW 17 WELL	33-13.	N 093-12.	W 0000310	100.
ARKANSAS	COLUMBIA	LEWIS D1 WELL	33-17.	N 093-04.	W 0000309	91.
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 23)	34-30.88	N 093-03.18	W 0001456	
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 17)	34-30.95	N 093-03.22	W 0001455	
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 33)	34-30.85	N 093-03.15	W 0001457	
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 48)	34-30.97	N 093-03.13	W 0001459	60.
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 49)	34-30.58	N 093-03.17	W 0001461	61.8
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 42)			0001460	61.3
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (HOT SPRING NO. 46)	34-30.82	N 093-03.18	W 0001458	
ARKANSAS	GARLAND	HOT SPRINGS NATIONAL PARK (MAURICE HOT SPRING)	34-30.85	N 093-03.18	W 0000079	
ARKANSAS	LAFAYETTE	MCKEAN D6 WELL	33-26.	N 093-26.	W 0000308	90.
ARKANSAS	LAFAYETTE	OIL WELL	33-28.	N 093-34.	W 0000307	89.4
ARKANSAS	MONTGOMERY	BARTONS SPRING (SOUTH)	34-22.1	N 093-39.1	W 0000299	30.
ARKANSAS	MONTGOMERY	CADDO GAP (NORTH)	34-23.04	N 093-36.42	W 0015218	34.4
ARKANSAS	MONTGOMERY	CADDO GAP (SOUTH)	34-23.04	N 093-36.42	W 0015217	36.
ARKANSAS	MONTGOMERY	CADDO RIVER SPRING	34-23.1	N 093-36.4	W 0001497	35.0
ARKANSAS	PIKE	REDLAND MOUNTAIN	34-19.26	N 093-44.34	W 0015219	25.
ARKANSAS	PIKE	REDLAND MTN SPRING	34-19.5	N 093-44.5	W 0001498	25.0
ARKANSAS	RANDOLF	WARM SPRINGS (RICE'S WARM SPRING)	36-28.85	N 091-03.18	W 0015216	28.
GEORGIA	MERIWETHER	BARNES, B. JEWETT	32-54.40	N 084-43.27	W 0016001	17.6
GEORGIA	MERIWETHER	BAXLEY, ANDY	32-54.22	N 084-42.97	W 0016000	17.0
GEORGIA	MERIWETHER	BROWN'S SPRING			0016059	20.
GEORGIA	MERIWETHER	BROWN'S SPRING			0016058	21.
GEORGIA	MERIWETHER	JAMES PHILLIPS WELL	32-53.13	N 084-43.12	W 0016002	33.8
GEORGIA	MERIWETHER	PARKMAN SPRING	32-51.7	N 084-39.0	W 0016057	25.
GEORGIA	MERIWETHER	SOUTH SPRING	32-52.93	N 084-40.38	W 0016003	17.7
GEORGIA	MERIWETHER	SOUTH SPRING	32-52.93	N 084-40.38	W 0016049	17.8
GEORGIA	MERIWETHER	WARM SPRINGS	32-53.55	N 084-41.40	W 0016004	31.6
GEORGIA	MERIWETHER	WARM SPRINGS	32-53.55	N 084-41.40	W 0016005	30.9
GEORGIA	MERIWETHER	WARM SPRINGS-EAST SOURCE	32-53.55	N 084-41.40	W 0016054	31.
GEORGIA	MERIWETHER	WARM SPRINGS-EAST SOURCE	32-53.55	N 084-41.40	W 0016053	31.
GEORGIA	MERIWETHER	WARM SPRINGS-WEST SOURCE	32-53.55	N 084-41.40	W 0016055	31.
GEORGIA	MERIWETHER	WARM SPRINGS-WEST SOURCE	32-53.55	N 084-41.40	W 0016056	31.
GEORGIA	PIKE	LIFSEY WARM SPRING	33-02.22	N 084-22.44	W 0015215	26.
GEORGIA	PIKE	TAYLOR	33-01.08	N 084-19.62	W 0015214	24.
GEORGIA	UPSON	BARKER SPRING	32-55.2	N 084-26.0	W 0016064	23.
GEORGIA	UPSON	BARKER SPRING	32-26.0	N 084-26.0	W 0016065	23.
GEORGIA	UPSON	THUNDERING SPRING			0016060	23.
GEORGIA	UPSON	THUNDERING SPRING			0016061	23.
GEORGIA	UPSON	TRIBUTARY SPRING TO THUNDERING SPRING			0016063	22.

