

GEOHERMAL STUDIES IN MONTANA
QUARTERLY REPORT

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Progress Report for Grant No. EY-76-C-06-2426
from Oct. 1, 1977 to June 11, 1978

The following items list progress made on the various research tasks since the last formal report (RLO-2426-T2-2):

(1) The hardrock study of mine-water temperatures - the study is complete, the manuscript has been edited, and galleys are currently being proofread. Because of many year-end demands upon our reproduction center, printing of the final report, as Montana Bureau of Mines and Geology Special Publication 79, will be delayed until early July. Mailings to DOE and our list of nearly 500 domestic and foreign libraries should be accomplished by the end of July, 1978.

(2) The Centennial and Madison Valley study - all chemical analyses are complete for samples collected to date. These data are included in the Appendix. The geologic mapping from last summer has been evaluated with respect to warm spring occurrences. Agreements have been made for support of an M.S. mapping thesis and an M.S. geophysical thesis in the Centennial Valley and a Ph.D. mapping thesis of basement structure on the east side of the Madison Valley.

(3) The warm spring inventory is in progress. Errors in previously existing information have been found. Considerable variation in temperature and discharge have been noted at some sites. Some of the lower temperatures can probably be attributed to increased contamination by shallow ground water during this spring runoff period.

(4) Several state and regional meetings have been attended to increase understanding of the various aspects of DOE programs and to exchange information with others working in Montana.

(5) To determine the validity or extent of departure from the SiO_2 geothermometers of waters in contact with the two volcanic units, laboratory leach simulations at 27° and 57° C were run on crushed samples of the Huckleberry Ridge and Mesa Falls tuffs for a period of 10 days. The 27° C fluid phases had silica contents between those expected for chalcedony and α -cristobalite, whereas the 57° samples exceeded the silica levels for α -cristobalite.

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444246N 1113620W	SAMPLE LOCATION	13S 1E 9DBC
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	813-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6715. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1730	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	BUCKET AND STOPW
SAMPLE HANDLING	6220	WATER FLOW RATE	35. GPM(M)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE HIDDEN LAKE SPNG (SW OF HIDDEN LAKE)
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	17.2	0.858	BICARBONATE (HCO3)	61.5	1.008
MAGNESIUM (MG)	2.4	0.197	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.9	0.170	CHLORIDE (CL)	10.3	0.290
POTASSIUM (K)	3.7	0.095	SULFATE (SO4)	4.6	0.096
IRON (FE)	.01	0.001	NITRATE (AS N)	.398	0.028
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	49.0		O-PHOSPHATE (AS P)		

TOTAL CATIONS 1.321 TOTAL ANIONS 1.433

STANDARD DEVIATION OF ANION - CATION BALANCE 0.88 SIGMA

LABORATORY PH	6.74	TOTAL HARDNESS AS CaCO3	53.
FIELD TEMPERATURE	5.1 C	TOTAL ALKALINITY AS CaCO3	50.
CALCULATED DISSOLVED SOLIDS	122.0	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	153.2	RYZMAR STABILITY INDEX	10.4
LAB SPEC. COND. (MICROMHOS/CM)	131.2	LANGLIER SATURATION INDEX	-1.8

ADDITIONAL PARAMETERS

CONDUCTVY, FIELD MICROMHOS	112.6	TEMPERATURE, AIR (C)	10.
AMMONIA, TOTAL (MG/L AS N) <	.03	H2S, LAB (MG/L AS H2S) <	.10
BROMIDE TOT. REC (MG/L-BR) <	.1	IODIDE TOT. REC. (MB/L-I) <	.01
ALUMINUM, DISS (MG/L-AL)	.06	BORON, DISS (MG/L AS B)	.03
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L-SR)	.05	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L-SE) <	2.0
URANIUM DIS. (UG/L AS U)	.3		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *SPECIAL LASL NO 309809

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
65	14	12	7	20	6	72	0	2

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0380

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444253N 1113932W	SAMPLE LOCATION	13S 1W 12DAAC02
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	812-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7760. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1430	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	6220	WATER FLOW RATE	0.08 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 0.75 FROM VABM BRIMSTONE (LOWER SPRING)
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	8.	0.399	BICARBONATE (HCO3)	46.	0.754
MAGNESIUM (MG)	1.6	0.132	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.4	0.148	CHLORIDE (CL)	4.0	0.113
POTASSIUM (K)	10.4	0.266	SULFATE (SO4)	2.9	0.060
IRON (FE)	1.63	0.088	NITRATE (AS N)	.115	0.008
MANGANESE (MN)	.49	0.018	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	24.6		O-PHOSPHATE (AS P)		

 TOTAL CATIONS 1.050 TOTAL ANIONS 0.935

STANDARD DEVIATION OF ANION - CATION BALANCE =0.95 SIGMA

LABORATORY PH	5.75	TOTAL HARDNESS AS CaCO3	27.
FIELD TEMPERATURE	6.8 C	TOTAL ALKALINITY AS CaCO3	38.
CALCULATED DISSOLVED SOLIDS	79.9	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	103.2	RYZMAR STABILITY INDEX	12.3
LAB SPEC. COND. (MICROMHOS/CM)	99.3	LANGLIER SATURATION INDEX	-3.3

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	92.2	TEMPERATURE, AIR (C)	8.0
AMMONIA, TOTAL (MG/L AS N)	.05	H2S, LAB (MG/L AS H2S)	.17
BROMIDE TOT. REC (MG/L=BR) <	.1	IODIDE TOT. REC. (MB/L=I) <	.01
ALUMINUM, DISS (MG/L=AL)	.26	BORON, DISS (MG/L AS B)	.02
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L=SR)	.05	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L=SE) <	2.0
URANIUM DIS. (UG/L AS U)	.2		

REMARKS: C+G 75 CENT. GEOTHERMAL PROJECT * SPECIAL LASL 309808 * WATER IS ALMOST STAGNANT * SCUMMY W/ OIL FILM

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
42	13	15	28	12	6	81	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0381

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444253N 1113932W	SAMPLE LOCATION	13S 1W 12DAAC01
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	811=CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7780. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1230	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3220	WATER FLOW RATE	0.4 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SPNGS .75 MI S OF 2 DRINK SPRINGS
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	5.4	0.269	BICARBONATE (HCO3)	24.2	0.397
MAGNESIUM (MG)	1.3	0.107	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.3	0.100	CHLORIDE (CL)	1.45	0.041
POTASSIUM (K)	2.2	0.056	SULFATE (SO4)	3.2	0.067
IRON (FE)	.75	0.040	NITRATE (AS N)	.251	0.018
MANGANESE (MN)	.09	0.003	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SiO2)	28.0		O-PHOSPHATE (AS P)		

TOTAL CATIONS 0.576

TOTAL ANIONS 0.522

STANDARD DEVIATION OF ANION - CATION BALANCE =0.45 SIGMA

LABORATORY PH	6.24	TOTAL HARDNESS AS CaCO3	19.
FIELD TEMPERATURE	6.3 C	TOTAL ALKALINITY AS CaCO3	20.
CALCULATED DISSOLVED SOLIDS	57.0	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	69.2	RYZMAR STABILITY INDEX	12.7
LAB SPEC. COND. (MICROMHOS/CM)	56.3	LANGLIER SATURATION INDEX	=3.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	73.3	TEMPERATURE, AIR (C)	8.0
AMMONIA, TOTAL (MG/L AS N)	.03	H2S, LAB (MG/L AS H2S) <	.10
BROMIDE TOT. REC (MG/L=BR) <	.1	IODIDE TOT. REC. (MG/L=I) <	.01
ALUMINUM, DISS (MG/L=AL)	.38	BORON, DISS (MG/L AS B)	.02
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L=SR)	.06	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L=SE) <	2.0
URANIUM DIS. (UG/L AS U) <	.2		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *RAINING *SPECIAL
 LASL NO 309806 *COMPOSITE OF 2 SPNGS *OIL FILM ON WATER

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES
 CA MG NA K CL SO4 HCO3 CO3 NO3
 50 20 18 10 8 13 78 0 3

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0382

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444348N 1115220W	SAMPLE LOCATION	13S 2W 5CAA
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	810=CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7950. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	0935	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	6220	WATER FLOW RATE	2.5 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE CAYUSE SPRING 2-5 MI N OF STAUDENMEYER S
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	70.5	3.518	BICARBONATE (HCO3)	224.	3.671
MAGNESIUM (MG)	4.6	0.378	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.4	0.148	CHLORIDE (CL)	8.45	0.238
POTASSIUM (K)	2.5	0.064	SULFATE (SO4)	7.4	0.154
IRON (FE)	.02	0.001	NITRATE (AS N)	1.536	0.110
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.5	0.026
SILICA (SI02)	22.9		O=PHOSPHATE (AS P)		

TOTAL CATIONS 4.110

TOTAL ANIONS 4.199

STANDARD DEVIATION OF ANION - CATION BALANCE 0.53 SIGMA

LABORATORY PH	7.09	TOTAL HARDNESS AS CaCO3	195.
FIELD TEMPERATURE	6.9 C	TOTAL ALKALINITY AS CaCO3	184.
CALCULATED DISSOLVED SOLIDS	232.2	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	345.8	RYZMAR STABILITY INDEX	7.6
LAB SPEC. COND. (MICROMHOS/CM)	386.3	LANGLIER SATURATION INDEX	-0.2

ADDITIONAL PARAMETERS

CONDUCTIVITY, FIELD MICROMHOS	344.7	TEMPERATURE, AIR (C)	8.25
AMMONIA, TOTAL (MG/L AS N) <	.03	H2S, LAB (MG/L AS H2S)	.12
BROMIDE TOT. REC (MG/L=BR) <	.1	IODIDE TOT. REC. (MG/L=I) <	.01
ALUMINUM, DISS (MG/L=AL) <	.01 .068	BORON, DISS (MG/L AS B)	.02
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DISS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L=SR)	.27	ARSENIC, DISS (UG/L AS AS)	2.5
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L=SE) <	2.0
URANIUM DIS. (UG/L AS U)	2.0		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *SPNG DEVEL BELOW CONTACT OF TV AND TLS *SPECIAL SAMPLE LASL NO 309805

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
85	9	3	1	5	3	90	0	2

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0383

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE		SAMPLE LOCATION	13S 2E 20C8B
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	808-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6920. FT <50
DATE SAMPLED	09-28-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1400	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	6220	WATER FLOW RATE	15. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 1 MI SE OF CONKLIN LAKE ORR RANCH<
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	20.	0.998	BICARBONATE (HCO3)	99.2	1.626
MAGNESIUM (MG)	6.4	0.526	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	5.3	0.231	CHLORIDE (CL)	4.3	0.121
POTASSIUM (K)	.9	0.023	SULFATE (SO4)	4.5	0.094
IRON (FE)	.10	0.005	NITRATE (AS N)	.178	0.013
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	22.9		O-PHOSPHATE (AS P)		

TOTAL CATIONS 1.784

TOTAL ANIONS 1.859

STANDARD DEVIATION OF ANION - CATION BALANCE 0.56 SIGMA

LABORATORY PH	7.64	TOTAL HARDNESS AS CaCO3	76.
FIELD TEMPERATURE	10.8 C	TOTAL ALKALINITY AS CaCO3	81.
CALCULATED DISSOLVED SOLIDS	113.6	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	163.9	RYZNAR STABILITY INDEX	8.8
LAB SPEC. COND. (MICROMHOS/CM)	168.0	LANGLIER SATURATION INDEX	-0.6

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	165.	TEMPERATURE, AIR (C)	18.4
AMMONIA, TOTAL (MG/L AS N) <	.03	H2S, LAB (MG/L AS H2S)	.17
BROMIDE TOT. REC (MG/L-BR) <	.1	IODIDE TOT. REC. (MB/L-I) <	.01
ALUMINUM, DISS (MG/L-AL)	.07	BORON, DISS (MG/L AS B)	.01
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L-SR)	.07	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L-SE) <	2.0
URANIUM DIS. (UG/L AS U) <	.2		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *SPECIAL SAMPLE
 PROC. THROU LASL NO.309804< TOOK SAMPLE AFTER MOVING CATTLE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
56	29	12	1	6	5	88	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0384

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443601N 1113433W	SAMPLE LOCATION	148 1E 23BCC
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	807-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6800. FT <10
DATE SAMPLED	09-28-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1145	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	6220	WATER FLOW RATE	0.06 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SMALL SPRING E OF TOBE MORTONS 0.5 MU<
DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	4.4	0.220	BICARBONATE (HCO3)	21.2	0.347
MAGNESIUM (MG)	.7	0.058	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.8	0.122	CHLORIDE (CL)	1.65	0.047
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	3.4	0.071
IRON (FE)	.06	0.003	NITRATE (AS N)	.097	0.007
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	21.8		O=PHOSPHATE (AS P)		
TOTAL CATIONS		0.431	TOTAL ANIONS		0.472

STANDARD DEVIATION OF ANION - CATION BALANCE 0.36 SIGMA

LABORATORY PH	6.99	TOTAL HARDNESS AS CaCO3	14.
FIELD TEMPERATURE	15.0 C	TOTAL ALKALINITY AS CaCO3	17.
CALCULATED DISSOLVED SOLIDS	46.6	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	57.3	RYZNAR STABILITY INDEX	12.2
LAB SPEC. COND. (MICROMHOS/CM)	46.1	LANGLIER SATURATION INDEX	-2.6

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	40.	TEMPERATURE, AIR (C)	20.5
AMMONIA, TOTAL (MG/L AS N)	.06	H2S, LAB (MG/L AS H2S)	.21
BROMIDE TOT. REC (MG/L=BR) <	.1	IODIDE TOT. REC. (MB/L=I) <	.01
ALUMINUM, DISS (MG/L=AL)	.13	BORON, DISS (MG/L AS B)	.02
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L=SR)	.03	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L=SE) <	2.0
URANIUM DIS. (UG/L AS U) <	.2		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*USED 7 FILTERS TO GET FILT. SAMP.*SPECIAL SAMPLE THROU LASL NO.309803<

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
51	13	28	6	10	15	74	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0385

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443911N 1113837W	SAMPLE LOCATION	13S 1E 31DCAB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	806=CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6640. FT <10
DATE SAMPLED	09=28=77	TOTAL DEPTH OF WATER	
TIME SAMPLED	0930	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	11=30=77	FLOW MEAS METHOD	FLOAT AND STOPWA
SAMPLE HANDLING	6220	WATER FLOW RATE	1.4 CFS(M)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE ELK SPRINGS, 1 MI SW OF ELK LAKE
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	23.6	1.178	BICARBONATE (HCO3)	98.	1.606
MAGNESIUM (MG)	4.2	0.346	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.8	0.209	CHLORIDE (CL)	4.1	0.116
POTASSIUM (K)	4.	0.102	SULFATE (SO4)	3.2	0.067
IRON (FE)	.01	0.001	NITRATE (AS N)	.404	0.029
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SI02)	34.4		O=PHOSPHATE (AS P)		

TOTAL CATIONS 1.835

TOTAL ANIONS 1.838

STANDARD DEVIATION OF ANION - CATION BALANCE 0.02 SIGMA

LABORATORY PH	7.44	TOTAL HARDNESS AS CaCO3	76.
FIELD TEMPERATURE	.	TOTAL ALKALINITY AS CaCO3	80.
CALCULATED DISSOLVED SOLIDS	127.4	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	177.1	RYZMAR STABILITY INDEX	8.9
LAB SPEC. COND. (MICROMHOS/CM)	177.6	LANGLIER SATURATION INDEX	-0.7

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	152.	TEMPERATURE, AIR (C)	10.1
AMMONIA, TOTAL (MG/L AS N) <	.03	H2S, LAB (MG/L AS H2S) <	.10
BROMIDE TOT. REC (MG/L=BR) <	.1	IODIDE TOT. REC. (MB/L=I) <	.01
ALUMINUM, DISS (MG/L=AL)	.08	BORON, DISS (MG/L AS B)	.03
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L=SR)	.06	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L=SE) <	2.0
URANIUM DIS. (UG/L AS U)	.6		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *SPECIAL SAMPLE
 THRU LASL SAMPLE 309802

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
64	18	11	5	6	3	89	0	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0386

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	444711N 1113918W	SAMPLE LOCATION	12S 1E 18CB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	908
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6720. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1300	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE WEST FORK SWIMMING HOLE
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	19.	0.948	BICARBONATE (HCO3)	194.	3.179
MAGNESIUM (MG)	29.	2.386	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.8	0.209	CHLORIDE (CL)	2.75	0.078
POTASSIUM (K)	1.9	0.049	SULFATE (SO4)	11.8	0.246
IRON (FE)	<.01	0.000	NITRATE (AS N)	.099	0.007
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SIO2)	13.7		O-PHOSPHATE (AS P)		

TOTAL CATIONS 3.591

TOTAL ANIONS 3.531

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.38 SIGMA

LABORATORY PH	7.88	TOTAL HARDNESS AS CaCO3	167.
FIELD TEMPERATURE	25.5 C	TOTAL ALKALINITY AS CaCO3	159.
CALCULATED DISSOLVED SOLIDS	179.0	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	277.5	RYZNAR STABILITY INDEX	8.1
LAB SPEC. COND. (MICROMHOS/CM)	320.8	LANGLIER SATURATION INDEX	-0.1

ADDITIONAL PARAMETERS

PH, FIELD (SU)	8.3	CNDUCTVY, FIELD MICROMHOS	322.
TEMPERATURE, AIR (C)	9.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.17	BROMIDE TOT. REC (MG/L-BR) <	.1
IODIDE TOT. REC. (MB/L-I) <	.01	ALUMINUM, DISS (MG/L-AL) 1.023	.023
BORON, DISS (MG/L AS B)	.02	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L-SR)	.12
ARSENIC, DISS (UG/L AS AS)	2.8	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L-SE) <	2.0	URANIUM DIS. (UG/L AS U)	1.0

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO. 309813

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
26	66	5	1	2	7	90	0	0	C

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0395

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	464648N 1113927W	SAMPLE LOCATION	125 1E 19CD
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	SLOAN CAMP
DRAINAGE BASIN	41*F	BOTTLE NO.	906
AGENCY + SAMPLER	MBMG + JLS	ALTITUDE OF SAMPLE POINT	6540. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1100	STAGE HEIGHT	
LAB + ANALYST	MBMG + GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNKNOWN

SAMPLING SITE SLOAN COW CAMP WARM SPRING
DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	.9	0.045	BICARBONATE (HCO3)	64.2	1.052
MAGNESIUM (MG)	.1	0.008	CARBONATE (CO3)	74.4	2.480
SODIUM (NA)	88.	3.828	CHLORIDE (CL)	7.65	0.216
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	3.7	0.077
IRON (FE)	.17	0.009	NITRATE (AS N)	.050	0.004
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	3.1	0.163
SILICA (SI02)	50.9		0-PHOSPHATE (AS P)		

TOTAL CATIONS 3.918 TOTAL ANIONS 3.991

STANDARD DEVIATION OF ANION - CATION BALANCE 0.44 SIGMA

LABORATORY PH	9.75	TOTAL HARDNESS AS CaCO3	3.
FIELD TEMPERATURE	29.8 C	TOTAL ALKALINITY AS CaCO3	177.
CALCULATED DISSOLVED SOLIDS	261.7	SODIUM ADSORPTION RATIO	23.5
SUM OF DISS. CONSTITUENTS	294.3	RYZNAR STABILITY INDEX	8.7
LAB SPEC. COND. (MICROMHOS/CM)	396.0	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS

PH, FIELD (SU)	10.05	CNDUCTVY, FIELD MICROMHOS	410.
TEMPERATURE, AIR (C)	12.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.94	BROMIDE TOT. REC (MG/L=BR)	.1
IODIDE TOT. REC. (MG/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) ←	← .087
BORON, DISS (MG/L AS B)	.16	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.01
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	.3

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO. 309812

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
1	0	97	0	5	2	27	64	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0397

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444134N 1115544W	SAMPLE LOCATION	13S 3W 23ARD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	111CLVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	905
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6810. FT <50
DATE SAMPLED	09-28-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1330	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6120	WATER FLOW RATE	20. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SPRING 1.5 MILES WEST OF FISH CK. RD JNCT
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	52.6	2.625	BICARBONATE (HCO3)	210.	3.442
MAGNESIUM (MG)	8.0	0.658	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	13.3	0.579	CHLORIDE (CL)	8.55	0.241
POTASSIUM (K)	4.0	0.102	SULFATE (SO4)	10.4	0.217
IRON (FE)	.02	0.001	NITRATE (AS N)	.312	0.022
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SI02)	37.9		O-PHOSPHATE (AS P)		
-----			-----		
TOTAL CATIONS		3.965	TOTAL ANIONS		3.937

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.16 SIGMA

LABORATORY PH	7.72	TOTAL HARDNESS AS CaCO3	164.
FIELD TEMPERATURE	11.8 C	TOTAL ALKALINITY AS CaCO3	172.
CALCULATED DISSOLVED SOLIDS	238.8	SODIUM ADSORPTION RATIO	0.5
SUM OF DISS. CONSTITUENTS	345.4	RYZMAR STABILITY INDEX	7.3
LAB SPEC. COND. (MICROMHOS/CM)	360.4	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	357.	PH, FIELD (SU)	7.8
TEMPERATURE, AIR (C)	16.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.25	BROMIDE TOT. REC (MG/L=BR) <	.1
IODIDE TOT. REC. (MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) <	.09
BORON, DISS (MG/L AS B) <	.01	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR) <	.21
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	3.6

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO. 309807,

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
66	16	14	2	6	5	88	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0398

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443622N 1115622W	SAMPLE LOCATION	14S 3W 23BBD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	122VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	901
AGENCY + SAMPLER	MBMG + JLS	ALTITUDE OF SAMPLE POINT	6630. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1415	STAGE HEIGHT	
LAB + ANALYST	MBMG + GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC AND STO

SAMPLING SITE HUNTSMAN RANCH SPRING
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	38.4	1.916	BICARBONATE (HCO3)	223.	3.655
MAGNESIUM (MG)	13.2	1.086	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	20.9	0.909	CHLORIDE (CL)	12.35	0.348
POTASSIUM (K)	4.8	0.123	SULFATE (SO4)	8.1	0.169
IRON (FE)	<.01	0.000	NITRATE (AS N)	.325	0.023
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	37.2		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		4.034	TOTAL ANIONS		4.205

STANDARD DEVIATION OF ANION - CATION BALANCE 1.01 SIGMA

LABORATORY PH	8.06	TOTAL HARDNESS AS CaCO3	150.
FIELD TEMPERATURE	9.8 C	TOTAL ALKALINITY AS CaCO3	183.
CALCULATED DISSOLVED SOLIDS	245.3	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	358.5	RYZNAR STABILITY INDEX	7.1
LAB SPEC. COND. (MICROMHOS/CM)	377.6	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS

PH, FIELD (SU)	7.31	TEMPERATURE, AIR (C)	18.5
CNDUCTVY, FIELD MICROMHOS	381.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.09	BROMIDE TOT, REC (MG/L=BR) <	.1
IODIDE TOT, REC. (MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) 0.047	0.047
BORON, DISS (MG/L AS B)	.02	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.21
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	2.8

REMARKS: CENT. VALLEY GEOTHERMAL SAMPLES FOR BR, I, H2S, U LASL NO. 309801

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
47	26	22	3	8	4	87	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0402

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445907N 1113656W	SAMPLE LOCATION	10S 1E 4CCC
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	11OTRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	912
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6100. FT <10
DATE SAMPLED	09-30-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1130	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE WOLF CREEK COLD SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	27.5	1.372	BICARBONATE (HCO3)	121.	1.983
MAGNESIUM (MG)	4.7	0.387	CARBONATE (CO3)	7.8	0.260
SODIUM (NA)	30.8	1.340	CHLORIDE (CL)	6.0	0.169
POTASSIUM (K)	3.4	0.087	SULFATE (SO4)	31.2	0.650
IRON (FE)	.24	0.013	NITRATE (AS N)	.380	0.027
MANGANESE (MN)	.13	0.005	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	4.3	0.226
SILICA (SIO2)	21.4		O-PHOSPHATE (AS P)		

 TOTAL CATIONS 3.203 TOTAL ANIONS 3.315

STANDARD DEVIATION OF ANION - CATION BALANCE 0.71 SIGMA

LABORATORY PH	8.74	TOTAL HARDNESS AS CaCO3	88.
FIELD TEMPERATURE	11.8 C	TOTAL ALKALINITY AS CaCO3	112.
CALCULATED DISSOLVED SOLIDS	197.5	SODIUM ADSORPTION RATIO	1.4
SUM OF DISS. CONSTITUENTS	258.8	RYZMAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	299.7	LANGLIER SATURATION INDEX	0.8

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	310.	PH, FIELD (SU)	10.2
TEMPERATURE, AIR (C)	1.5	AMMONIA, TOTAL (MG/L AS N)	.06
H2S, LAB (MG/L AS H2S)	.08	BROMIDE TOT. REC (MG/L-BR) <	.1
IODIDE TOT. REC. (MB/L-I) <	.01	ALUMINUM, DISS (MG/L-AL)	.37
BORON, DISS (MG/L AS B)	.02	LITHIUM, DISS (MG/L AS LI)	.04
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L-SR)	.15
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L-SE) <	2.0	URANIUM DIS. (UG/L AS U)	2.3

REMARKS: CENT. VALLEY GEOTHERMAL LOC. NNE OF HOT SPRING=JUST ACROSS
 FENCE IN NEXT SEC. NORTH*LASL NO. 309815

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)	PERCENTAGE REACTANCE VALUES									
FUND: /	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
	43	12	42	2	5	21	64	8	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0424

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	445902N 1113656W	SAMPLE LOCATION	10S 1E 98BBB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110TRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	913
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6085. FT <11
DATE SAMPLED	09-30-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1330	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-15-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE WOLF CREEK HOT SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	8.6	0.429	BICARBONATE (HCO3)	154.	2.524
MAGNESIUM (MG)	1.5	0.123	CARBONATE (CO3)	8.2	0.273
SODIUM (NA)	97.	4.219	CHLORIDE (CL)	20.75	0.585
POTASSIUM (K)	1.8	0.046	SULFATE (SO4)	42.6	0.887
IRON (FE)	<.01	0.000	NITRATE (AS N)	.063	0.004
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	16.0	0.000
SILICA (SI02)	50.3		0-PHOSPHATE (AS P)		

TOTAL CATIONS 4.818

TOTAL ANIONS 4.274

STANDARD DEVIATION OF ANION - CATION BALANCE -3.07 SIGMA

LABORATORY PH	8.64	TOTAL HARDNESS AS CaCO3	28.
FIELD TEMPERATURE	54. C	TOTAL ALKALINITY AS CaCO3	140.
CALCULATED DISSOLVED SOLIDS	306.8	SODIUM ADSORPTION RATIO	8.0
SUM OF DISS. CONSTITUENTS	384.9	RYZNAR STABILITY INDEX	8.1
LAB SPEC. COND. (MICROMHOS/CM)	483.3	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	494.	PH, FIELD (SU)	11.03
TEMPERATURE, AIR (C)	8.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.20	BROMIDE TOT. REC (MG/L-BR)	.1
IODIDE TOT. REC. (MB/L-I)	.01	ALUMINUM, DISS (MG/L-AL) ≠	.039
BORON, DISS (MG/L AS B)	.03	LITHIUM, DISS (MG/L AS LI)	.07
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L-SR)	.06
ARSENIC, DISS (UG/L AS AS)	5.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L-SE) <	2.0	URANIUM DIS. (UG/L AS U)	.6

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO. 309814 -POOR BALANCE MAY BE DUE TO CO2 LOSS *Fluoride Value*

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
8	2	87	0	13	20	59	6	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0425

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445735N 1113714W	SAMPLE LOCATION	10S 1E 17DAC
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVF	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	917
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5800. FT <50
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WELL	299 FT
TIME SAMPLED	1200	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	16. FT (R
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE SUN RANCH GUEST HOUSE WELL
GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	41.2	2.056	BICARBONATE (HCO3)	153.	2.508
MAGNESIUM (MG)	5.4	0.444	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	8.7	0.378	CHLORIDE (CL)	8.05	0.227
POTASSIUM (K)	3.7	0.095	SULFATE (SO4)	8.3	0.173
IRON (FE)	<.01	0.000	NITRATE (AS N)	.531	0.038
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SIO2)	40.2		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.973	TOTAL ANIONS		2.961

STANDARD DEVIATION OF ANION - CATION BALANCE =0.08 SIGMA

LABORATORY PH	7.83	TOTAL HARDNESS AS CaCO3	125.
FIELD TEMPERATURE	8.0 C	TOTAL ALKALINITY AS CaCO3	125.
CALCULATED DISSOLVED SOLIDS	191.8	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	269.4	RYZNAR STABILITY INDEX	7.6
LAB SPEC.COND.(MICROMHOS/CM)	277.0	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	278.	PH, FIELD (SU)	8.57
TEMPERATURE, AIR (C)	8.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.28	BROMIDE TOT.REC (MG/L=BR)	.1
IODIDE TOT.REC.(MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) 0.042	
BORON ,DISS (MG/L AS B)	.02	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.13
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS.(UG/L AS U)	3.1

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO. 309816

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
69	14	12	3	7	5	86	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0429

STATE MONTANA COUNTY MADISON
 LATITUDE=LONGITUDE 445229N 1113242W SAMPLE LOCATION 11S 1E 13DBB
 TOPOGRAPHIC MAP CLIFF LAKE SAMPLE SOURCE SPRING
 GEOLOGICAL SOURCE 110TRRCC STATION CODE
 DRAINAGE BASIN 41*F BOTTLE NO. 918
 AGENCY + SAMPLER MBMG * JLS ALTITUDE OF SAMPLE POINT 6280. FT <10
 DATE SAMPLED 10-01-77 TOTAL DEPTH OF WATER
 TIME SAMPLED 1445 STAGE HEIGHT
 LAB + ANALYST MBMG * GAM DEPTH TO SAMPLING POINT .
 DATE ANALYZED 11-30-77 FLOW MEAS METHOD
 SAMPLE HANDLING 6220 WATER FLOW RATE 15. GPM(E)
 METHOD SAMPLED GRAB WATER USE STOCK

SAMPLING SITE SCHUSTERS PLACE HILLSLOPE SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	15.7	0.783	BICARBONATE (HCO3)	68.	1.114
MAGNESIUM (MG)	3.2	0.263	CARBONATE (CO3)	1.2	0.040
SODIUM (NA)	4.7	0.204	CHLORIDE (CL)	1.40	0.039
POTASSIUM (K)	1.0	0.026	SULFATE (SO4)	4.1	0.085
IRON (FE)	.03	0.002	NITRATE (AS N)	644	0.046
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SI02)	19.3		0-PHOSPHATE (AS P)		
TOTAL CATIONS		1.278	TOTAL ANIONS		1.346

STANDARD DEVIATION OF ANION - CATION BALANCE 0.53 SIGMA

LABORATORY PH	8.46	TOTAL HARDNESS AS CaCO3	52.
FIELD TEMPERATURE	9.5 C	TOTAL ALKALINITY AS CaCO3	58.
CALCULATED DISSOLVED SOLIDS	85.2	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	119.7	RYZMAR STABILITY INDEX	8.5
LAB SPEC. COND. (MICROMHOS/CM)	123.8	LANGLIER SATURATION INDEX	-0.0

ADDITIONAL PARAMETERS

PH, FIELD (SU)	8.10	TEMPERATURE, AIR (C)	8.0
CNDUCTVY, FIELD MICROMHOS	128.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.17	BROMIDE TOT. REC (MG/L=BR) <	.1
IODIDE TOT. REC. (MG/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) RE	0.032
BORON, DISS (MG/L AS B)	.02	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.06
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	.6

REMARKS: CENT- VALLEY GEOTHERMAL LASL MO. 309817

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES
 CA MG NA K CL SO4 HCO3 CO3 NO3
 61 20 16 2 3 6 87 3 3

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0430

STATE MONTANA COUNTY MADISON
 LATITUDE=LONGITUDE 444603N 1112951W SAMPLE LOCATION 12S 2E 20DDD
 TOPOGRAPHIC MAP CLIFF LAKE SAMPLE SOURCE SPRING
 GEOLOGICAL SOURCE 112VLCC STATION CODE
 DRAINAGE BASIN 41*F BOTTLE NO. 925
 AGENCY + SAMPLER MBMG * JLS ALTITUDE OF SAMPLE POINT 6450. FT <50
 DATE SAMPLED 10-02-77 TOTAL DEPTH OF WATER
 TIME SAMPLED 1700 STAGE HEIGHT
 LAB + ANALYST MBMG * GAM DEPTH TO SAMPLING POINT .
 DATE ANALYZED 11-30-77 FLOW MEAS METHOD
 SAMPLE HANDLING 6220 WATER FLOW RATE 30. GPM(E)
 METHOD SAMPLED GRAB WATER USE DOMESTIC AND STO

SAMPLING SITE HORN CREEK SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	27.	1.347	BICARBONATE (HCO3)	170.	2.786
MAGNESIUM (MG)	14.2	1.168	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	9.6	0.418	CHLORIDE (CL)	3.65	0.103
POTASSIUM (K)	2.0	0.051	SULFATE (SO4)	4.2	0.087
IRON (FE)	<.01	0.000	NITRATE (AS N)	.565	0.040
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SI02)	17.3		0=PHOSPHATE (AS P)		
-----			-----		
TOTAL CATIONS		2.984	TOTAL ANIONS		3.033

STANDARD DEVIATION OF ANION - CATION BALANCE 0.31 SIGMA

LABORATORY PH	8.01	TOTAL HARDNESS AS CaCO3	126.
FIELD TEMPERATURE	8.4 C	TOTAL ALKALINITY AS CaCO3	139.
CALCULATED DISSOLVED SOLIDS	162.6	SODIUM ADSORPTION RATIO	0.4
SUM OF DISS. CONSTITUENTS	248.8	RYZMAR STABILITY INDEX	7.7
LAB SPEC. COND. (MICROMHOS/CM)	276.2	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS			
CNDUCTVY, FIELD MICROMHOS	280.	TEMPERATURE, AIR (C)	13.
PH, FIELD (SU)	8.5	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.12	BROMIDE TOT. REC (MG/L=BR) <	.1
IODIDE TOT. REC. (MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) *	0.030
BORON, DISS (MG/L AS B)	.03	LITHIUM, DISS (MG/L AS LI) <	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.06
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	1.4

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO. 809824

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
45	39	13	1	3	2	93	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0437

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444209N 1115308W	SAMPLE LOCATION	13S 2W 18ADC
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	926
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6840. FT <50
DATE SAMPLED	10-03-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1030	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3220	WATER FLOW RATE	2. CFS(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE JIMMY ANDERSONS SPRING NO. 1
DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	66.5	3.318	BICARBONATE (HCO3)	246.	4.032
MAGNESIUM (MG)	24.	1.974	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	27.7	1.205	CHLORIDE (CL)	9.7	0.274
POTASSIUM (K)	7.3	0.187	SULFATE (SO4)	114.	2.373
IRON (FE)	<.01	0.000	NITRATE (AS N)	.036	0.003
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.7	0.089
SILICA (SIO2)	21.4		O-PHOSPHATE (AS P)		

TOTAL CATIONS 6.685 TOTAL ANIONS 6.771

STANDARD DEVIATION OF ANION - CATION BALANCE 0.41 SIGMA

LABORATORY PH	7.47	TOTAL HARDNESS AS CaCO3	265.
FIELD TEMPERATURE	28. C	TOTAL ALKALINITY AS CaCO3	202.
CALCULATED DISSOLVED SOLIDS	393.5	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	518.4	RYZMAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	615.0	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C)	12.	PH, FIELD (SU)	7.4
CNDUCTVY, FIELD MICROMHOS	614.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S) <	.10	BROMIDE TOT. REC (MG/L-BR)	.1
IODIDE TOT. REC. (MB/L-I)	.01	ALUMINUM, DISS (MG/L-AL) M	.051
BORON, DISS (MG/L AS B)	.20	LITHIUM, DISS (MG/L AS LI)	.05
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L-SR)	.54
ARSENIC, DISS (UG/L AS AS)	13.6	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L-SE) <	2.0	URANIUM DIS. (UG/L AS U)	2.4

REMARKS: CENT. VALLEY GEOTHERMAL SPRING ABOVE HORSE PASTURE WHERE 3 TREES BELOW ROCK OUTCROP*LASL NO. 809818

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
49	29	18	2	4	35	60	0		(

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0438

STATE MONTANA COUNTY BEAVERHEAD
 LATITUDE=LONGITUDE 444214N 1115334W SAMPLE LOCATION 13S 2W 18BDAD
 TOPOGRAPHIC MAP LOWER RED ROCK LAKE SAMPLE SOURCE SPRING
 GEOLOGICAL SOURCE STATION CODE
 DRAINAGE BASIN 41*A BOTTLE NO. 927
 AGENCY + SAMPLER MBMG + JLS ALTITUDE OF SAMPLE POINT 6840. FT <50
 DATE SAMPLED 10-03-77 TOTAL DEPTH OF WATER
 TIME SAMPLED 1200 STAGE HEIGHT
 LAB + ANALYST MBMG + GAM DEPTH TO SAMPLING POINT .
 DATE ANALYZED 11-30-77 FLOW MEAS METHOD
 SAMPLE HANDLING 6220 WATER FLOW RATE 2. CFS(E)
 METHOD SAMPLED GRAB WATER USE STOCK

SAMPLING SITE JIMMY ANDERSONS SPRING NO. 2
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	71.	3.543	BICARBONATE (HCO3)	247.	4.048
MAGNESIUM (MG)	24.	1.974	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	26.9	1.170	CHLORIDE (CL)	9.0	0.254
POTASSIUM (K)	7.3	0.187	SULFATE (SO4)	118.	2.457
IRON (FE)	.01	0.001	NITRATE (AS N)	.066	0.005
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.8	0.095
SILICA (SiO2)	21.0		O-PHOSPHATE (AS P)		
TOTAL CATIONS		6.875	TOTAL ANIONS		6.858

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.08 SIGMA

LABORATORY PH	7.47	TOTAL HARDNESS AS CaCO3	276.
FIELD TEMPERATURE	23.5 C	TOTAL ALKALINITY AS CaCO3	203.
CALCULATED DISSOLVED SOLIDS	400.8	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	526.1	RYZMAR STABILITY INDEX	7.1
LAB SPEC. COND. (MICROMHOS/CM)	627.0	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	709.	TEMPERATURE, AIR (C)	13.
PH, FIELD (SU)	7.4	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S) <	.10	BROMIDE TOT. REC (MG/L-BR)	.1
IODIDE TOT. REC. (MB/L-I)	.01	ALUMINUM, DISS (MG/L-AL) #	0.05 .032
BORON, DISS (MG/L AS B)	.23	LITHIUM, DISS (MG/L AS LI)	.05
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L-SR)	.51
ARSENIC, DISS (UG/L AS AS)	15.2	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L-SE) <	2.0	URANIUM DIS. (UG/L AS U)	2.5

REMARKS: CENT. VALLEY GEOTHERMAL SPRINGSHOWN ON MAP IN SEC. 18
 LASL NO. 309819

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM:	GWANAL (FORM 153)	PERCENTAGE REACTANCE VALUES									
FUND:	/	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
		51	28	17	2	3	36	59	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0439

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444156N 1115241W	SAMPLE LOCATION	13S 2W 17CBD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	928
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6820. FT <10
DATE SAMPLED	10-03-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1400	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	3. CFS(E)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE UPPERMOST SPRING=STAUDENMEYER RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	67.5	3.368	BICARBONATE (HCO3)	244.	3.999
MAGNESIUM (MG)	24.5	2.015	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	25.8	1.122	CHLORIDE (CL)	9.25	0.261
POTASSIUM (K)	6.8	0.174	SULFATE (SO4)	114.	2.373
IRON (FE)	.01	0.001	NITRATE (AS N)	.075	0.005
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.8	0.095
SILICA (SIO2)	20.1		O-PHOSPHATE (AS P)		
-----			-----		
TOTAL CATIONS	6.681		TOTAL ANIONS	6.733	

STANDARD DEVIATION OF ANION - CATION BALANCE 0.25 SIGMA

LABORATORY PH	7.64	TOTAL HARDNESS AS CaCO3	269.
FIELD TEMPERATURE	28. C	TOTAL ALKALINITY AS CaCO3	200.
CALCULATED DISSOLVED SOLIDS	390.0	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	513.8	RYZMAR STABILITY INDEX	7.0
LAB SPEC.COND.(MICROMHOS/CM)	608.0	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C)	12.5	PH, FIELD (SU)	7.57
CNDUCTVY, FIELD MICROMHOS	644.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S) <	.10	BROMIDE TOT, REC (MG/L=BR)	.1
IODIDE TOT, REC. (MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) #	0.5 .044
BORON, DISS (MG/L AS B)	.20	LITHIUM, DISS (MG/L AS LI)	.05
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.51
ARSENIC, DISS (UG/L AS AS)	16.	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	2.2

REMARKS: CENT. VALLEY GEOTHERMAL APPROX 20 GPM OF 17DEG C WATER RUNNING IN FROM CREEK LASL NO.309820

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
50	30	16	2	3	35	60	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0440

STATE MONTANA COUNTY BEAVERHEAD
 LATITUDE=LONGITUDE 444156N 1115241W SAMPLE LOCATION 138 2W 17CBD
 TOPOGRAPHIC MAP LOWER RED ROCK LAKE SAMPLE SOURCE SPRING
 GEOLOGICAL SOURCE 112VLCC STATION CODE
 DRAINAGE BASIN 41*A BOTTLE NO. 929
 AGENCY + SAMPLER MBMG * JLS ALTITUDE OF SAMPLE POINT 6810. FT <10
 DATE SAMPLED 10-03-77 TOTAL DEPTH OF WATER
 TIME SAMPLED 1500 STAGE HEIGHT
 LAB + ANALYST MBMG * GAM DEPTH TO SAMPLING POINT .
 DATE ANALYZED 11-30-77 FLOW MEAS METHOD
 SAMPLE HANDLING 6220 WATER FLOW RATE 1. CFS(E)
 METHOD SAMPLED GRAB WATER USE MULTIPLE USE

SAMPLING SITE UPPER WEST SPRING=STAUDENMEYER RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	67.	3.343	BICARBONATE (HCO3)	249.	4.081
MAGNESIUM (MG)	24.	1.974	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	27.9	1.214	CHLORIDE (CL)	9.8	0.276
POTASSIUM (K)	7.2	0.184	SULFATE (SO4)	114.	2.373
IRON (FE)	.02	0.001	NITRATE (AS N)	.056	0.004
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.8	0.095
SILICA (SIO2)	20.8		O=PHOSPHATE (AS P)		

TOTAL CATIONS 6.717

TOTAL ANIONS 6.829

STANDARD DEVIATION OF ANION - CATION BALANCE 0.53 SIGMA

LABORATORY PH	7.52	TOTAL HARDNESS AS CaCO3	266.
FIELD TEMPERATURE	29. C	TOTAL ALKALINITY AS CaCO3	204.
CALCULATED DISSOLVED SOLIDS	395.2	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	521.6	RYZNAR STABILITY INDEX	7.1
LAB SPEC.COND.(MICROMHOS/CM)	617.2	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C)	15.	PH, FIELD (SU)	7.54
CNDUCTVY, FIELD MICROMHOS	649.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S)	.17	BROMIDE TOT, REC (MG/L=BR)	.1
IODIDE TOT, REC. (MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) *	0.060
BORON, DISS (MG/L AS B)	.20	LITHIUM, DISS (MG/L AS LI)	.05
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.53
ARSENIC, DISS (UG/L AS AS)	11.8	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE)	2.2	URANIUM DIS. (UG/L AS U)	1.9

REMARKS: CENT. VALLEY GEOTHERMAL LASL NO.309821

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES
 CA MG NA K CL SO4 HCO3 CO3 NO3
 49 29 18 2 4 35 60 0 0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0441

STATE MONTANA COUNTY BEAVERHEAD
 LATITUDE=LONGITUDE 444156N 1115241W SAMPLE LOCATION 13S 2W 17C8D
 TOPOGRAPHIC MAP LOWER RED ROCK LAKE SAMPLE SOURCE SPRING
 GEOLOGICAL SOURCE 112VLCC STATION CODE
 DRAINAGE BASIN 41*A BOTTLE NO. 930
 AGENCY + SAMPLER MBMG * JLS ALTITUDE OF SAMPLE POINT 6800. FT <50
 DATE SAMPLED 10-03-77 TOTAL DEPTH OF WATER
 TIME SAMPLED 1630 STAGE HEIGHT
 LAB + ANALYST MBMG * GAM DEPTH TO SAMPLING POINT .
 DATE ANALYZED 11-30-77 FLOW MEAS METHOD
 SAMPLE HANDLING 6220 WATER FLOW RATE 50. GPM(E)
 METHOD SAMPLED GRAB WATER USE MULTIPLE USE

SAMPLING SITE LOWER WEST SPRINGS=STAUDENMEYER RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	68.	3.393	BICARBONATE (HCO3)	251.	4.114
MAGNESIUM (MG)	24.	1.974	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	29.	1.261	CHLORIDE (CL)	9.35	0.264
POTASSIUM (K)	7.7	0.197	SULFATE (SO4)	116.	2.415
IRON (FE)	<.01	0.000	NITRATE (AS N)	.050	0.004
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.8	0.095
SILICA (SiO2)	21.4		O-PHOSPHATE (AS P)		
TOTAL CATIONS		6.826	TOTAL ANIONS		6.891

STANDARD DEVIATION OF ANION - CATION BALANCE 0.32 SIGMA

LABORATORY PH	7.44	TOTAL HARDNESS AS CaCO3	269.
FIELD TEMPERATURE	31. C	TOTAL ALKALINITY AS CaCO3	206.
CALCULATED DISSOLVED SOLIDS	401.0	SODIUM ADSORPTION RATIO	0.8
SUM OF DISS. CONSTITUENTS	528.3	RYZNAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	625.5	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C)	11.	PH, FIELD (SU)	7.44
CNDUCTVY, FIELD MICROMHOS	645.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S) <	.10	BROMIDE TOT. REC (MG/L=BR)	.1
IODIDE TOT. REC. (MB/L=I) <	.01	ALUMINUM, DISS (MG/L=AL) M	0.067
BORON, DISS (MG/L AS B)	.23	LITHIUM, DISS (MG/L AS LI)	.05
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.55
ARSENIC, DISS (UG/L AS AS)	15.4	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE) <	2.0	URANIUM DIS. (UG/L AS U)	2.7

REMARKS: CENT VALLEY GEOTHERMAL HIGH FREQUENCY OF GAS DISCHARGE
 LASL NO. 309822

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
49	28	18	2	3	35	60	0	C

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0442

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444137N 1115146W	SAMPLE LOCATION	13S 2W 20AAA
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	111ALVF	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	935
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6720. FT <50
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1200	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	62.6 FT (R)
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	6220	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE JIMMY ANDERSON S STOCK WELL, N. OF HOUSE
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	72.5	3.618	BICARBONATE (HCO3)	237.	3.884
MAGNESIUM (MG)	11.5	0.946	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	22.7	0.987	CHLORIDE (CL)	12.25	0.345
POTASSIUM (K)	5.0	0.128	SULFATE (SO4)	69.	1.437
IRON (FE)	<.01	0.000	NITRATE (AS N)	.813	0.058
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	36.4		O-PHOSPHATE (AS P)		

TOTAL CATIONS 5.679

TOTAL ANIONS 5.735

STANDARD DEVIATION OF ANION - CATION BALANCE 0.29 SIGMA

LABORATORY PH	7.80	TOTAL HARDNESS AS CaCO3	228.
FIELD TEMPERATURE	7.4 C	TOTAL ALKALINITY AS CaCO3	194.
CALCULATED DISSOLVED SOLIDS	347.1	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	467.4	RYZNAR STABILITY INDEX	6.8
LAB SPEC. COND. (MICROMHOS/CM)	523.2	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS

PH, FIELD (SU)	8.16	TEMPERATURE, AIR (C)	3.
CNDUCTVY, FIELD MICROMHOS	528.	AMMONIA, TOTAL (MG/L AS N) <	.03
H2S, LAB (MG/L AS H2S) <	.10	BROMIDE TOT. REC (MG/L=BR)	.1
IODIDE TOT. REC. (MB/L-I) <	.01	ALUMINUM, DISS (MG/L=AL) #	05 .043
BORON, DISS (MG/L AS B)	.05	LITHIUM, DISS (MG/L AS LI)	.01
ANTIMONY, DIS (MG/L AS SB) <	.2	STRONTIUM, DISS (MG/L=SR)	.24
ARSENIC, DISS (UG/L AS AS) <	2.0	MERCURY, DISS (UG/L AS HG) <	.3
SELENIUM, DISS (UG/L=SE)	2.0	URANIUM DIS. (UG/L AS U)	3.9

REMARKS: CENT. VALLEY GEOTHERMAL WELL N. OF RD. LASL NO. 809823

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES
 CA MG NA K CL SO4 HCO3 CO3 NO3
 63 16 17 2 6 25 68 0 1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0447

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	443942N 1113602W	SAMPLE LOCATION	135 1E 33AAC
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	820-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7225. FT <50
DATE SAMPLED	10-02-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1100	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	6220	WATER FLOW RATE	3. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE LIMESTONE CREEK 0.5 MI NE ELK MTN
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	23.6	1.178	BICARBONATE (HCO3)	126.	2.065
MAGNESIUM (MG)	11.	0.905	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.4	0.104	CHLORIDE (CL)	3.0	0.085
POTASSIUM (K)	1.4	0.036	SULFATE (SO4)	6.0	0.125
IRON (FE)	<.01	0.000	NITRATE (AS N)	.373	0.027
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	17.5		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.223	TOTAL ANIONS		2.306

STANDARD DEVIATION OF ANION - CATION BALANCE 0.59 SIGMA

LABORATORY PH	7.71	TOTAL HARDNESS AS CaCO3	104.
FIELD TEMPERATURE	4.1 C	TOTAL ALKALINITY AS CaCO3	103.
CALCULATED DISSOLVED SOLIDS	127.5	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	191.4	RYZMAR STABILITY INDEX	8.4
LAB SPEC. COND. (MICROMHOS/CM)	208.7	LANGLIER SATURATION INDEX	-0.4

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	185.4	TEMPERATURE, AIR (C)	9.75
AMMONIA, TOTAL (MG/L AS N) <	.03	H2S, LAB (MG/L AS H2S)	.17
BROMIDE TOT. REC (MG/L=BR) <	.1	IODIDE TOT. REC. (MG/L=I) <	.01
ALUMINUM, DISS (MG/L=AL) <	.05	BORON, DISS (MG/L AS B)	.01
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L=SR)	.04	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L=SE) <	2.0
URANIUM DIS. (UG/L AS U)	.7		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SNOW ON GROUND*
 SPRING FLOW THE SAME AS JULY 77*SPEC. LASL NO.309810

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
52	40	4	1	3	5	90	0	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0465

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445818N 1113824W	SAMPLE LOCATION	10S 1E 7DD
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110TRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	914
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5740. FT <10
DATE SAMPLED	09-30-77	TOTAL DEPTH OF WELL	41 FT
TIME SAMPLED	1545	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	17.9 FT (M)
DATE ANALYZED	12-07-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SUN RANCH LOADING CORRAL WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	38.	1.896	BICARBONATE (HCO3)	133.	2.180
MAGNESIUM (MG)	7.9	0.650	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	12.8	0.557	CHLORIDE (CL)	15.90	0.448
POTASSIUM (K)	1.5	0.038	SULFATE (SO4)	23.1	0.481
IRON (FE)	.02	0.001	NITRATE (AS N)	.700	0.050
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SI02)	21.6		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.142	TOTAL ANIONS		3.175

STANDARD DEVIATION OF ANION - CATION BALANCE 0.21 SIGMA

LABORATORY PH	7.40	TOTAL HARDNESS AS CaCO3	127.
FIELD TEMPERATURE	10.9 C	TOTAL ALKALINITY AS CaCO3	109.
CALCULATED DISSOLVED SOLIDS	187.3	SODIUM ADSORPTION RATIO	0.5
SUM OF DISS. CONSTITUENTS	254.8	RYZMAR STABILITY INDEX	8.3
LAB SPEC. COND. (MICROMHOS/CM)	305.0	LANGLIER SATURATION INDEX	-0.4

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 257. ALUMINUM, DISS (MG/L=AL) < .05

REMARKS: CENT VALLEY GEOTHERMAL SAMPLE TAKEN AT 1ST STOCK TANK, SMALL PRES. TANK IN LINE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153) PERCENTAGE REACTANCE VALUES
 FUND: / CA MG NA K CL SO4 HCO3 CO3 NO3
 60 20 17 1 14 15 70 0 1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0426

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	443555N 1113753W	SAMPLE LOCATION	14S 1E 20CAB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	832-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7040. FT <50
DATE SAMPLED	10-06-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1600	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	6220	WATER FLOW RATE	2.0 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC AND STOC

SAMPLING SITE SPRING ABOVE G.WALSH RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	10.3	0.514	BICARBONATE (HCO3)	46.	0.754
MAGNESIUM (MG)	2.6	0.214	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.7	0.117	CHLORIDE (CL)	2.75	0.078
POTASSIUM (K)	.8	0.020	SULFATE (SO4)	3.8	0.079
IRON (FE)	.16	0.009	NITRATE (AS N)	.079	0.006
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	16.3		0-PHOSPHATE (AS P)		

 TOTAL CATIONS 0.875 TOTAL ANIONS 0.916

STANDARD DEVIATION OF ANION - CATION BALANCE 0.36 SIGMA

LABORATORY PH	7.31	TOTAL HARDNESS AS CaCO3	36.
FIELD TEMPERATURE	14. C	TOTAL ALKALINITY AS CaCO3	38.
CALCULATED DISSOLVED SOLIDS	62.3	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	85.6	RYZMAR STABILITY INDEX	10.4
LAB SPEC. COND. (MICROMHOS/CM)	82.3	LANGLIER SATURATION INDEX	-1.6

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	77.9	TEMPERATURE, AIR (C)	17.0
AMMONIA, TOTAL (MG/L AS N) <	.03	H2S, LAB (MG/L AS H2S)	.25
BROMIDE TOT. REC (MG/L-BR) <	.1	IODIDE TOT. REC. (MG/L-I) <	.01
ALUMINUM, DISS (MG/L-AL)	.12	BORON, DISS (MG/L AS B)	.02
LITHIUM, DISS (MG/L AS LI) <	.01	ANTIMONY, DIS (MG/L AS SB) <	.2
STRONTIUM, DISS (MG/L-SR)	.03	ARSENIC, DISS (UG/L AS AS) <	2.0
MERCURY, DISS (UG/L AS HG) <	.3	SELENIUM, DISS (UG/L-SE) <	2.0
URANIUM DIS. (UG/L AS U) <	.2		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *SPEC. SAMPLE
 LASL 309811

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
59	24	13	2	8	8	82	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0477

APPENDIX
CHEMICAL ANALYSES

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	445130N 1113230W	SAMPLE LOCATION	11S 1E 1308B
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	90
AGENCY + SAMPLER	MSU * G W	ALTITUDE OF SAMPLE POINT	6240. FT <10
DATE SAMPLED	09-09-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1400	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE CURLEW CREEK SCHUSTERS PLACE
DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	16.5	0.823	BICARBONATE (HCO3)	79.	1.295
MAGNESIUM (MG)	3.5	0.288	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	5.3	0.231	CHLORIDE (CL)	1.55	0.044
POTASSIUM (K)	1.7	0.044	SULFATE (SO4)	2.8	0.058
IRON (FE)	.28	0.015	NITRATE (AS N)	.059	0.004
MANGANESE (MN)	.12	0.004	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SIO2)	19.0		O-PHOSPHATE (AS P)		

TOTAL CATIONS 1.405

TOTAL ANIONS 1.417

STANDARD DEVIATION OF ANION - CATION BALANCE 0.10 SIGMA

LABORATORY PH	7.68	TOTAL HARDNESS AS CaCO3	56.
FIELD TEMPERATURE	16. C	TOTAL ALKALINITY AS CaCO3	65.
CALCULATED DISSOLVED SOLIDS	90.0	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	130.1	RYZMAR STABILITY INDEX	9.2
LAB SPEC. COND. (MICROMHOS/CM)	131.0	LANGLIER SATURATION INDEX	-0.7

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: GEOTHERMAL

GEOLOGIC SOURCE=ALLUVIUM

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
59	20	16	3	3	4	92	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0289

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445222N 1113242W	SAMPLE LOCATION	11S 1E 1300C
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	*1*F	BOTTLE NO.	91
AGENCY * SAMPLER	MSU * G W	ALTITUDE OF SAMPLE POINT	6220. FT <
DATE SAMPLED	09-09-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1600	STAGE HEIGHT	
LAB + ANALYST	MRMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNUSED
SAMPLING SITE		CURLEW CREEK WARM SPRING	
DRAINAGE BASIN		MADISON RIVER	