GEORGIA	UPSON	TRIBUTARY SPRING TO THUNDERING SPRING			0016062	23.
MASSACHUSETTS	BERKSHIRE	FREDERICK GEORGE	42-44.12 N	073-12.05 W	0015222	22.
MASSACHUSETTS	BERKSHIRE	SAND SPRING	42-44.13 N	073-12.02 W	0015221	22.
MASSACHUSETTS	BERKSHIRE	SAND SPRING	42-44.13 N	073-12.02 W	0015220	21.0
NEBRASKA	BOYD	UNNAMED STOCK WELL	42-59.00 N	098-52.33 W	0004005	21.
NEBRASKA	BOYD	UNNAMED STOCK WELL	42-57.79 N	098-31.00 W	0004004	28.
NEBRASKA	BOYD	UNNAMED STOCK WELL	42-48.95 N	098-38.55 W	0004003	28.
NEBRASKA	BOYD	UNNAMED STOCK WELL	42-49.79 N	098-35.50 W	0004002	28.
NEBRASKA	BOYD	UNNAMED STOCK WELL	42-47.30 N	098-31.96 W	0004001	27.
NEBRASKA	BOYD	UNNAMED WATER WELL	42-49.75 N	098-27.95 W	0004000	28.
NEW YORK	COLUMBIA	LEBANON SPRING	42-28.83 N	073-22.20 W	0015224	18.7
NEW YORK	COLUMBIA	LEBANON SPRING	42-28.83 N	073-22.20 W	0015223	21.9
NORTH CAROLINA	MADISON	CITY WELL	35-53.28 N	082-49.80 W	0016008	15.2
NORTH CAROLINA	MADISON	CITY WELL	35-53.28 N	082-49.80 W	0016007	15.2
NORTH CAROLINA	MADISON	HOT SPRING	35-53.83 N	082-49.55 W	0016010	41.4
NORTH CAROLINA	MADISON	HOT SPRING	35-53.83 N	082-49.55 W	0016009	39.3
NORTH CAROLINA	MADISON	LOVIN, PAUL	35-53.95 N	082-51.77 W	0016006	15.0
PENNSYLVANIA	PERRY	KRETZING, MAX	40-19.50 N	077-15.13 W	0016045	15.1
PENNSYLVANIA	PERRY	PERRY COUNTY WARM SPRINGS	40-19.72 N	077-14.78 W	0016052	17.7
PENNSYLVANIA	PERRY	PERRY COUNTY WARM SPRINGS	40-19.72 N	077-14.78 W	0016044	17.8
SOUTH DAKOTA	FALL RIVER	CASCADE SPRING	43-20.1 N	103-33.05 W	0001465	22.
SOUTH DAKOTA	FALL RIVER	EVANS PLUNGE	43-26.51 N	103-28.82 W	0001464	32.
SOUTH DAKOTA	FALL RIVER	EVANS PLUNGE	43-26.51 N	103-28.82 W	0001463	30.
SOUTH DAKOTA	FALL RIVER	HOT BROOK CANYON HOT SPRING	43-27.12 N	103-30.48 W	0001462	24.
VIRGINIA	ALLEGHANY	FALLING SPRING	37-52.15 N	079-56.00 W	0016012	20.8
VIRGINIA	ALLEGHANY	FALLING SPRING	37-52.15 N	079-56.00 W	0015237	22.2
VIRGINIA	ALLEGHANY	FALLING SPRING	37-52.15 N	079-56.00 W	0016013	25.0
VIRGINIA	ALLEGHANY	MRS. JENNIE LAYTON SPRING	37-51.85 N	079-59.40 W	0015234	21.6
VIRGINIA	ALLEGHANY	SWEET CHALYBEATE	37-38.53 N	080-14.32 W	0015241	22.5
VIRGINIA	ALLEGHANY	WEBB, H.D.	37-52.48 N	079-55.65 W	0016011	27.2
VIRGINIA	BATH	COLD MAGNESIA SPRING	37-59.82 N	079-49.67 W	0016030	15.2
VIRGINIA	BATH	DUNN, M.	38-01.25 N	079-48.72 W	0016024	15.8
VIRGINIA	BATH	DUNN, M.	38-01.25 N	079-48.72 W	0016050	14.4
VIRGINIA	BATH	GARDNER, G.	38-02.70 N	079-46.98 W	0016021	16.4
VIRGINIA	BATH	HEALING SPRINGS	37-57.78 N	079-51.66 W	0015231	27.5
VIRGINIA	BATH	HOMESTEAD HOT WELL	37-59.93 N	079-49.35 W	0016029	19.6
VIRGINIA	BATH	HOMESTEAD HOT WELL	37-59.93 N	079-49.35 W	0016028	17.9
VIRGINIA	BATH	HOMESTEAD HOT WELL	37-59.93 N	079-49.35 W	0016027	19.5
VIRGINIA	BATH	HOMESTEAD HOT WELL	37-59.93 N	079-49.35 W	0016026	32.2
VIRGINIA	BATH	HOT SPRINGS (BOILER SPRING)	37-59.87 N	079-49.80 W	0016036	39.9
VIRGINIA	BATH	HOT SPRINGS (BOILER SPRING)	37-59.87 N	079-49.80 W	0015240	39.0
VIRGINIA	BATH	HOT SPRINGS (BOILER SPRING)	37-59.87 N	079-49.80 W	0016035	40.0
VIRGINIA	BATH	HOT SPRINGS (HOT SULPHUR SPRING)	37-59.87 N	079-49.78 W	0015239	36.0
VIRGINIA	BATH	HOT SPRINGS (HOT SULPHUR SPRING)	37-59.87 N	079-49.78 W	0016034	36.5
VIRGINIA	BATH	HOT SPRINGS (HOT SULPHUR SPRING)	37-59.87 N	079-49.78 W	0016033	35.2
VIRGINIA	BATH	HOT SPRINGS (MAGNESIA SPRING)	37-59.83 N	079-49.72 W	0015238	30.2
VIRGINIA	BATH	HOT SPRINGS (OCTAGON SPRING)	37-59.90 N	079-49.83 W	0016037	36.8
VIRGINIA	BATH	HOT SPRINGS (OCTAGON SPRING)	37-59.90 N	079-49.83 W	0016038	36.5
VIRGINIA	BATH	HOT SPRINGS (OCTAGON)	37-59.90 N	079-49.98 W	0015236	37.0
VIRGINIA	BATH	MAGNESIA SPRING	37-59.83 N	079-49.68 W	0016032	16.2
VIRGINIA	BATH	MAGNESIA SPRING	37-59.83 N	079-49.68 W	0016031	28.4
VIRGINIA	BATH	WARM SPRING (CHILDREN'S POOL)	38-03.22 N	079-46.87 W	0016019	35.3
VIRGINIA	BATH	WARM SPRING (CHILDREN'S POOL)	38-03.22 N	079-46.87 W	0016017	35.4
VIRGINIA	BATH	WARM SPRING (LADIES' POOL)	38-03.22 N	079-46.87 W	0016023	34.8