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	12.5	0.624	BICARBONATE (HCO3)	88.5	1.450
MAGNESIUM (MG)	1.3	0.107	CARBONATE (CO3)	.6	0.020
SODIUM (NA)	33.	1.435	CHLORIDE (CL)	4.05	0.114
POTASSIUM (K)	1.2	0.031	SULFATE (SO4)	12.3	0.256
IRON (FE)	1.11	0.060	NITRATE (AS N)	.377	0.027
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	6.4	0.337
SILICA (SIO2)	19.7		O=PHOSPHATE (AS P)		
TOTAL CATIONS		2.257	TOTAL ANIONS		2.204

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.38 SIGMA

LABORATORY PH	8.35	TOTAL HARDNESS AS CaCO3	37.
FIELD TEMPERATURE	23. C	TOTAL ALKALINITY AS CaCO3	74.
CALCULATED DISSOLVED SOLIDS	136.1	SODIUM ADSORPTION RATIO	2.4
SUM OF DISS. CONSTITUENTS	181.0	RYZMAR STABILITY INDEX	8.6
LAB SPEC. COND. (MICROMHOS/CM)	216.6	LANGLIER SATURATION INDEX	-0.1

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L=AL) ~~2.105~~
 0.047

REMARKS: GEOTHERMAL GEOLOGIC SOURCE UPPER UNIT RHYOLITE
 WARM SPRING IN CENTER OF MARSH

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
28	4	65	1	6	13	78	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0290

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445907N 1113656W	SAMPLE LOCATION	10S 1E 4CCC
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	92
AGENCY + SAMPLER	MSU * G W	ALTITUDE OF SAMPLE POINT	6085. FT <10
DATE SAMPLED	09-13-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1000	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNUSED

SAMPLING SITE WOLF CREEK WARM SPRING
DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	14.7	0.734	BICARBONATE (HCO3)	136.	2.229
MAGNESIUM (MG)	2.0	0.165	CARBONATE (CO3)	3.8	0.127
SODIUM (NA)	58.	2.523	CHLORIDE (CL)	10.10	0.285
POTASSIUM (K)	1.4	0.036	SULFATE (SO4)	26.2	0.545
IRON (FE)	.18	0.010	NITRATE (AS N)	.221	0.016
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	7.2	0.379
SILICA (SIO2)	33.8		O-PHOSPHATE (AS P)		
TOTAL CATIONS		3.467	TOTAL ANIONS		3.580

STANDARD DEVIATION OF ANION - CATION BALANCE 0.70 SIGMA

LABORATORY PH	8.49	TOTAL HARDNESS AS CaCO3	45.
FIELD TEMPERATURE	31. C	TOTAL ALKALINITY AS CaCO3	118.
CALCULATED DISSOLVED SOLIDS	224.6	SODIUM ADSORPTION RATIO	3.8
SUM OF DISS. CONSTITUENTS	293.6	RYZMAR STABILITY INDEX	7.9
LAB SPEC. COND. (MICROMHOS/CM)	342.8	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L-AL) ~~<.05~~
0.051

REMARKS: GEOTHERMAL SPRING DITCHED 10M. POND DRAINED
GEOL GLAC OUTWASH

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVLENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
21	4	72	1	8	17	69	3	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0291

STATE MONTANA COUNTY MADISON
 LATITUDE=LONGITUDE 445901N 1113656W SAMPLE LOCATION 10S 1E 9BBB
 TOPOGRAPHIC MAP CLIFF LAKE SAMPLE SOURCE SPRING
 GEOLOGICAL SOURCE STATION CODE
 DRAINAGE BASIN 41*F BOTTLE NO. 93
 AGENCY + SAMPLER MSU * G W ALTITUDE OF SAMPLE POINT 6080. FT <10
 DATE SAMPLED 09-13-77 TOTAL DEPTH OF WATER
 TIME SAMPLED 1100 STAGE HEIGHT
 LAB + ANALYST MBMG * GAM DEPTH TO SAMPLING POINT
 DATE ANALYZED 11-30-77 FLOW MEAS METHOD
 SAMPLE HANDLING 3120 WATER FLOW RATE
 METHOD SAMPLED GRAB WATER USE UNUSED

SAMPLING SITE WOLF CREEK HOT SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	8.9	0.444	BICARBONATE (HCO3)	158.	2.589
MAGNESIUM (MG)	1.7	0.140	CARBONATE (CO3)	6.0	0.200
SODIUM (NA)	96.	4.176	CHLORIDE (CL)	19.3	0.544
POTASSIUM (K)	1.8	0.046	SULFATE (SO4)	43.9	0.914
IRON (FE)	.07	0.004	NITRATE (AS N)	.059	0.004
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	13.2	0.694
SILICA (SIO2)	49.4		O-PHOSPHATE (AS P)		
TOTAL CATIONS		4.810	TOTAL ANIONS		4.946

STANDARD DEVIATION OF ANION - CATION BALANCE 0.75 SIGMA

LABORATORY PH	8.50	TOTAL HARDNESS AS CaCO3	29.
FIELD TEMPERATURE	56. C	TOTAL ALKALINITY AS CaCO3	140.
CALCULATED DISSOLVED SOLIDS	318.2	SODIUM ADSORPTION RATIO	7.7
SUM OF DISS. CONSTITUENTS	398.3	RYZMAR STABILITY INDEX	8.2
LAB SPEC. COND. (MICROMHOS/CM)	474.0	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L-AL) < .05
0.043

REMARKS: GEOTHERMAL SPRING DITCHED 5 M. NW FROM PREVIOUS LOCATION, GEOL GLAC OUTWASH

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
9	2	86	0	12	21	60	4	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0292

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445834N 1113905W	SAMPLE LOCATION	10S 1E 7CAB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	94
AGENCY + SAMPLER	MSU * G W	ALTITUDE OF SAMPLE POINT	5800. FT <10
DATE SAMPLED	09-13-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1300	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNUSED

SAMPLING SITE WALL CANYON WARM SPRING
DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	6.6	0.329	BICARBONATE (HCO3)	493.	8.080
MAGNESIUM (MG)	1.7	0.140	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	260.	11.310	CHLORIDE (CL)	49.2	1.387
POTASSIUM (K)	6.	0.154	SULFATE (SO4)	80.8	1.682
IRON (FE)	.08	0.004	NITRATE (AS N)	.052	0.004
MANGANESE (MN)	.02	0.001	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	14.4	0.757
SILICA (SI02)	41.7		O=PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		11.938	TOTAL ANIONS		11.911

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.08 SIGMA

LABORATORY PH	8.06	TOTAL HARDNESS AS CAC03	23.
FIELD TEMPERATURE	24. C	TOTAL ALKALINITY AS CAC03	404.
CALCULATED DISSOLVED SOLIDS	703.4	SODIUM ADSORPTION RATIO	23.4
SUM OF DISS. CONSTITUENTS	953.6	RYZMAR STABILITY INDEX	8.0
LAB SPEC. COND. (MICROMHOS/CM)	1097.0	LANGLIER SATURATION INDEX	0.0

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L=AL) ← ~~.05~~
0.036

REMARKS: GEOTHERMAL MARSH, FROM UNDER RHYOLITE CLIFF

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM:	GWANAL (FORM 153)	PERCENTAGE REACTANCE VALUES								
FUND:	/	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
		2	1	94	1	12	15	72	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0293

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	445834N 1113905W	SAMPLE LOCATION	10S 1E 7CAB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	95
AGENCY + SAMPLER	MSU * G W	ALTITUDE OF SAMPLE POINT	5800. FT <50
DATE SAMPLED	09-13-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1400	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNUSED
SAMPLING SITE	WALL CREEK		
DRAINAGE BASIN	MADISON RIVER		

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	33.4	1.667	BICARBONATE (HCO3)	149.	2.442
MAGNESIUM (MG)	8.	0.658	CARBONATE (CO3)	1.8	0.060
SODIUM (NA)	8.2	0.357	CHLORIDE (CL)	2.3	0.065
POTASSIUM (K)	2.1	0.054	SULFATE (SO4)	4.6	0.096
IRON (FE)	.22	0.012	NITRATE (AS N)	.221	0.016
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SiO2)	25.7		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.747	TOTAL ANIONS		2.694

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.36 SIGMA

LABORATORY PH	8.37	TOTAL HARDNESS AS CaCO3	116.
FIELD TEMPERATURE	15. C	TOTAL ALKALINITY AS CaCO3	125.
CALCULATED DISSOLVED SOLIDS	160.2	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	235.9	RYZMAR STABILITY INDEX	7.3
LAB SPEC. COND. (MICROMHOS/CM)	246.9	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L-AL) ← .05
 0.040

REMARKS: GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
60	24	13	1	2	3	91	2	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0294

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444714N 1113846W	SAMPLE LOCATION	12S 1E 18DBB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	96
AGENCY + SAMPLER	MSU * G W	ALTITUDE OF SAMPLE POINT	6680. FT <1
DATE SAMPLED	09-13-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1600	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNUSED

SAMPLING SITE WEST FORK OF THE MADISON WARM SPRING
DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	18.6	0.928	BICARBONATE (HCO3)	177.	2.901
MAGNESIUM (MG)	28.8	2.369	CARBONATE (CO3)	12.	0.400
SODIUM (NA)	4.9	0.213	CHLORIDE (CL)	1.9	0.054
POTASSIUM (K)	1.9	0.049	SULFATE (SO4)	11.2	0.233
IRON (FE)	.02	0.001	NITRATE (AS N)	.226	0.016
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SIO2)	13.5		O-PHOSPHATE (AS P)		

TOTAL CATIONS 3.560 TOTAL ANIONS 3.625

STANDARD DEVIATION OF ANION - CATION BALANCE 0.40 SIGMA

LABORATORY PH	8.71	TOTAL HARDNESS AS CaCO3	165.
FIELD TEMPERATURE	29. C	TOTAL ALKALINITY AS CaCO3	165.
CALCULATED DISSOLVED SOLIDS	180.6	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	270.5	RYZMAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	307.7	LANGLIER SATURATION INDEX	0.7

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L-AL) ~~0.05~~
0.033

REMARKS: GEOTHERMAL GEOL- ALLUVIUM SLUMP BLOCK
HIGH VOL SPRING 10M IN DIAMETER

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
26	66	5	1	1	6	80	11	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0295

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	443737N 1113155W	SAMPLE LOCATION	14S 2E 7CBAD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	805-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7420. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1640	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	FLOAT AND STOPWA1
SAMPLE HANDLING	3120	WATER FLOW RATE	1.0 CFS(M)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 2 MI N OF RED ROCK PASS
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	30.4	1.517	BICARBONATE (HCO3)	186.	3.048
MAGNESIUM (MG)	18.2	1.497	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.	0.087	CHLORIDE (CL)	2.05	0.058
POTASSIUM (K)	1.8	0.046	SULFATE (SO4)	2.5	0.052
IRON (FE)	.04	0.002	NITRATE (AS N)	.210	0.015
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	11.1		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.149	TOTAL ANIONS		3.173

STANDARD DEVIATION OF ANION - CATION BALANCE 0.15 SIGMA

LABORATORY PH	7.86	TOTAL HARDNESS AS CaCO3	151.
FIELD TEMPERATURE	7.0 C	TOTAL ALKALINITY AS CaCO3	153.
CALCULATED DISSOLVED SOLIDS	160.0	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	254.4	RYZMAR STABILITY INDEX	7.7
LAB SPEC. COND. (MICROMHOS/CM)	284.4	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS

CONDUCTVY, FIELD MICROMHOS 252.1 TEMPERATURE, AIR (C) 15.
 ALUMINUM, DISS (MG/L=AL) .07

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
48	47	2	1	1	1	96	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0387

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443811N 1113207W	SAMPLE LOCATION	14S 2E 6CCCB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	804-CM
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7360. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1545	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	FLOAT AND STOPWA
SAMPLE HANDLING	3120	WATER FLOW RATE	0.15 CFS(M)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 1 MI S OF LONE TREE PASS
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	23.9	1.193	BICARBONATE (HCO3)	126.	2.065
MAGNESIUM (MG)	10.	0.823	CARBONATE (CO3)	0	0.000
SODIUM (NA)	2.4	0.104	CHLORIDE (CL)	1.90	0.054
POTASSIUM (K)	1.3	0.033	SULFATE (SO4)	1.5	0.031
IRON (FE)	.02	0.001	NITRATE (AS N)	.490	0.035
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	15.2		O-PHOSPHATE (AS P)		

TOTAL CATIONS 2.154 TOTAL ANIONS 2.185

STANDARD DEVIATION OF ANION - CATION BALANCE 0.22 SIGMA

LABORATORY PH	7.57	TOTAL HARDNESS AS CaCO3	101.
FIELD TEMPERATURE	6.9 C	TOTAL ALKALINITY AS CaCO3	103.
CALCULATED DISSOLVED SOLIDS	118.9	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	182.8	RYZMAR STABILITY INDEX	8.5
LAB SPEC. COND. (MICROMHOS/CM)	204.3	LANGLIER SATURATION INDEX	-0.5

ADDITIONAL PARAMETERS

CONDUCTVY, FIELD MICROMHOS 412.1 TEMPERATURE, AIR (C) 17.5
 ALUMINUM, DISS (MG/L=AL) .07

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SPNG ON W FLANK OF HENRY S LAKE MTNS.

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)	PERCENTAGE REACTANCE VALUES								
FUND: CG75/	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
	55	38	4	1	2	1	96	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0388

BOTTLE MONTANA 02702 1100722 0000

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443824N 1113158W	SAMPLE LOCATION	14S 2E 6CBD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	803-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7480. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1500	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	0.20 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 0.5 MI SE OF LONE TREE PASS
DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	23.	1.148	BICARBONATE (HCO3)	120.	1.967
MAGNESIUM (MG)	9.7	0.798	CARBONATE (CO3)	0	0.000
SODIUM (NA)	2.3	0.100	CHLORIDE (CL)	2.45	0.069
POTASSIUM (K)	1.3	0.033	SULFATE (SO4)	3.0	0.062
IRON (FE)	.02	0.001	NITRATE (AS N)	221	0.016
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	13.9		O=PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.080	TOTAL ANIONS		2.114

STANDARD DEVIATION OF ANION - CATION BALANCE 0.24 SIGMA

LABORATORY PH	7.54	TOTAL HARDNESS AS CaCO3	97.
FIELD TEMPERATURE	15.0 C	TOTAL ALKALINITY AS CaCO3	98.
CALCULATED DISSOLVED SOLIDS	115.1	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	176.0	RYZNAR STABILITY INDEX	8.7
LAB SPEC. COND. (MICROMHOS/CM)	195.0	LANGLIER SATURATION INDEX	-0.6

ADDITIONAL PARAMETERS
CONDUCTVY, FIELD MICROMHOS 172.1
ALUMINUM, DISS (MG/L=AL) .06
TEMPERATURE, AIR (C) 20.5

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*MAIN SPNG DRY *
SMALL SPNG 100YDS DOWN SLOPE*DUG PIT TO SAMPLE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL(FORM 153)
FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
55	38	4	1	3	2	93	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0387

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE		SAMPLE LOCATION	13S 2E 31CADD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MMP	STATION CODE	
DRAINAGE BASIN	41*C	BOTTLE NO.	802-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7640. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1348	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	BUCKET AND STOPWA
SAMPLE HANDLING	3120	WATER FLOW RATE	0.65 GPM(M)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 1 MI SE OF SADDLE MT=ON US FOREST LAND
DRAINAGE BASIN RUBY RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	3.9	0.195	BICARBONATE (HCO3)	13.7	0.225
MAGNESIUM (MG)	1.2	0.099	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	1.5	0.065	CHLORIDE (CL)	1.2	0.034
POTASSIUM (K)	.3	0.008	SULFATE (SO4)	.5	0.010
IRON (FE)	.21	0.011	NITRATE (AS N)	.768	0.055
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	11.3		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		0.378	TOTAL ANIONS		0.324

STANDARD DEVIATION OF ANION - CATION BALANCE =0.48 SIGMA

LABORATORY PH	6.23	TOTAL HARDNESS AS CaCO3	15.
FIELD TEMPERATURE	9.0 C	TOTAL ALKALINITY AS CaCO3	11.
CALCULATED DISSOLVED SOLIDS	27.7	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	34.7	RYZMAR STABILITY INDEX	13.5
LAB SPEC. COND. (MICROMHOS/CM)	36.4	LANGLIER SATURATION INDEX	-3.6

ADDITIONAL PARAMETERS
CONDUCTVY, FIELD MICROMHOS 36.2 TEMPERATURE, AIR (C) 11.0
ALUMINUM, DISS (MG/L=AL) .25

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SPNG DEVEL SAMPLE
TAKEN AT STOCK TANK=HOSE FILLING TANK

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153) PERCENTAGE REACTANCE VALUES
FUND: CG75/ CA MG NA K CL SO4 HCO3 CO3 NO3
53 26 17 2 12 3 83 0 20

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0390

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	444035N 1113559W	SAMPLE LOCATION	13S 1E 28AACD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MMPG	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	801=CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7320. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED		STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	BUCKET AND STOPW
SAMPLE HANDLING	3120	WATER FLOW RATE	0.63 GPM(M)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SPRING NW OF DEER MT ON US FOREST LAND
DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	35.4	1.766	BICARBONATE (HCO3)	169.	2.770
MAGNESIUM (MG)	12.	0.987	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.5	0.109	CHLORIDE (CL)	1.95	0.055
POTASSIUM (K)	.4	0.010	SULFATE (SO4)	3.5	0.073
IRON (FE)	.09	0.005	NITRATE (AS N)	.312	0.022
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	15.0		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.877	TOTAL ANIONS		2.920

STANDARD DEVIATION OF ANION - CATION BALANCE 0.28 SIGMA

LABORATORY PH	7.63	TOTAL HARDNESS AS CaCO3	138.
FIELD TEMPERATURE	6.3 C	TOTAL ALKALINITY AS CaCO3	139.
CALCULATED DISSOLVED SOLIDS	154.5	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	240.3	RYZNAR STABILITY INDEX	7.9
LAB SPEC. COND. (MICROMHOS/CM)	262.8	LANGLIER SATURATION INDEX	-0.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 246. TEMPERATURE, AIR (C) 13.
ALUMINUM, DISS (MG/L=AL) < .05

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SPNG DEVEL. SAMPL
ETAKEN FROM HOSE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
61	34	3	0	1	2	95	0	0	C

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0391

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	445137N 1113242W	SAMPLE LOCATION	11S 1E 24DBB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110TRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	911
AGENCY + SAMPLER	MBMG * JCS	ALTITUDE OF SAMPLE POINT	6000. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1740	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	1. CFS(E)
METHOD SAMPLED	GRAB	WATER USE	UNUSED

SAMPLING SITE MADISON RIVER LODGE-SPRING AT HIGHWAY
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	12.8	0.639	BICARBONATE (HCO3)	54.2	0.888
MAGNESIUM (MG)	2.4	0.197	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.2	0.139	CHLORIDE (CL)	.85	0.024
POTASSIUM (K)	1.0	0.026	SULFATE (SO4)	2.5	0.052
IRON (FE)	.01	0.001	NITRATE (AS N)	.208	0.015
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.6	0.032
SILICA (SI02)	15.8		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		1.001	TOTAL ANIONS		1.011

STANDARD DEVIATION OF ANION - CATION BALANCE 0.07 SIGMA

LABORATORY PH	7.22	TOTAL HARDNESS AS CaCO3	42.
FIELD TEMPERATURE	8.2 C	TOTAL ALKALINITY AS CaCO3	44.
CALCULATED DISSOLVED SOLIDS	66.1	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	93.6	RYZMAR STABILITY INDEX	10.2
LAB SPEC. COND. (MICROMHOS/CM)	99.2	LANGLIER SATURATION INDEX	-1.5