VIRGINIA	BATH	WARM SPRING (LADIES' POOL)	38-03.22	N 079-46.87	W 0016022	34.9
VIRGINIA	BATH	WARM SPRING (LADIES' POOL)	38-03.22	N 079-46.87	W 0016020	35.1
VIRGINIA	BATH	WARM SPRING (MEN'S POOL)	38-03.22	N 079-46.85	W 0016015	35.0
VIRGINIA	BATH	WARM SPRING (MEN'S POOL)	38-03.22	N 079-46.85	W 0016014	35.4
VIRGINIA	BATH	WARM SPRING (MEN'S POOL)	38-03.22	N 079-46.85	W 0016016	35.2
VIRGINIA	BATH	WARM SPRINGS (GENTLEMANS POOL)	38-03.22	N 079-46.85	W 0015235	35.
VIRGINIA	BATH	WESTERN AUTO STORE	38-00.77	N 079-48.68	W 0016025	17.2
VIRGINIA	GILES	NEW RIVER WHITE SULPHUR SPRINGS	37-17.40	N 080-37.14	W 0015233	29.4
VIRGINIA	HIGHLAND	BOLAR SPRING	38-12.97	N 079-40.43	W 0016040	22.2
VIRGINIA	HIGHLAND	BOLAR SPRING	38-12.97	N 079-40.43	W 0015232	21.
VIRGINIA	HIGHLAND	BOLAR SPRING	38-12.97	N 079-40.43	W 0016039	20.2
VIRGINIA	HIGHLAND	BRAGG SPRING	38-14.28	N 079-39.00	W 0015242	23.
VIRGINIA	ROCKBRIDGE	ROCKBRIDGE BATHS (LITHIA SPRING)	37-53.9	N 079-24.4	W 0015230	22.
VIRGINIA	ROCKBRIDGE	ROCKBRIDGE BATHS (MAGNESIA SPRING)	37-53.9	N 079-24.4	W 0015229	22.
WEST VIRGINIA	BERKELEY	SWAN POND SPRING	39-28.17	N 077-52.62	W 0015228	22.
WEST VIRGINIA	MONROE	OLD SWEET SPRING	37-37.79	N 080-14.44	W 0015227	23.
WEST VIRGINIA	MONROE	OLD SWEET SPRING	37-37.79	N 080-14.44	W 0015226	23.
WEST VIRGINIA	MORGAN	BERKELEY SPRINGS	39-37.62	N 078-13.78	W 0016046	22.2
WEST VIRGINIA	MORGAN	BERKELEY SPRINGS	39-37.62	N 078-13.78	W 0016051	21.9
WEST VIRGINIA	MORGAN	HOVERMALE, H.	39-36.38	N 078-14.82	W 0016043	16.6
WEST VIRGINIA	PENDLETON	THORN SPRING	38-36.30	N 079-21.18	W 0015225	22.
WEST VIRGINIA	POCAHONTAS	MINNEHAHA SPRING	38-09.83	N 079-58.48	W 0016042	20.4
WEST VIRGINIA	POCAHONTAS	MINNEHAHA SPRING	38-09.83	N 079-58.48	W 0016041	20.3

APPENDIX B

Sources for the records in the GEOTHERM sample file for Arkansas, Georgia, Massachusetts, Nebraska, New York, North Carolina, Pennsylvania, South Dakota, Virginia, and West Virginia. Each reference is preceded by the abbreviated reference (called CODE) used in the sample file (Table 1). Entries in this computer-generated appendix are sorted by CODE.

CODE = BEDINGER AND OTHERS, 1979

BEDINGER, M. S., PEARSON, F. J., JR., REED, J. E., SNIEGOCKI, R. T., AND STONE, C. G., 1979, THE WATERS OF HOT SPRINGS NATIONAL PARK, ARKANSAS - THEIR NATURE AND ORIGIN: U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1044-C, 33 P.

CODE = BRYAN, 1922

BRYAN, K., 1922, THE HOT WATER SUPPLY OF THE HOT SPRINGS, ARKANSAS: JOURNAL OF GEOLOGY, V. 30, NO. 6, P. 425-449.

CODE = CARPENTER AND TROUT, 1978

CARPENTER, A. B., AND TROUT, M. L., 1978, GEOCHEMISTRY OF BROMIDE-RICH BRINES OF THE DEAD SEA AND SOUTHERN ARKANSAS, IN JOHNSON, N. K. A., AND RUSSELL, J. A., EDS., THIRTEENTH ANNUAL FORUM ON THE GEOLOGY OF INDUSTRIAL MINERALS: OKLAHOMA GEOLOGICAL SURVEY CIRCULAR 79, P. 78-88.

CODE = COLLINS AND OTHERS, 1930

COLLINS W. D., FOSTER, M. D., REEVES, F., AND MEACHAM, R. P., 1930, SPRINGS OF VIRGINIA - A REPORT ON THE DISCHARGE, TERMPERATURE, AND CHEMICAL CHARACTER OF SPRINGS IN THE SOUTHERN PART OF THE GREAT VALLEY: VIRGINIA DIVISION OF WATER RESOURCES AND POWER BULLETIN 1, 55 P.