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 96. ALUMINUM, DISS (MG/L-AL) ← .05
 0.025

REMARKS: CENT. VALLEY GEOTHERMAL SPRING GOES THRU CULVERT UNDER RD.
 LOCAT. BETWEEN THE 2 DRIVEWAYS

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
63	19	13	2	2	5	92	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0392

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445410N 1113522W	SAMPLE LOCATION	11S 1E 3CA
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110TRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	910
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5870. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WELL	99 FT
TIME SAMPLED	1640	DEPTH WATER ENTERS WELL	96 FT
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	12. FT (R)
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	
METHOD SAMPLED	GRAB	WATER USE	PUBLIC SUPPLY

SAMPLING SITE HIGHWAY REST AREA*1 MILE S. OF N. FORK
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	51.4	2.565	BICARBONATE (HCO3)	251.	4.114
MAGNESIUM (MG)	6.8	0.559	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	28.	1.218	CHLORIDE (CL)	6.95	0.196
POTASSIUM (K)	7.1	0.182	SULFATE (SO4)	6.6	0.137
IRON (FE)	.02	0.001	NITRATE (AS N)	.249	0.018
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.6	0.084
SILICA (SIO2)	43.2		O=PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		4.525	TOTAL ANIONS		4.549

STANDARD DEVIATION OF ANION - CATION BALANCE 0.14 SIGMA

LABORATORY PH	7.28	TOTAL HARDNESS AS CaCO3	156.
FIELD TEMPERATURE	11.3 C	TOTAL ALKALINITY AS CaCO3	206.
CALCULATED DISSOLVED SOLIDS	275.6	SODIUM ADSORPTION RATIO	1.0
SUM OF DISS. CONSTITUENTS	402.9	RYZMAR STABILITY INDEX	7.6
LAB SPEC. COND. (MICROMHOS/CM)	416.2	LANGLIER SATURATION INDEX	-0.1

ADDITIONAL PARAMETERS
 CNDUCTVY, FIELD MICROMHOS 417. ALUMINUM, DISS (MG/L-AL) .050

REMARKS: CENT. VALLEY GEOTHERMAL PRESSURE TANK

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
56	12	26	4	4	3	92	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0393

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	445110N 1113441W	SAMPLE LOCATION	11S 1E 27AAA
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	909
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6050. FT <100
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1545	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	11-30-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE WEST FORK ABOVE SOAP AND LAKE CREEKS
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	36.	1.796	BICARBONATE (HCO3)	149.	2.442
MAGNESIUM (MG)	8.	0.658	CARBONATE (CO3)	2.4	0.080
SODIUM (NA)	5.1	0.222	CHLORIDE (CL)	2.25	0.063
POTASSIUM (K)	2.2	0.056	SULFATE (SO4)	7.6	0.158
IRON (FE)	.03	0.002	NITRATE (AS N)	.023	0.002
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SI02)	22.0		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.734	TOTAL ANIONS		2.756

STANDARD DEVIATION OF ANION - CATION BALANCE 0.15 SIGMA

LABORATORY PH	8.42	TOTAL HARDNESS AS CaCO3	123.
FIELD TEMPERATURE	8.0 C	TOTAL ALKALINITY AS CaCO3	126.
CALCULATED DISSOLVED SOLIDS	159.2	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	234.8	RYZMAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	249.0	LANGLIER SATURATION INDEX	0.6

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 253.
 ALUMINUM, DISS (MG/L=AL) ~~0.05~~
 0.034
 TEMPERATURE, AIR (C) 14.

REMARKS: CENT. VALLEY GEOTHERMAL SAMPLED 20 FT ABOVE RD CROSSING WES
 TFORK AT CAMPING PULLOFF

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
65	24	8	2	2	5	89	2	(

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0394

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	444605N 1113860W	SAMPLE LOCATION	12S 1E 19CD
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	111CLVM	STATION CODE	SLOAN CAMP
DRAINAGE BASIN	41*F	BOTTLE NO.	907
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6540. FT <50
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1130	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-07-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE SLOAN COW CAMP COLD SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	38.8	1.936	BICARBONATE (HCO3)	144.	2.360
MAGNESIUM (MG)	1.6	0.132	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	7.6	0.331	CHLORIDE (CL)	5.80	0.164
POTASSIUM (K)	6.8	0.174	SULFATE (SO4)	5.1	0.106
IRON (FE)	<.01	0.000	NITRATE (AS N)	.411	0.029
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	67.2		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.572	TOTAL ANIONS		2.670

STANDARD DEVIATION OF ANION - CATION BALANCE 0.66 SIGMA

LABORATORY PH	7.79	TOTAL HARDNESS AS CaCO3	103.
FIELD TEMPERATURE	7.4 C	TOTAL ALKALINITY AS CaCO3	118.
CALCULATED DISSOLVED SOLIDS	204.5	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	277.5	RYZMAR STABILITY INDEX	7.8
LAB SPEC. COND. (MICROMHOS/CM)	254.2	LANGLIER SATURATION INDEX	0.0

ADDITIONAL PARAMETERS			
PH, FIELD (SU)	8.6	CONDUCTIVITY, FIELD MICROMHOS	254.
TEMPERATURE, AIR (C)	12.	ALUMINUM, DISS (MG/L=AL)	.05

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
75	5	12	6	6	4	89	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0396

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443537N 1114351W	SAMPLE LOCATION	14S 1W 21CDD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	111ALVP	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	904
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6620. FT <50
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1820	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-07-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	4. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE U.S. FISH-WILDLIFE CAMPGROUND
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	46.2	2.305	BICARBONATE (HCO3)	231.	3.786
MAGNESIUM (MG)	16.5	1.357	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.8	0.209	CHLORIDE (CL)	1.20	0.034
POTASSIUM (K)	1.0	0.026	SULFATE (SO4)	4.9	0.102
IRON (FE)	.03	0.002	NITRATE (AS N)	.174	0.012
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SI02)	10.7		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.899	TOTAL ANIONS		3.945

STANDARD DEVIATION OF ANION - CATION BALANCE 0.28 SIGMA

LABORATORY PH	7.82	TOTAL HARDNESS AS CaCO3	183.
FIELD TEMPERATURE	7.5 C	TOTAL ALKALINITY AS CaCO3	189.
CALCULATED DISSOLVED SOLIDS	199.5	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	316.7	RYZMAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	351.8	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 353. ALUMINUM, DISS (MG/L=AL) .07

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO
59	34	5	0	0	2	96	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0399

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	443618N 1114909W	SAMPLE LOCATION	14S 2W 23BBC
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	111CLVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	903
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6780. FT <1
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1715	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	7.3 FT (
DATE ANALYZED	12-07-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE RUSH, KEITH*STOCK WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	82.5	4.117	BICARBONATE (HCO3)	345.	5.654
MAGNESIUM (MG)	13.4	1.102	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	12.	0.522	CHLORIDE (CL)	3.85	0.109
POTASSIUM (K)	5.8	0.148	SULFATE (SO4)	5.2	0.108
IRON (FE)	.17	0.009	NITRATE (AS N)	.097	0.007
MANGANESE (MN)	.02	0.001	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	44.1		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		5.899	TOTAL ANIONS		5.888

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.05 SIGMA

LABORATORY PH	7.23	TOTAL HARDNESS AS CaCO3	261.
FIELD TEMPERATURE	4.5 C	TOTAL ALKALINITY AS CaCO3	283.
CALCULATED DISSOLVED SOLIDS	337.3	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	512.3	RYZNAR STABILITY INDEX	6.9
LAB SPEC. COND. (MICROMHOS/CM)	530.7	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 517. ALUMINUM, DISS (MG/L-AL) ~~0.06~~ ~~0.06~~ .06

REMARKS: CENT. VALLEY GEOTHERMAL DISCHARG OUT PIPE 8 FT. FROM WELL
 DISC. EST. 15-20 6PM NO WELL DATA

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: /	PERCENTAGE REACTANCE VALUES								
	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO:
	69	18	8	2	1	1	96	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0400

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443621N 1114809W	SAMPLE LOCATION	14S 2W 23AA
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	111CLVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	902
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6720. FT <10
DATE SAMPLED	09-27-77	TOTAL DEPTH OF WELL	100 FT
TIME SAMPLED		DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-07-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE MONTGOMERY HOUSE WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	42.8	2.136	BICARBONATE (HCO3)	195.	3.196
MAGNESIUM (MG)	8.4	0.691	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	8.5	0.370	CHLORIDE (CL)	1.60	0.045
POTASSIUM (K)	3.5	0.090	SULFATE (SO4)	2.9	0.060
IRON (FE)			NITRATE (AS N)	.181	0.013
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	34.2		O-PHOSPHATE (AS P)		

 TOTAL CATIONS 3.286 TOTAL ANIONS 3.320

STANDARD DEVIATION OF ANION - CATION BALANCE 0.20 SIGMA

LABORATORY PH	7.84	TOTAL HARDNESS AS CaCO3	141.
FIELD TEMPERATURE	7.5 C	TOTAL ALKALINITY AS CaCO3	160.
CALCULATED DISSOLVED SOLIDS	198.3	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	297.2	RYZMAR STABILITY INDEX	7.4
LAB SPEC. COND. (MICROMHOS/CM)	301.4	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 300. ALUMINUM, DISS (MG/L=AL) < .05
 ARSENIC, DISS (MG/L = AS) < 0.0100

REMARKS: CENT. VALLEY GEOTHERMAL KITCH. TAP THRU PRESS. TANK

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)	PERCENTAGE REACTANCE VALUES								
FUND: /	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
	64	21	11	2	1	1	96	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0401

STATE	MONTANA	COUNTY	MADISON
LATITUDE-LONGITUDE	445841N 1113856W	SAMPLE LOCATION	10S 1E 7BDD
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110TRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	915
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5710. FT <50
DATE SAMPLED	09-30-77	TOTAL DEPTH OF WELL	33 FT
TIME SAMPLED	1715	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	10. FT (F)
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE WOLF CREEK RANCH WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	18.9	0.943	BICARBONATE (HCO3)	84.2	1.380
MAGNESIUM (MG)	3.8	0.313	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	7.0	0.304	CHLORIDE (CL)	2.00	0.056
POTASSIUM (K)	1.0	0.026	SULFATE (SO4)	7.2	0.150
IRON (FE)	.01	0.001	NITRATE (AS N)	.131	0.009
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SIO2)	10.7		O-PHOSPHATE (AS P)		

 TOTAL CATIONS 1.586 TOTAL ANIONS 1.617

STANDARD DEVIATION OF ANION - CATION BALANCE 0.22 SIGMA

LABORATORY PH	7.22	TOTAL HARDNESS AS CaCO3	63.
FIELD TEMPERATURE	6.0 C	TOTAL ALKALINITY AS CaCO3	69.
CALCULATED DISSOLVED SOLIDS	92.6	SODIUM ADSORPTION RATIO	0.4
SUM OF DISS. CONSTITUENTS	135.4	RYZMAR STABILITY INDEX	9.4
LAB SPEC. COND. (MICROMHOS/CM)	154.8	LANGLIER SATURATION INDEX	-1.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 142. ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL TAKEN AT KITCHEN TAP, PRES. TANK DIR
 -ECTLY ON PUMP

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO:
59	19	19	1	3	9	86	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0427

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445735N 1113714W	SAMPLE LOCATION	10S 1E 17DAC
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVF	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	916
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5840. FT <5
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WELL	75 FT
TIME SAMPLED	1130	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	15. FT (I
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	120	WATER FLOW RATE	.
METHOD SAMPLED	TIME COMPOSITE	WATER USE	DOMESTIC

SAMPLING SITE SUN RANCH-FOREMANS HOUSE TIM MERICASK
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	34.5	1.722	BICARBONATE (HCO3)	141.	2.311
MAGNESIUM (MG)	4.0	0.329	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	10.8	0.470	CHLORIDE (CL)	5.60	0.158
POTASSIUM (K)	4.2	0.108	SULFATE (SO4)	7.0	0.146
IRON (FE)	.01	0.001	NITRATE (AS N)	.633	0.045
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SIO2)	42.8		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.628	TOTAL ANIONS		2.675

STANDARD DEVIATION OF ANION - CATION BALANCE 0.32 SIGMA

LABORATORY PH	7.64	TOTAL HARDNESS AS CaCO3	103.
FIELD TEMPERATURE	8.9 C	TOTAL ALKALINITY AS CaCO3	116.
CALCULATED DISSOLVED SOLIDS	179.3	SODIUM ADSORPTION RATIO	0.5
SUM OF DISS. CONSTITUENTS	250.9	RYZMAR STABILITY INDEX	8.1
LAB SPEC. COND. (MICROMHOS/CM)	254.5	LANGLIER SATURATION INDEX	-0.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 236. ALUMINUM, DISS (MG/L-AL) ~~5~~ 5.04

REMARKS: CENT. VALLEY GEOTHERMAL KIT. TAP, PRESS. TANK IN LINE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO:
65	12	17	4	6	5	88	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0428

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445150N 1113300W	SAMPLE LOCATION	11S 1E 24BDB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	919
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5930. FT <50
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1715	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE DEADMAN CREEK AT RD.
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	12.2	0.609	BICARBONATE (HCO3)	52.5	0.860
MAGNESIUM (MG)	2.2	0.181	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.3	0.144	CHLORIDE (CL)	.95	0.027
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	.00	0.000
IRON (FE)	.02	0.001	NITRATE (AS N)	.242	0.017
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.5	0.026
SILICA (SIO2)	13.5		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		0.963	TOTAL ANIONS		0.931

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.27 SIGMA

LABORATORY PH	8.05	TOTAL HARDNESS AS CaCO3	40.
FIELD TEMPERATURE	7.5 C	TOTAL ALKALINITY AS CaCO3	43.
CALCULATED DISSOLVED SOLIDS	59.9	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	86.5	RYZNAR STABILITY INDEX	9.4
LAB SPEC. COND. (MICROMHOS/CM)	94.2	LANGLIER SATURATION INDEX	-0.7

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 96. TEMPERATURE, AIR (C) 10.
 ALUMINUM, DISS (MG/L=AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL FRED HAS DISCHARGE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO:	
63	18	14	2	3	0	96	0		

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0431

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445156N 1113309W	SAMPLE LOCATION	11S 1E 2488D
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	920
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5950. FT <50
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1745	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE CURLEW CREEK AT RD.
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	17.6	0.878	BICARBONATE (HCO3)	38.2	0.626
MAGNESIUM (MG)	3.1	0.255	CARBONATE (CO3)	21.8	0.727
SODIUM (NA)	8.7	0.378	CHLORIDE (CL)	2.50	0.070
POTASSIUM (K)	1.3	0.033	SULFATE (SO4)	3.7	0.077
IRON (FE)	.02	0.001	NITRATE (AS N)	.355	0.025
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	2.0	0.105
SILICA (SI02)	18.4		O-PHOSPHATE (AS P)		

 TOTAL CATIONS 1.546 TOTAL ANIONS 1.631

STANDARD DEVIATION OF ANION - CATION BALANCE 0.66 SIGMA

LABORATORY PH	9.72	TOTAL HARDNESS AS CaCO3	57.
FIELD TEMPERATURE	10. C	TOTAL ALKALINITY AS CaCO3	68.
CALCULATED DISSOLVED SOLIDS	98.3	SODIUM ADSORPTION RATIO	0.5
SUM OF DISS. CONSTITUENTS	117.7	RYZMAR STABILITY INDEX	7.0
LAB SPEC. COND. (MICROMHOS/CM)	147.6	LANGLIER SATURATION INDEX	1.3

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C) 10. CONDUCTIVITY, FIELD MICROMHOS 154.
 ALUMINUM, DISS (MG/L=AL) ~~0.03~~
 0.022

REMARKS: CENT. VALLEY GEOTHERMAL FRED HAS DISCHARGE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)	PERCENTAGE REACTANCE VALUES								
FUND: /	CA	MG	NA	K	CL	SO4	HCO3	CO3	NO
	56	16	24	2	4	5	41	48	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0432

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445451N 1113560W	SAMPLE LOCATION	10S 1E 33DDB
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVF	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	921
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5880. FT <50
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1030	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE SQUAW CREEK RANCH HOUSE WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	23.5	1.173	BICARBONATE (HCO3)	98.9	1.621
MAGNESIUM (MG)	4.0	0.329	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	6.4	0.278	CHLORIDE (CL)	4.55	0.128
POTASSIUM (K)	3.9	0.100	SULFATE (SO4)	.00	0.000
IRON (FE)	.38	0.020	NITRATE (AS N)	.291	0.021
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.5	0.026
SILICA (SIO2)	43.2		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		1.901	TOTAL ANIONS		1.796

STANDARD DEVIATION OF ANION - CATION BALANCE =0.77 SIGMA

LABORATORY PH	7.12	TOTAL HARDNESS AS CaCO3	75.
FIELD TEMPERATURE	6. C	TOTAL ALKALINITY AS CaCO3	81.
CALCULATED DISSOLVED SOLIDS	135.5	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	185.6	RYZMAR STABILITY INDEX	9.2
LAB SPEC. COND. (MICROMHOS/CM)	186.5	LANGLIER SATURATION INDEX	-1.0

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 148.
 ALUMINUM, DISS (MG/L-AL) .08
 TEMPERATURE, AIR (C) 12.

REMARKS: CENT. VALLEY GEOTHERMAL VAC PUMP BROKE 800 ML FU SAMPLE,
 HIGH IRON WATER

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /
 PERCENTAGE REACTANCE VALUES
 CA MG NA K CL SO4 HCO3 CO3 NO3
 62 17 14 5 7 0 92 0 1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0433

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	445914N 1113924W	SAMPLE LOCATION	10S 1E 6CC8
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110TRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	922
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	5670. FT <50
DATE SAMPLED	10-02-77	TOTAL DEPTH OF WELL	62 FT
TIME SAMPLED	1200	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	4. FT (R
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	PUBLIC SUPPLY

SAMPLING SITE N.PICNIC WELL, S. MADISON REC. AREA
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	19.	0.948	BICARBONATE (HCO3)	121.	1.983
MAGNESIUM (MG)	5.9	0.485	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	21.2	0.922	CHLORIDE (CL)	12.65	0.357
POTASSIUM (K)	1.8	0.046	SULFATE (SO4)	6.1	0.127
IRON (FE)	.05	0.003	NITRATE (AS N)	.194	0.014
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.1	0.058
SILICA (SIO2)	17.8		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.405	TOTAL ANIONS		2.539

STANDARD DEVIATION OF ANION - CATION BALANCE 0.93 SIGMA

LABORATORY PH	7.88	TOTAL HARDNESS AS CaCO3	72.
FIELD TEMPERATURE	8.5 C	TOTAL ALKALINITY AS CaCO3	99.
CALCULATED DISSOLVED SOLIDS	145.4	SODIUM ADSORPTION RATIO	1.1
SUM OF DISS. CONSTITUENTS	206.8	RYZNAR STABILITY INDEX	8.5
LAB SPEC.COND.(MICROMHOS/CM)	236.5	LANGLIER SATURATION INDEX	-0.3

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C) 12. CONDUCTVY, FIELD MICROMHOS 234.
 ALUMINUM, DISS (MG/L=AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL PITCHER PUMP, HIGH IRON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL(FORM 153)

FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO:
39	20	38	1	14	5	80	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0434

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444944N 1113009W	SAMPLE LOCATION	11S 2E 32DBD
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110TRRCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	923
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6120. FT <50
DATE SAMPLED	10-27-71	TOTAL DEPTH OF WATER	
TIME SAMPLED	400	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	1. CFS(E)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE CLIFF LAKE TOWN SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	29.2	1.457	BICARBONATE (HCO3)	181.	2.966
MAGNESIUM (MG)	17.2	1.415	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.6	0.200	CHLORIDE (CL)	1.75	0.049
POTASSIUM (K)	1.7	0.044	SULFATE (SO4)	4.3	0.090
IRON (FE)	.02	0.001	NITRATE (AS N)	.492	0.035
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	11.6		O-PHOSPHATE (AS P)		

TOTAL CATIONS 3.117 TOTAL ANIONS 3.146

STANDARD DEVIATION OF ANION - CATION BALANCE 0.19 SIGMA

LABORATORY PH	8.30	TOTAL HARDNESS AS CaCO3	144.
FIELD TEMPERATURE	8.7 C	TOTAL ALKALINITY AS CaCO3	148.
CALCULATED DISSOLVED SOLIDS	160.1	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	252.0	RYZMAR STABILITY INDEX	7.3
LAB SPEC. COND. (MICROMHOS/CM)	283.4	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS

TEMPERATURE, AIR (C) 18. CONDUCTIVITY, FIELD MICROMHOS 285.
 ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
46	45	6	1	1	2	95	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0435

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444813N 1113328W	SAMPLE LOCATION	12S 1E 11ADD
TOPOGRAPHIC MAP	CLIFF LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	924
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6280. FT <5
DATE SAMPLED	10-02-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1500	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	45. CFS(E
METHOD SAMPLED	GRAB	WATER USE	PUBLIC SUPPLY

SAMPLING SITE WADE LAKE SPRING
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	23.3	1.163	BICARBONATE (HCO3)	139.	2.278
MAGNESIUM (MG)	11.5	0.946	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	5.2	0.226	CHLORIDE (CL)	2.30	0.065
POTASSIUM (K)	1.7	0.044	SULFATE (SO4)	2.0	0.042
IRON (FE)	<.01	0.000	NITRATE (AS N)	.237	0.017
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SIO2)	13.3		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.378	TOTAL ANIONS		2.423

STANDARD DEVIATION OF ANION - CATION BALANCE 0.31 SIGMA

LABORATORY PH	7.93	TOTAL HARDNESS AS CaCO3	106.
FIELD TEMPERATURE	6.4 C	TOTAL ALKALINITY AS CaCO3	114.
CALCULATED DISSOLVED SOLIDS	128.4	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	199.0	RYZNAR STABILITY INDEX	8.1
LAB SPEC. COND. (MICROMHOS/CM)	223.4	LANGLIER SATURATION INDEX	-0.1

ADDITIONAL PARAMETERS

CONDUCTVY, FIELD MICROMHOS 223. TEMPERATURE, AIR (C) 10.7
 ALUMINUM, DISS (MG/L=AL) .08

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	NO
48	39	9	1	2	1	95	0		

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0436

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	444051N 1114720W	SAMPLE LOCATION	13S 2W 24DCCC
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	112WDBL	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	931
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6670. FT <50
DATE SAMPLED	10-03-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1800	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE STAUDENMEYER S WELL NEXT TO ROAD
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	44.	2.196	BICARBONATE (HCO3)	170.	2.786
MAGNESIUM (MG)	7.8	0.642	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.6	0.200	CHLORIDE (CL)	5.05	0.142
POTASSIUM (K)	3.0	0.077	SULFATE (SO4)	3.3	0.069
IRON (FE)	<.01	0.000	NITRATE (AS N)	1.717	0.123
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SiO2)	30.8		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.114	TOTAL ANIONS		3.130

STANDARD DEVIATION OF ANION - CATION BALANCE 0.10 SIGMA

LABORATORY PH	7.91	TOTAL HARDNESS AS CaCO3	142.
FIELD TEMPERATURE	.	TOTAL ALKALINITY AS CaCO3	139.
CALCULATED DISSOLVED SOLIDS	184.2	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	270.5	RYZMAR STABILITY INDEX	7.4
LAB SPEC. COND. (MICROMHOS/CM)	290.6	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

ALUMINUM, DISS (MG/L=AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
70	20	6	2	4	2	92	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0443

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444156N 1115241W	SAMPLE LOCATION	13S 2W 17CBD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	932
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6810. FT <50
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WATER	38 FT
TIME SAMPLED	915	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	10. FT (R)
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.5 CFS(E)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE UPPER-EAST SPRING-STAUDENMEYER RANCH
DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	69.	3.443	BICARBONATE (HCO3)	250.	4.097
MAGNESIUM (MG)	25.2	2.073	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	28.1	1.222	CHLORIDE (CL)	10.0	0.282
POTASSIUM (K)	7.4	0.189	SULFATE (SO4)	115.	2.394
IRON (FE)	<.01	0.000	NITRATE (AS N)	.038	0.003
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.8	0.095
SILICA (SIO2)	22.7		O-PHOSPHATE (AS P)		

TOTAL CATIONS 6.928 TOTAL ANIONS 6.871

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.26 SIGMA

LABORATORY PH	7.52	TOTAL HARDNESS AS CaCO3	276.
FIELD TEMPERATURE	29. C	TOTAL ALKALINITY AS CaCO3	205.
CALCULATED DISSOLVED SOLIDS	402.4	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	529.3	RYZMAR STABILITY INDEX	7.1
LAB SPEC. COND. (MICROMHOS/CM)	629.4	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 659. TEMPERATURE, AIR (C) 3.
ALUMINUM, DISS (MG/L-AL) .10

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
49	29	17	2	4	35	60	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0444

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444156N 1115241W	SAMPLE LOCATION	135 2W 17CBD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	933
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6800. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1100	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	100. GPM(E
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE LOWER EAST SPRING=STAUDENMEYER RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	68.	3.393	BICARBONATE (HCO3)	251.	4.114
MAGNESIUM (MG)	24.6	2.024	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	27.8	1.209	CHLORIDE (CL)	9.80	0.276
POTASSIUM (K)	7.4	0.189	SULFATE (SO4)	114.	2.373
IRON (FE)	<.01	0.000	NITRATE (AS N)	.027	0.002
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	1.8	0.095
SILICA (SIO2)	23.3		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		6.816	TOTAL ANIONS		6.860

STANDARD DEVIATION OF ANION - CATION BALANCE 0.21 SIGMA

LABORATORY PH	7.48	TOTAL HARDNESS AS CaCO3	271.
FIELD TEMPERATURE	28. C	TOTAL ALKALINITY AS CaCO3	206.
CALCULATED DISSOLVED SOLIDS	400.4	SODIUM ADSORPTION RATIO	0.7
SUM OF DISS. CONSTITUENTS	527.7	RYZNAR STABILITY INDEX	7.1
LAB SPEC. COND. (MICROMHOS/CM)	628.3	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 681.
 ALUMINUM, DISS (MG/L=AL) < .05
 TEMPERATURE, AIR (C) 3.

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
49	29	17	2	4	35	60	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0445

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444150N 1115250W	SAMPLE LOCATION	13S 2W 17CCB
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	111ALVF	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	934
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6760. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1100	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE STAUDENMEYER RANCH HOUSE WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	87.5	4.366	BICARBONATE (HCO3)	342.	5.605
MAGNESIUM (MG)	34.	2.797	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	36.2	1.575	CHLORIDE (CL)	14.20	0.400
POTASSIUM (K)	12.1	0.310	SULFATE (SO4)	134.	2.790
IRON (FE)	.02	0.001	NITRATE (AS N)	.488	0.035
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	2.0	0.105
SILICA (SIO2)	30.0		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		9.049	TOTAL ANIONS		8.935

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.46 SIGMA

LABORATORY PH	7.55	TOTAL HARDNESS AS CaCO3	358.
FIELD TEMPERATURE	10.2 C	TOTAL ALKALINITY AS CaCO3	280.
CALCULATED DISSOLVED SOLIDS	519.0	SODIUM ADSORPTION RATIO	0.8
SUM OF DISS. CONSTITUENTS	692.5	RYZMAR STABILITY INDEX	6.6
LAB SPEC. COND. (MICROMHOS/CM)	798.8	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS
 TEMPERATURE, AIR (C) 6.
 ALUMINUM, DISS (MG/L=AL) .08
 CONDUCTIVITY, FIELD MICROMHOS 786.

REMARKS: CENT. VALLEY GEOTHERMAL VERY HI GAS CONTENT=LIKE FILTERING
 7-UP

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
48	30	17	3	4	31	63	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0446

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444124N 1115155W	SAMPLE LOCATION	13S 2W 20ADB
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	936
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6680. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1330	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC AND ST
SAMPLING SITE	JIMMY ANDERSON HOUSE, WELL EAST OF HOUSE		
GEOLOGICAL SOURCE			

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	82.	4.092	BICARBONATE (HCO3)	258.	4.228
MAGNESIUM (MG)	13.1	1.078	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	21.1	0.918	CHLORIDE (CL)	8.00	0.226
POTASSIUM (K)	5.0	0.128	SULFATE (SO4)	84.6	1.761
IRON (FE)	.02	0.001	NITRATE (AS N)	.380	0.027
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	34.7		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		6.217	TOTAL ANIONS		6.253

STANDARD DEVIATION OF ANION - CATION BALANCE 0.18 SIGMA

LABORATORY PH	7.98	TOTAL HARDNESS AS CaCO3	259.
FIELD TEMPERATURE	6.9 C	TOTAL ALKALINITY AS CaCO3	212.
CALCULATED DISSOLVED SOLIDS	376.2	SODIUM ADSORPTION RATIO	0.6
SUM OF DISS. CONSTITUENTS	507.1	RYZGAR STABILITY INDEX	6.4
LAB SPEC. COND. (MICROMHOS/CM)	568.5	LANGLIER SATURATION INDEX	0.8

ADDITIONAL PARAMETERS
 TEMPERATURE, AIR (C) 13. CONDUCTIVITY, FIELD MICROMHOS 483.
 ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL HIGH IRON CONTENT

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
65	17	14	2	3	28	68	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0448

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444030N 1114418W	SAMPLE LOCATION	13S 1W 28BCB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	112WDBL	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	937
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6670. FT <50
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1500	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	. FT (M)
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC AND STO

SAMPLING SITE STANLEY SMITH WELL AT BOX CAR
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	33.	1.647	BICARBONATE (HCO3)	147.	2.409
MAGNESIUM (MG)	5.7	0.469	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.6	0.157	CHLORIDE (CL)	3.00	0.085
POTASSIUM (K)	2.9	0.074	SULFATE (SO4)	.2	0.004
IRON (FE)	.07	0.004	NITRATE (AS N)	<.023	0.000
MANGANESE (MN)	.21	0.008	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	6.8		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.358	TOTAL ANIONS		2.503

STANDARD DEVIATION OF ANION - CATION BALANCE 1.00 SIGMA

LABORATORY PH	8.09	TOTAL HARDNESS AS CaCO3	106.
FIELD TEMPERATURE	7.7 C	TOTAL ALKALINITY AS CaCO3	121.
CALCULATED DISSOLVED SOLIDS	128.0	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	202.6	RYZNAR STABILITY INDEX	7.6
LAB SPEC. COND. (MICROMHOS/CM)	234.3	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS			
TEMPERATURE, AIR (C)	13.	CNDUCTVY, FIELD MICROMHOS	230.
PH, FIELD (SU)	7.8	ALUMINUM, DISS (MG/L=AL)	.07

REMARKS: CENT. VALLEY GEOTHERMAL HIGH IRON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
70	19	6	3	3	0	96	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0449

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443958N 1114314W	SAMPLE LOCATION	13S 1W 28DDD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	938
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6645. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	13 FT
TIME SAMPLED	1600	DEPTH WATER ENTERS WELL	10 FT
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	4.4 FT (
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SMITH S STOCK WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	59.	2.944	BICARBONATE (HCO3)	303.	4.966
MAGNESIUM (MG)	23.	1.892	CARBONATE (CO3)	0	0.000
SODIUM (NA)	7.5	0.326	CHLORIDE (CL)	5.70	0.161
POTASSIUM (K)	4.4	0.113	SULFATE (SO4)	4.2	0.087
IRON (FE)	.02	0.001	NITRATE (AS N)	1.717	0.123
MANGANESE (MN)	.74	0.027	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.7	0.037
SILICA (SI02)	15.0		0=PHOSPHATE (AS P)		
TOTAL CATIONS		5.303	TOTAL ANIONS		5.373

STANDARD DEVIATION OF ANION - CATION BALANCE 0.38 SIGMA

LABORATORY PH	7.88	TOTAL HARDNESS AS CaCO3	242.
FIELD TEMPERATURE	9.3 C	TOTAL ALKALINITY AS CaCO3	249.
CALCULATED DISSOLVED SOLIDS	271.2	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	425.0	RYZMAR STABILITY INDEX	6.7
LAB SPEC. COND. (MICROMHOS/CM)	471.5	LANGLIER SATURATION INDEX	0.6

ADDITIONAL PARAMETERS
 TEMPERATURE, AIR (C) 14.
 ALUMINUM, DISS (MG/L-AL) < .05
 CONDUCTIVITY, FIELD MICROMHOS 474.

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
55	35	6	2	3	1	95	0	2	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0450

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444123N 1114628W	SAMPLE LOCATION	13S 1W 198DB
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	112WDBL	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	939
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6700. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	95 FT
TIME SAMPLED	1700	DEPTH WATER ENTERS WELL	105 FT
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	22. FT (
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE STAUDENMEYER WELL 3/4 M. N. OF RD.
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	50.	2.495	BICARBONATE (HCO3)	192.	3.147
MAGNESIUM (MG)	7.1	0.584	CARBONATE (CO3)	0	0.000
SODIUM (NA)	5.1	0.222	CHLORIDE (CL)	4.10	0.116
POTASSIUM (K)	3.0	0.077	SULFATE (SO4)	4.1	0.085
IRON (FE)	.01	0.001	NITRATE (AS N)	.971	0.069
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	31.9		O-PHOSPHATE (AS P)		

TOTAL CATIONS 3.378

TOTAL ANIONS 3.428

STANDARD DEVIATION OF ANION - CATION BALANCE 0.31 SIGMA

LABORATORY PH	7.99	TOTAL HARDNESS AS CaCO3	154.
FIELD TEMPERATURE	7.8 C	TOTAL ALKALINITY AS CaCO3	157.
CALCULATED DISSOLVED SOLIDS	201.1	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	298.5	RYZMAR STABILITY INDEX	7.1
LAB SPEC. COND. (MICROMHOS/CM)	309.9	LANGLIER SATURATION INDEX	0.4

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 327.
 ALUMINUM, DISS (MG/L-AL) < .05
 TEMPERATURE, AIR (C) 8.

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
73	17	6	2	3	2	93	0	2	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0451

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444017N 1114637W	SAMPLE LOCATION	13S 1W 30CBA
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	940
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6645. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1715	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE STAUDENMEYERS SOUTH PASTURE WELL ON EAST
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	45.4	2.265	BICARBONATE (HCO3)	183.	2.999
MAGNESIUM (MG)	6.7	0.551	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	3.6	0.157	CHLORIDE (CL)	2.25	0.063
POTASSIUM (K)	1.7	0.044	SULFATE (SO4)	.00	0.000
IRON (FE)	.01	0.001	NITRATE (AS N)	.678	0.048
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	25.7		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.017	TOTAL ANIONS		3.116

STANDARD DEVIATION OF ANION - CATION BALANCE 0.64 SIGMA

LABORATORY PH	7.93	TOTAL HARDNESS AS CaCO3	141.
FIELD TEMPERATURE	7.0 C	TOTAL ALKALINITY AS CaCO3	150.
CALCULATED DISSOLVED SOLIDS	176.3	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	269.1	RYZNAR STABILITY INDEX	7.3
LAB SPEC. COND. (MICROMHOS/CM)	294.4	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS
 TEMPERATURE, AIR (C) 7.
 ALUMINUM, DISS (MG/L=AL) < .05
 CONDUCTIVITY, FIELD MICROMHOS 319.

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
75	18	5	1	2	0	97	0	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0452

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444003N 1114829W	SAMPLE LOCATION	13S 2W 26DC
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	941
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6630. FT <5
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	28 FT
TIME SAMPLED	1815	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	.
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE STAUDENMEYERS SOUTH PASTURE WELL ON WEST
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	65.5	3.268	BICARBONATE (HCO3)	263.	4.310
MAGNESIUM (MG)	12.4	1.020	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	13.8	0.600	CHLORIDE (CL)	25.85	0.729
POTASSIUM (K)	7.3	0.187	SULFATE (SO4)	3.6	0.075
IRON (FE)	1.22	0.066	NITRATE (AS N)	1.536	0.110
MANGANESE (MN)	.54	0.020	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SIO2)	51.8		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		5.161	TOTAL ANIONS		5.240

STANDARD DEVIATION OF ANION - CATION BALANCE 0.42 SIGMA

LABORATORY PH	7.47	TOTAL HARDNESS AS CaCO3	215.
FIELD TEMPERATURE	6.5 C	TOTAL ALKALINITY AS CaCO3	216.
CALCULATED DISSOLVED SOLIDS	313.4	SODIUM ADSORPTION RATIO	0.4
SUM OF DISS. CONSTITUENTS	446.8	RYZNAR STABILITY INDEX	7.1
LAB SPEC. COND. (MICROMHOS/CM)	486.8	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS
 TEMPERATURE, AIR (C) 5.
 ALUMINUM, DISS (MG/L-AL) # .051
 CONDUCTIVITY, FIELD MICROMHOS 488.

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
64	20	11	3	14	1	84	0	2	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0453

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443660N 1113753W	SAMPLE LOCATION	14S 1E 17BDB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41#A	BOTTLE NO.	942
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6680. FT <5
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WELL	29 FT
TIME SAMPLED	915	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	10.2 FT ()
DATE ANALYZED	12-15-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	
METHOD SAMPLED	GRAB	WATER USE	UNUSED

SAMPLING SITE HANSON RANCH WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	39.2	1.956	BICARBONATE (HCO3)	192.	3.147
MAGNESIUM (MG)	15.	1.234	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.3	0.100	CHLORIDE (CL)	1.10	0.031
POTASSIUM (K)	1.4	0.036	SULFATE (SO4)	3.4	0.071
IRON (FE)	1.25	0.067	NITRATE (AS N)	.147	0.010
MANGANESE (MN)	.25	0.009	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	12.2		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.402	TOTAL ANIONS		3.264

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.87 SIGMA

LABORATORY PH	7.40	TOTAL HARDNESS AS CaCO3	160.
FIELD TEMPERATURE	6.5 C	TOTAL ALKALINITY AS CaCO3	157.
CALCULATED DISSOLVED SOLIDS	170.9	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	268.3	RYZNAR STABILITY INDEX	7.9
LAB SPEC. COND. (MICROMHOS/CM)	314.2	LANGLIER SATURATION INDEX	-0.3

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 326.
 ALUMINUM, DISS (MG/L=AL) < .05
 TEMPERATURE, AIR (C) 8.