CODE = COLLINS, 1974

COLLINS, A. G., 1974, GEOCHEMISTRY OF LIQUIDS, GASES, AND ROCKS FROM THE SMACKOVER FORMTION: U.S. BUREAU OF MINES REPORT OF INVESTIGATION 7897, 84 P.

CODE = ERSKINE, 1948

ERSKINE, H. M., 1948, PRINCIPAL SPRINGS OF WEST VIRGINIA: WEST VIRGINIA CONSERVATION COMMISSION, 50 P.

CODE = GOTT AND SCHNABEL, 1963

GOTT, G. B., AND SCHNABEL, R. W., 1963, GEOLOGY OF THE EDGEMONT NE QUADRANGLE, FALL RIVER AND CUSTER COUNTIES, SOUTH DAKOTA: U.S. GEOLOGICAL SURVEY BULLETIN 1063-E, P. 127-188.

CODE = HANSEN AND OTHERS, 1974

HANSEN, B. P., GAY, F. B., AND TOLER, L. G., 1974, HYDROLOGIC DATA OF THE HOOSIC RIVER BASIN, MASSACHUSETTS: MASSACHUSETTS HYDROLOGIC DATA REPORT NO. 15; U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 74-368, 31 P.

CODE = HELZ AND SINEX, 1974

HELZ, G. R., AND SINEX, S. A., 1974, CHEMICAL EQUILIBRA IN THE THERMAL SPRING WATERS OF VIRGINIA: GEOCHIMICA ET COSMOCHIMICA ACTA, V. 38, P. 1807-1820.

CODE = HEWETT AND CRICKMAY, 1937

HEWETT, D. F., AND CRICKMAY, G. W., 1937, THE WARM SPRINGS OF GEORGIA - THEIR GEOLOGIC RELATIONS AND ORGIN, A SUMMARY REPORT: U.S. GEOLOGICAL SURVEY WATER-SUPPLY PAPER 819, 40 P.

CODE = HOBBA AND AOTHERS, 1979

HOBBA, W. A., JR., FISHER, D. W., PEARSON, F. J., JR., AND CHEMERYS, J. C., 1979, HYDROLOGY AND GEOCHEMISTRY OF THERMAL SPRINGS OF THE APPALACHIANS: U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1044-E, 36 P.

CODE = MISER AND PURDUE, 1929

MISER, H. D., AND PURDUE, A. H., 1929, GEOLOGY OF THE DE QUEEN AND CADDO GAP QUALDRANGLES, ARKANSAS: U.S. GEOLOGICAL SURVEY BULLETIN 808, 195 P.

CODE = PEALE, 1886

PEALE, A. C., 1886, LISTS & ANALYSES OF THE MINERAL SPRINGS OF THE UNITED STATES - PRELIMINARY STUDY: U.S. GEOLOGICAL SURVEY BULLETIN 32, 235 P.

CODE = POST, 1967

POST, E. V., 1967, GEOLOGY OF THE CASCADE SPRINGS QUADRANGLE, FALL RIVER COUNTY, SOUTH DAKOTA: U.S. GEOLOGICAL SURVEY BULLETIN 1063-L, P. 443-504.

CODE = RAHN AND GRIES, 1973

RAHN P. H., AND GRIES, J. P., 1973, LARGE SPRINGS IN THE BLACK HILLS, SOUTH DAKOTA AND WYOMING: SOUTH DAKOTA GEOLOGICAL SURVEY REPORT OF INVESTIGATION NO. 107, 46 P.

CODE = SAUDERS, 1976

SAUDERS, V. L., 1976, PHYSIOGRAPHY, GEOLOGY, AND WATER RESOURCES OF BOYD COUNTY, NEBRASKA: CONSERVATION AND SURVEY DIVISION, NEBRASKA WATER SUPPLY PAPER NUMBER 42, 113 P.

CODE = WAGNER AND STEELE, 1980

WAGNER, G. H., AND STEELE, L. F., 1980, CHEMISTRY OF THE SPRING WATERS OF THE OUACHITA MOUNTAINS EXCLUDING HOT SPRINGS, ARKANSAS: ARKANSAS WATER RESOURCES RESEARCH CENTER, UNIVERSITY OF ARKANSAS PUBLICATION NO. 69.