REMARKS: CENT. VALLEY GEOTHERMAL SMELLS HORRIBLE=PROB. POLLUTED, HI FE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
58	37	3	1	0	2	96	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0454

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444413N 1114729W	SAMPLE LOCATION	13S 2W 18AA
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	120TRTR	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	943
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	7420. FT <1
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1215	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	BUCKET AND STOP
SAMPLE HANDLING	3120	WATER FLOW RATE	.2 GPM(M
METHOD SAMPLED	GRAB	WATER USE	STOCK
SAMPLING SITE		SPRINGFOR STOCK TANK	
DRAINAGE BASIN		RED ROCK RIVER	

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	58.2	2.904	BICARBONATE (HCO3)	251.	4.114
MAGNESIUM (MG)	16.3	1.341	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	6.6	0.287	CHLORIDE (CL)	11.7	0.330
POTASSIUM (K)	3.6	0.092	SULFATE (SO4)	5.9	0.123
IRON (FE)	.02	0.001	NITRATE (AS N)	.858	0.061
MANGANESE (MN)	.02	0.001	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SI02)	31.0		O-PHOSPHATE (AS P)		
TOTAL CATIONS		4.626	TOTAL ANIONS		4.643

STANDARD DEVIATION OF ANION - CATION BALANCE 0.10 SIGMA

LABORATORY PH	7.86	TOTAL HARDNESS AS CaCO3	212.
FIELD TEMPERATURE	4.7 C	TOTAL ALKALINITY AS CaCO3	206.
CALCULATED DISSOLVED SOLIDS	258.1	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	385.5	RYZGAR STABILITY INDEX	6.9
LAB SPEC. COND. (MICROMHOS/CM)	417.0	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 439.
 ALUMINUM, DISS (MG/L-AL) < .05
 TEMPERATURE, AIR (C) 15.

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
62	28	6	1	7	2	90	0	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0455

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444001N 1114050W	SAMPLE LOCATION	13S 1W 26DD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	112WDBL	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	944
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6680. FT <1
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WELL	85 FT
TIME SAMPLED	1500	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	UNUSED

SAMPLING SITE REFUGE STOCK WELL
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	27.	1.347	BICARBONATE (HCO3)	96.	1.573
MAGNESIUM (MG)	3.9	0.321	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	5.3	0.231	CHLORIDE (CL)	6.65	0.188
POTASSIUM (K)	2.6	0.067	SULFATE (SO4)	3.2	0.067
IRON (FE)	.13	0.007	NITRATE (AS N)	1.898	0.136
MANGANESE (MN)	.03	0.001	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.4	0.021
SILICA (SI02)	37.0		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		1.973	TOTAL ANIONS		1.984

STANDARD DEVIATION OF ANION - CATION BALANCE 0.08 SIGMA

LABORATORY PH	7.25	TOTAL HARDNESS AS CaCO3	83.
FIELD TEMPERATURE	6.5 C	TOTAL ALKALINITY AS CaCO3	79.
CALCULATED DISSOLVED SOLIDS	135.4	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	184.1	RYZGAR STABILITY INDEX	9.0
LAB SPEC. COND. (MICROMHOS/CM)	198.0	LANGLIER SATURATION INDEX	-0.9

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 236. ALUMINUM, DISS (MG/L-AL) ~~M~~ ~~0.028~~

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
68	16	11	3	10	3	86	0	7

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0456

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443601N 1114837W	SAMPLE LOCATION	14S 2W 23
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	111ALVF	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	945
AGENCY + SAMPLER	MBMG * JLS	ALTITUDE OF SAMPLE POINT	6690. FT <50
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WELL	
TIME SAMPLED	1610	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE OLD SCHOOL HOUSE, LAKEVIEW
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	60.	2.994	BICARBONATE (HCO3)	247.	4.048
MAGNESIUM (MG)	9.7	0.798	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	8.7	0.378	CHLORIDE (CL)	4.85	0.137
POTASSIUM (K)	5.1	0.131	SULFATE (SO4)	6.5	0.135
IRON (FE)	.02	0.001	NITRATE (AS N)	.384	0.027
MANGANESE (MN)	.10	0.004	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	30.4		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		4.306	TOTAL ANIONS		4.348

STANDARD DEVIATION OF ANION - CATION BALANCE 0.24 SIGMA

LABORATORY PH	7.42	TOTAL HARDNESS AS CaCO3	190.
FIELD TEMPERATURE	7.7 C	TOTAL ALKALINITY AS CaCO3	203.
CALCULATED DISSOLVED SOLIDS	247.5	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	372.9	RYZMAR STABILITY INDEX	7.3
LAB SPEC. COND. (MICROMHOS/CM)	400.5	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 404. ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: CENT. VALLEY GEOTHERMAL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: /

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
69	18	8	3	3	3	93	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0457

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443732N 1113716W	SAMPLE LOCATION	14S 1E 8DACC
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	809-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6680. FT <5
DATE SAMPLED	09-28-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1800	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	25. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE
SAMPLING SITE	CULVER SPRINGS 2.5 MI S. OF ELK LAKE CAMP		
DRAINAGE BASIN	RED ROCK RIVER		

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	33.	1.647	BICARBONATE (HCO3)	171.	2.803
MAGNESIUM (MG)	13.6	1.119	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.3	0.100	CHLORIDE (CL)	1.20	0.034
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	1.9	0.040
IRON (FE)	<.01	0.000	NITRATE (AS N)	.167	0.012
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	16.3		O=PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.894	TOTAL ANIONS		2.888

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.04 SIGMA

LABORATORY PH	7.92	TOTAL HARDNESS AS CaCO3	138.
FIELD TEMPERATURE	7.0 C	TOTAL ALKALINITY AS CaCO3	140.
CALCULATED DISSOLVED SOLIDS	153.9	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	240.7	RYZNAR STABILITY INDEX	7.6
LAB SPEC. COND. (MICROMHOS/CM)	262.7	LANGLIER SATURATION INDEX	0.1

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 229.2 ALUMINUM, DISS (MG/L=AL) .11

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*WATER POURING OVER ROCK PILE INTO LAKE ACCURATE FLOW IS IMPOSSIBLE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
56	38	3	0	1	1	97	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0458

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444060N 1115742W	SAMPLE LOCATION	13S 3W 22CC8C
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	814-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6840. FT <5
DATE SAMPLED	09-30-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1000	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	FLOAT AND STOPW.
SAMPLE HANDLING	3120	WATER FLOW RATE	1.0 CFS(M
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE LOUSY SPRING 2.5 MI NE OF BRUNDAGE BRIDGE
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	48.	2.395	BICARBONATE (HCO3)	204.	3.343
MAGNESIUM (MG)	10.3	0.847	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	8.4	0.365	CHLORIDE (CL)	5.35	0.151
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	3.2	0.067
IRON (FE)	<.01	0.000	NITRATE (AS N)	.655	0.047
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	19.3		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.636	TOTAL ANIONS		3.613

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.14 SIGMA

LABORATORY PH	7.58	TOTAL HARDNESS AS CaCO3	162.
FIELD TEMPERATURE	6.8 C	TOTAL ALKALINITY AS CaCO3	167.
CALCULATED DISSOLVED SOLIDS	196.9	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	300.4	RYZNAR STABILITY INDEX	7.5
LAB SPEC. COND. (MICROMHOS/CM)	333.9	LANGLIER SATURATION INDEX	0.0

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 278.1 TEMPERATURE, AIR (C) 0.5
 ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SNOWING DURING SAMPLING 0.5 IN TODAY<

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
65	23	10	0	4	1	93	0	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0459

(1)

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	444116N 1115639W	SAMPLE LOCATION	13S 3W 22DAAB
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	815-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6875. FT <10
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1049	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-30-77	FLOW MEAS METHOD	FLOAT AND STOPWA
SAMPLE HANDLING	3120	WATER FLOW RATE	0.18 CFS(M)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SMALL SPNG 1MI ENE OF LOUSY SPRING
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	50.8	2.535	BICARBONATE (HCO3)	212.	3.474
MAGNESIUM (MG)	12.3	1.012	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	12.7	0.552	CHLORIDE (CL)	19.15	0.540
POTASSIUM (K)	1.8	0.046	SULFATE (SO4)	5.2	0.108
IRON (FE)	.04	0.002	NITRATE (AS N)	.587	0.042
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	21.0		O-PHOSPHATE (AS P)		

TOTAL CATIONS 4.147

TOTAL ANIONS 4.175

STANDARD DEVIATION OF ANION - CATION BALANCE 0.16 SIGMA

FILTERED SAMPLE

LABORATORY PH	7.76	TOTAL HARDNESS AS CaCO3	177.
FIELD TEMPERATURE	7.0 C	TOTAL ALKALINITY AS CaCO3	174.
CALCULATED DISSOLVED SOLIDS	228.2	SODIUM ADSORPTION RATIO	0.4
SUM OF DISS. CONSTITUENTS	335.8	RYZMAR STABILITY INDEX	7.2
LAB SPEC. COND. (MICROMHOS/CM)	317.6	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	323.9	TEMPERATURE, AIR (C)	8.25
ALUMINUM, DISS (MG/L=AL) <	.05		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *SNOWING DURING SAMPLING (RGC. 0.5 IN TODAY) ANALYSIS BASED ON FILTERED ONLY

NOTE THE ↑ Cl due to HCl rinse - assume cause of pH ↓

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
61	24	13	1	13	2	84	0	1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0460

2

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	444116N 1115639W	SAMPLE LOCATION	13S 3W 22DAAB
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	815-CV
AGENCY + SAMPLER	MBMG + WMB	ALTITUDE OF SAMPLE POINT	6875. FT <1
DATE SAMPLED	09-29-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1049	STAGE HEIGHT	
LAB + ANALYST	MBMG + GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	12-30-77	FLOW MEAS METHOD	FLOAT AND STOPW.
SAMPLE HANDLING	3120	WATER FLOW RATE	0.18 CFS(M
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SMALL SPRING 1MI ENE OF LOUSY SPRING
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA) <i>Raw</i>	33.	1.647	BICARBONATE (HCO3) <i>Raw</i>	181.	2.966
MAGNESIUM (MG) <i>Filt</i>	12.3	1.012	CARBONATE (CO3) <i>Raw</i>	9.6	0.320
SODIUM (NA) <i>Filt</i>	12.7	0.552	CHLORIDE (CL) <i>Raw</i>	6.4	0.180
POTASSIUM (K) <i>Filt</i>	1.8	0.046	SULFATE (SO4) <i>Filt</i>	5.2	0.108
IRON (FE) <i>FA</i>	.04	0.002	NITRATE (AS N) <i>Filt</i>	.587	0.042
MANGANESE (MN) <i>FA</i>	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL) <i>FA</i>			FLUORIDE (F) <i>Filt</i>	.2	0.011
SILICA (SI02) <i>Filt</i>	21.0		0-PHOSPHATE (AS P)		
TOTAL CATIONS		3.259	TOTAL ANIONS		3.628

STANDARD DEVIATION OF ANION - CATION BALANCE 2.31 SIGMA

LABORATORY PH	8.59	TOTAL HARDNESS AS CaCO3	133.
FIELD TEMPERATURE	.	TOTAL ALKALINITY AS CaCO3	164.
CALCULATED DISSOLVED SOLIDS	192.0	SODIUM ADSORPTION RATIO	0.5
SUM OF DISS. CONSTITUENTS	283.8	RYZMAR STABILITY INDEX	6.8
LAB SPEC. COND. (MICROMHOS/CM)	317.6	LANGLIER SATURATION INDEX	0.9

ADDITIONAL PARAMETERS
 ALUMINUM, DISS (MG/L-AL) < .05

Original analysis:
 E = 4.147 meq/l
 A = 3.628 meq/l

Ca 50.8 → 33. ⇒ 2.535 - 1.647 = 0.888 meq/l
 HCO3 212 → 181 ⇒ 3.474 - 2.966 = 0.508 meq/l
 Cl 115 → 64 ⇒ .540 - .180 = 0.360 meq/l } 0.868 meq/l
 CO3 9.6 → 0 ⇒ 0 - 0.320 = -0.320 meq/l

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT
 CL, ALK, AND CA RUN ON RAW SAMPLE CAUSE OF BAD SIGMA

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
50	31	16	1	5	3	82	8	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0460

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444327N 1114341W	SAMPLE LOCATION	13S 1W 4DCC
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	816-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7310. FT <5
DATE SAMPLED	09-30-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1336	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	3.0 GPM(E
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 1.5 MI SW OF SNOWSHOE PASS
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	17.4	0.868	BICARBONATE (HCO3)	70.5	1.155
MAGNESIUM (MG)	2.9	0.239	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.3	0.187	CHLORIDE (CL)	5.60	0.158
POTASSIUM (K)	5.3	0.136	SULFATE (SO4)	1.2	0.025
IRON (FE)	.19	0.010	NITRATE (AS N)	.971	0.069
MANGANESE (MN)	.04	0.001	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	35.5		O-PHOSPHATE (AS P)		

TOTAL CATIONS 1.441 TOTAL ANIONS 1.418

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.18 SIGMA

LABORATORY PH	6.91	TOTAL HARDNESS AS CaCO3	55.
FIELD TEMPERATURE	7.3 C	TOTAL ALKALINITY AS CaCO3	58.
CALCULATED DISSOLVED SOLIDS	108.3	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	144.1	RYZMAR STABILITY INDEX	10.1
LAB SPEC. COND. (MICROMHOS/CM)	146.3	LANGLIER SATURATION INDEX	-1.6

ADDITIONAL PARAMETERS
 CONDUCTIVITY, FIELD MICROMHOS 139.7 TEMPERATURE, AIR (C) 6.0
 ALUMINUM, DISS (MG/L=AL) .16

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*STOPED SNOWING IS NOW MELTING*WATER SAMPLE CONTA. AS A DILUTE MIXTURE.

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
60	16	13	9	11	1	86	0	5

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0461

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443509N 1113725W	SAMPLE LOCATION	14S 1E 29ACD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	817-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7120. FT <5
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WATER	1 FT
TIME SAMPLED	1304	STAGE HEIGHT	.
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	.
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE 1.5 MI SE OF WALSH RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	42.2	2.106	BICARBONATE (HCO3)	184.	3.016
MAGNESIUM (MG)	13.	1.069	CARBONATE (CO3)	3.8	0.127
SODIUM (NA)	1.4	0.061	CHLORIDE (CL)	.80	0.023
POTASSIUM (K)	.8	0.020	SULFATE (SO4)	5.2	0.108
IRON (FE)	.02	0.001	NITRATE (AS N)	.043	0.003
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	9.0		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.258	TOTAL ANIONS		3.276

STANDARD DEVIATION OF ANION - CATION BALANCE 0.13 SIGMA

LABORATORY PH	8.47	TOTAL HARDNESS AS CaCO3	159.
FIELD TEMPERATURE	6.5 C	TOTAL ALKALINITY AS CaCO3	157.
CALCULATED DISSOLVED SOLIDS	167.0	SODIUM ADSORPTION RATIO	0.0
SUM OF DISS. CONSTITUENTS	260.4	RYZMAR STABILITY INDEX	6.8
LAB SPEC. COND. (MICROMHOS/CM)	292.8	LANGLIER SATURATION INDEX	0.8

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 261.7
 ALUMINUM, DISS (MG/L=AL) < .05
 TEMPERATURE, AIR (C) 12.25

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*TD#0.3*MADISON LS
 15 IN FLOAT W/ MINOR SCHIST

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
64	32	1	0	0	3	92	3	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0462

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443504N 1113725W	SAMPLE LOCATION	14S 1E 29DBAB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	818-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7110. FT <5
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1345	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	. .
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	
SAMPLE HANDLING	3120	WATER FLOW RATE	.
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 1.5 MI SE OF WALSH RANCH
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	13.2	0.659	BICARBONATE (HCO3)	54.9	0.900
MAGNESIUM (MG)	2.4	0.197	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.3	0.100	CHLORIDE (CL)	.60	0.017
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	3.4	0.071
IRON (FE)	.02	0.001	NITRATE (AS N)	.056	0.004
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	13.0		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		0.985	TOTAL ANIONS		0.991

STANDARD DEVIATION OF ANION - CATION BALANCE 0.06 SIGMA

LABORATORY PH	7.48	TOTAL HARDNESS AS CaCO3	43.
FIELD TEMPERATURE	4.3 C	TOTAL ALKALINITY AS CaCO3	45.
CALCULATED DISSOLVED SOLIDS	63.2	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	91.1	RYZMAR STABILITY INDEX	9.9
LAB SPEC. COND. (MICROMHOS/CM)	98.6	LANGLIER SATURATION INDEX	-1.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 97.1 TEMPERATURE, AIR (C) 13.0
 ALUMINUM, DISS (MG/L-AL) < .05

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SPRING IS DOWN FROM JULY

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
66	20	10	2	1	7	91	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0463

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443614N 1113509W	SAMPLE LOCATION	14S 1E 22ABCC
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	819-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6775. FT <5
DATE SAMPLED	10-01-77	TOTAL DEPTH OF WATER	2 FT
TIME SAMPLED	1530	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-15-77	FLOW MEAS METHOD	FLOAT AND STOPW
SAMPLE HANDLING	3120	WATER FLOW RATE	2.76 CFS(M
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE
SAMPLING SITE	CORRAL CK AT TOBE MORTON RANCH		
DRAINAGE BASIN	RED ROCK RIVER		

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	27.6	1.377	BICARBONATE (HCO3)	136.	2.229
MAGNESIUM (MG)	12.4	1.020	CARBONATE (CO3)	5.0	0.167
SODIUM (NA)	1.3	0.057	CHLORIDE (CL)	.40	0.011
POTASSIUM (K)	.5	0.013	SULFATE (SO4)	6.0	0.125
IRON (FE)	<.01	0.000	NITRATE (AS N)	.023	0.002
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	10.9		0-PHOSPHATE (AS P)		

TOTAL CATIONS 2.467 TOTAL ANIONS 2.533

STANDARD DEVIATION OF ANION - CATION BALANCE 0.46 SIGMA

LABORATORY PH	8.48	TOTAL HARDNESS AS CaCO3	120.
FIELD TEMPERATURE	6.1 C	TOTAL ALKALINITY AS CaCO3	120.
CALCULATED DISSOLVED SOLIDS	131.2	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	200.2	RYZNAR STABILITY INDEX	7.4
LAB SPEC. COND. (MICROMHOS/CM)	222.7	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 200.3 TEMPERATURE, AIR (C) 5.5
 ALUMINUM, DISS (MG/L=AL) .07

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT *MORTONS USE WATER FOR DOMESTIC STOCK

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
55	41	2	0	0	4	88	6	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0464

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443903N 1113214W	SAMPLE LOCATION	13S 1E 36DDD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*F	BOTTLE NO.	821-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7405. FT <1
DATE SAMPLED	10-02-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1315	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	2.5 GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE SPNG HEAD OF LONE TREE CREEK
 DRAINAGE BASIN MADISON RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	5.9	0.294	BICARBONATE (HCO3)	29.9	0.490
MAGNESIUM (MG)	1.8	0.148	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.8	0.122	CHLORIDE (CL)	2.25	0.063
POTASSIUM (K)	.6	0.015	SULFATE (SO4)	.2	0.004
IRON (FE)	.24	0.013	NITRATE (AS N)	<.023	0.000
MANGANESE (MN)	.09	0.003	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SI02)	9.8		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		0.596	TOTAL ANIONS		0.558

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.33 SIGMA

LABORATORY PH	7.18	TOTAL HARDNESS AS CaCO3	22.
FIELD TEMPERATURE	8.5 C	TOTAL ALKALINITY AS CaCO3	25.
CALCULATED DISSOLVED SOLIDS	38.5	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	53.7	RYZNAR STABILITY INDEX	11.4
LAB SPEC. COND. (MICROMHOS/CM)	59.6	LANGLIER SATURATION INDEX	-2.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	61.7	TEMPERATURE, AIR (C)	15.75
ALUMINUM, DISS (MG/L=AL)	.09		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*FINE BROWN SILT ON BOTTOM

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
50	25	21	2	11	0	87	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0466

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE		SAMPLE LOCATION	136 2E 32CAB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41#F	BOTTLE NO.	822=CV
AGENCY + SAMPLER	MBMG + WMB	ALTITUDE OF SAMPLE POINT	7680. FT <50
DATE SAMPLED	10-02-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1500	STAGE HEIGHT	
LAB + ANALYST	MBMG + GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	FLOAT AND STOPWA
SAMPLE HANDLING	3120	WATER FLOW RATE	CFS(M)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE
SAMPLING SITE	MAIN SPRING HEADWATER FOR ANTELOPE CREEK		
DRAINAGE BASIN	MADISON RIVER		

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	5.7	0.284	BICARBONATE (HCO3)	34.5	0.565
MAGNESIUM (MG)	3.0	0.247	CARBONATE (CO3)	0	0.000
SODIUM (NA)	1.9	0.083	CHLORIDE (CL)	1.15	0.032
POTASSIUM (K)	.3	0.008	SULFATE (SO4)	1.3	0.027
IRON (FE)	.03	0.002	NITRATE (AS N)	0.300	0.021
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	16.7		0=PHOSPHATE (AS P)		
TOTAL CATIONS		0.623	TOTAL ANIONS		0.646

STANDARD DEVIATION OF ANION - CATION BALANCE 0.18 SIGMA

LABORATORY PH	7.15	TOTAL HARDNESS AS CaCO3	27
FIELD TEMPERATURE	4.9 C	TOTAL ALKALINITY AS CaCO3	28
CALCULATED DISSOLVED SOLIDS	47.5	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	65.0	RYZMAR STABILITY INDEX	11.3
LAB SPEC. COND. (MICROMHOS/CM)	63.9	LANGLIER SATURATION INDEX	-2.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	64.7	TEMPERATURE, AIR (C)	9.0
ALUMINUM, DISS (MG/L=AL)	.07		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*WATER IS COMING OUT FROM UNDER A PINE TREE

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL BUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES								
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
45	39	13	1	5	4	90	0	3

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0467

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443556N 1114211W	SAMPLE LOCATION	14S 1W 22DAB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	823-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6640. FT <1
DATE SAMPLED	10-03-77	TOTAL DEPTH OF WATER	2 FT
TIME SAMPLED	1137	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	FLOAT AND STOPW
SAMPLE HANDLING	3120	WATER FLOW RATE	2.0 CFS(M
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE 1.25 MI E OF UPPER RED RK LK CAMPGROUND
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	48.8	2.435	BICARBONATE (HCO3)	228.	3.737
MAGNESIUM (MG)	16.9	1.390	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	1.4	0.061	CHLORIDE (CL)	.40	0.011
POTASSIUM (K)	.9	0.023	SULFATE (SO4)	5.0	0.104
IRON (FE)	.03	0.002	NITRATE (AS N)	.183	0.013
MANGANESE (MN)	.02	0.001	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	6.4		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.912	TOTAL ANIONS		3.865

STANDARD DEVIATION OF ANION - CATION BALANCE = -0.28 SIGMA

LABORATORY PH	7.95	TOTAL HARDNESS AS CaCO3	191.
FIELD TEMPERATURE	7.0 C	TOTAL ALKALINITY AS CaCO3	187.
CALCULATED DISSOLVED SOLIDS	192.4	SODIUM ADSORPTION RATIO	0.0
SUM OF DISS. CONSTITUENTS	308.1	RYZNAR STABILITY INDEX	7.0
LAB SPEC. COND. (MICROMHOS/CM)	346.5	LANGLIER SATURATION INDEX	0.5

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 308.7
 ALUMINUM, DISS (MG/L-AL) < .05
 TEMPERATURE, AIR (C) 24.5

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SPRING FIELD W/
 MANY SPRINGS

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
62	35	1	0	0	2	97	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0468

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443660N 1113253W	SAMPLE LOCATION	14S 1E 13BDA
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	824-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6800. FT <5
DATE SAMPLED	10-03-77	TOTAL DEPTH OF WATER	4 FT
TIME SAMPLED	1300	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	FLOAT AND STOPW
SAMPLE HANDLING	3120	WATER FLOW RATE	2.24 CFS(M
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC AND ST
SAMPLING SITE	E. HUNTSMAN RANCH	EAST ALASKA BASIN	
DRAINAGE BASIN	RED ROCK RIVER		

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	30.	1.497	BICARBONATE (HCO3)	187.	3.065
MAGNESIUM (MG)	18.7	1.538	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.4	0.104	CHLORIDE (CL)	1.45	0.041
POTASSIUM (K)	1.1	0.028	SULFATE (SO4)	.9	0.019
IRON (FE)	<.01	0.000	NITRATE (AS N)	.255	0.018
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SIO2)	13.9		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		3.168	TOTAL ANIONS		3.148

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.12 SIGMA

LABORATORY PH	7.99	TOTAL HARDNESS AS CaCO3	152.
FIELD TEMPERATURE	8.1 C	TOTAL ALKALINITY AS CaCO3	153.
CALCULATED DISSOLVED SOLIDS	160.9	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	255.8	RYZNAR STABILITY INDEX	7.6
LAB SPEC. COND. (MICROMHOS/CM)	283.8	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS	
CNDUCTVY, FIELD MICROMHOS	264.2
ALUMINUM, DISS (MG/L-AL)	.08
TEMPERATURE, AIR (C)	16.0

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SEND COPY TO E.HUNTSMAN DELL MT.

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
47	48	3	0	1	0	98	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0469

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443556N 1114107W	SAMPLE LOCATION	14S 1W 23DBA
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	110ALVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	825-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6635. FT <11
DATE SAMPLED	10-03-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1500	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-08-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	0.1 GPM(E
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE 2 MI E OF UPPER RED RK LAKE CAMPGROUND
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	62.	3.094	BICARBONATE (HCO3)	276.	4.523
MAGNESIUM (MG)	18.3	1.505	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	2.8	0.122	CHLORIDE (CL)	1.50	0.042
POTASSIUM (K)	.6	0.015	SULFATE (SO4)	5.3	0.110
IRON (FE)	<.01	0.000	NITRATE (AS N)	.269	0.019
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SI02)	10.3		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		4.737	TOTAL ANIONS		4.700

STANDARD DEVIATION OF ANION - CATION BALANCE = 0.21 SIGMA

LABORATORY PH	8.12	TOTAL HARDNESS AS CaCO3	230.
FIELD TEMPERATURE	16.8 C	TOTAL ALKALINITY AS CaCO3	226.
CALCULATED DISSOLVED SOLIDS	237.1	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	377.2	RYZMAR STABILITY INDEX	6.5
LAB SPEC. COND. (MICROMHOS/CM)	412.5	LANGLIER SATURATION INDEX	0.8

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	397.1	TEMPERATURE, AIR (C)	17.5
ALUMINUM, DISS (MG/L=AL)	.06		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SOURCE IS MORE OF A BOG THEN SPNG.*TOOK SCDFM ATTRUCK

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
65	31	2	0	0	2	96	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0470

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE-LONGITUDE	443844N 1115335W	SAMPLE LOCATION	14S 2W 6BDD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	RESERVOIR
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	826-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6605. FT <1
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WATER	2 FT
TIME SAMPLED	0930	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	12-09-77	FLOW MEAS METHOD	GURLEY METER
SAMPLE HANDLING	3120	WATER FLOW RATE	83.69 CFS(M
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE
SAMPLING SITE LOWER RED ROCK LAKE DAM			
DRAINAGE BASIN RED ROCK RIVER			

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	21.1	1.053	BICARBONATE (HCO3)	139.	2.278
MAGNESIUM (MG)	13.5	1.111	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	6.1	0.265	CHLORIDE (CL)	2.90	0.082
POTASSIUM (K)	1.8	0.046	SULFATE (SO4)	5.3	0.110
IRON (FE)	.10	0.005	NITRATE (AS N)	.077	0.005
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	10.1		0-PHOSPHATE (AS P)		
TOTAL CATIONS		2.480	TOTAL ANIONS		2.486

STANDARD DEVIATION OF ANION - CATION BALANCE 0.04 SIGMA

LABORATORY PH	7.93	TOTAL HARDNESS AS CaCO3	108.
FIELD TEMPERATURE	6.2 C	TOTAL ALKALINITY AS CaCO3	114.
CALCULATED DISSOLVED SOLIDS	129.7	SODIUM ADSORPTION RATIO	0.3
SUM OF DISS. CONSTITUENTS	200.2	RYZMAR STABILITY INDEX	8.2
LAB SPEC. COND. (MICROMHOS/CM)	225.4	LANGLIER SATURATION INDEX	-0.1

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	187.3	TEMPERATURE, AIR (C)	1.50
ALUMINUM, DISS (MG/L-AL)	.06		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*WATER IS MURKY *
NORMAL WATER LEVEL

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
FUND: /

PERCENTAGE REACTANCE VALUES

CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3
42	44	10	1	3	4	92	0	0

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0471

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443558N 1114841W	SAMPLE LOCATION	14S 2W 23CAA
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	WELL
GEOLOGICAL SOURCE	111CLVM	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	827-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6720. FT <50
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WELL	50 FT
TIME SAMPLED	1135	DEPTH WATER ENTERS WELL	
LAB + ANALYST	MBMG * GAM	SWL ABOVE(+) OR BELOW GS	20. FT (F)
DATE ANALYZED	12-09-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	30. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE US FISH AND WILDLIFE WELL LAKEVIEW MT
 GEOLOGICAL SOURCE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	42.2	2.106	BICARBONATE (HCO3)	173.	2.835
MAGNESIUM (MG)	6.7	0.551	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.6	0.200	CHLORIDE (CL)	.95	0.027
POTASSIUM (K)	2.3	0.059	SULFATE (SO4)	4.4	0.092
IRON (FE)	.01	0.001	NITRATE (AS N)	.450	0.032
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.1	0.005
SILICA (SI02)	24.4		O-PHOSPHATE (AS P)		

 TOTAL CATIONS 2.916 TOTAL ANIONS 2.991

STANDARD DEVIATION OF ANION - CATION BALANCE 0.49 SIGMA

LABORATORY PH	7.97	TOTAL HARDNESS AS CaCO3	133.
FIELD TEMPERATURE	8.3 C	TOTAL ALKALINITY AS CaCO3	142.
CALCULATED DISSOLVED SOLIDS	171.3	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	259.1	RYZMAR STABILITY INDEX	7.4
LAB SPEC. COND. (MICROMHOS/CM)	268.0	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS
 CONDUCTVY, FIELD MICROMHOS 239.1 ALUMINUM, DISS (MG/L-AL) .06

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*WELL APPROP ON
 FILE AT MBMG

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED; TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153) PERCENTAGE REACTANCE VALUES
 FUND: CG75/ CA MG NA K CL SO4 HCO3 CO3 NO3
 72 18 6 2 0 3 95 0 1

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0472

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443605N 1114841W	SAMPLE LOCATION	14S 2W 23BDD
TOPOGRAPHIC MAP	LOWER RED ROCK LAKE	SAMPLE SOURCE	STREAM
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	828-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6710. FT <50
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WATER	1 FT
TIME SAMPLED	1205	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-09-77	FLOW MEAS METHOD	GURLEY METER
SAMPLE HANDLING	3120	WATER FLOW RATE	5.7 CFS(M)
METHOD SAMPLED	GRAB	WATER USE	MULTIPLE USE

SAMPLING SITE SHAMBOW CK BELOW SCPTIC TANK*LAKEVIEW MT
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	30.6	1.527	BICARBONATE (HCO3)	126.	2.065
MAGNESIUM (MG)	4.6	0.378	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.2	0.183	CHLORIDE (CL)	.85	0.024
POTASSIUM (K)	2.1	0.054	SULFATE (SO4)	3.9	0.081
IRON (FE)	.01	0.001	NITRATE (AS N)	.108	0.008
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	<.1	0.000
SILICA (SIO2)	24.4		O=PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		2.142	TOTAL ANIONS		2.178

STANDARD DEVIATION OF ANION - CATION BALANCE 0.25 SIGMA

LABORATORY PH	8.20	TOTAL HARDNESS AS CaCO3	95.
FIELD TEMPERATURE	3.8 C	TOTAL ALKALINITY AS CaCO3	103.
CALCULATED DISSOLVED SOLIDS	132.9	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	196.9	RYZMAR STABILITY INDEX	7.7
LAB SPEC. COND. (MICROMHOS/CM)	199.7	LANGLIER SATURATION INDEX	0.2

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS 182.0 TEMPERATURE, AIR (C) 14.0
 ALUMINUM, DISS (MG/L=AL) < .05

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*WQB SENT LETTER
 STATING NOT POTABLE WATER

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
71	17	8	2	1	3	95	0	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0473

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	443830N 1113534W	SAMPLE LOCATION	14S 1E 3CBAD
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	400MPC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	829-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7520. FT <50
DATE SAMPLED	10-04-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1748	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-09-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	5. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE HUNTSMAN SPRING 1.5 MI SE OF ELK MTN
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	21.1	1.053	BICARBONATE (HCO3)	95.2	1.560
MAGNESIUM (MG)	8.7	0.716	CARBONATE (CO3)	5.5	0.183
SODIUM (NA)	2.7	0.117	CHLORIDE (CL)	2.25	0.063
POTASSIUM (K)	1.6	0.041	SULFATE (SO4)	8.0	0.167
IRON (FE)	.05	0.003	NITRATE (AS N)	.036	0.003
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SI02)	10.7		0-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		1.930	TOTAL ANIONS		1.987

STANDARD DEVIATION OF ANION - CATION BALANCE 0.42 SIGMA

LABORATORY PH	8.52	TOTAL HARDNESS AS CaCO3	88.
FIELD TEMPERATURE	13.0 C	TOTAL ALKALINITY AS CaCO3	87.
CALCULATED DISSOLVED SOLIDS	107.7	SODIUM ADSORPTION RATIO	0.1
SUM OF DISS. CONSTITUENTS	156.0	RYZNAR STABILITY INDEX	7.8
LAB SPEC. COND. (MICROMHOS/CM)	184.1	LANGLIER SATURATION INDEX	0.3

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	170.2	TEMPERATURE, AIR (C)	16.25
ALUMINUM, DISS (MG/L-AL)	.08		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*SPNG FEEDS DITCH*
 THIS IS W. MOST SPNG

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
54	37	6	2	3	8	79	9	0	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0474

STATE	MONTANA	COUNTY	MADISON
LATITUDE=LONGITUDE	444320N 1114255W	SAMPLE LOCATION	13S 1W 10BBA
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE		STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	830-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	7280. FT <50
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1305	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	
DATE ANALYZED	12-09-77	FLOW MEAS METHOD	FLOAT AND STOPWA'
SAMPLE HANDLING	3120	WATER FLOW RATE	0.94 CFS(M)
METHOD SAMPLED	GRAB	WATER USE	STOCK

SAMPLING SITE TEPEE CK SPRING 1 MI S OF SNOWSHOE PASS
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	21.6	1.078	BICARBONATE (HCO3)	88.2	1.446
MAGNESIUM (MG)	3.3	0.271	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.3	0.187	CHLORIDE (CL)	4.05	0.114
POTASSIUM (K)	3.4	0.087	SULFATE (SO4)	2.5	0.052
IRON (FE)	.04	0.002	NITRATE (AS N)	.309	0.022
MANGANESE (MN)	.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.2	0.011
SILICA (SIO2)	44.1		O-PHOSPHATE (AS P)		
		-----			-----
TOTAL CATIONS		1.626	TOTAL ANIONS		1.644

STANDARD DEVIATION OF ANION - CATION BALANCE 0.14 SIGMA

LABORATORY PH	7.69	TOTAL HARDNESS AS CaCO3	68.
FIELD TEMPERATURE	9.0 C	TOTAL ALKALINITY AS CaCO3	72.
CALCULATED DISSOLVED SOLIDS	127.3	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	172.0	RYZMAR STABILITY INDEX	8.8
LAB SPEC. COND. (MICROMHOS/CM)	158.1	LANGLIER SATURATION INDEX	-0.6

ADDITIONAL PARAMETERS

CONDUCTVY, FIELD MICROMHOS 141.9 TEMPERATURE, AIR (C) 19.5
 ALUMINUM, DISS (MG/L=AL) .05

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT * LIVESTOCK IN AREA

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)
 FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
66	16	11	5	7	3	89	0	1	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0475

STATE	MONTANA	COUNTY	BEAVERHEAD
LATITUDE=LONGITUDE	444015N 1113751W	SAMPLE LOCATION	13S 1E 29CAB
TOPOGRAPHIC MAP	UPPER RED ROCK LAKE	SAMPLE SOURCE	SPRING
GEOLOGICAL SOURCE	112VLCC	STATION CODE	
DRAINAGE BASIN	41*A	BOTTLE NO.	831-CV
AGENCY + SAMPLER	MBMG * WMB	ALTITUDE OF SAMPLE POINT	6710. FT <50
DATE SAMPLED	10-05-77	TOTAL DEPTH OF WATER	
TIME SAMPLED	1454	STAGE HEIGHT	
LAB + ANALYST	MBMG * GAM	DEPTH TO SAMPLING POINT	.
DATE ANALYZED	12-09-77	FLOW MEAS METHOD	NOT USED
SAMPLE HANDLING	3120	WATER FLOW RATE	30. GPM(E)
METHOD SAMPLED	GRAB	WATER USE	DOMESTIC

SAMPLING SITE ELK LAKE CAMP WATER SUPPLY
 DRAINAGE BASIN RED ROCK RIVER

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	20.	0.998	BICARBONATE (HCO3)	79.5	1.303
MAGNESIUM (MG)	3.0	0.247	CARBONATE (CO3)	.0	0.000
SODIUM (NA)	4.2	0.183	CHLORIDE (CL)	3.65	0.103
POTASSIUM (K)	3.6	0.092	SULFATE (SO4)	2.2	0.046
IRON (FE)	.03	0.002	NITRATE (AS N)	.456	0.033
MANGANESE (MN)	<.01	0.000	NO3+NO2 TOT (AS N)		
ALUMINUM (AL)			FLUORIDE (F)	.3	0.016
SILICA (SI02)	48.3		O=PHOSPHATE (AS P)		

 TOTAL CATIONS 1.521 TOTAL ANIONS 1.500

STANDARD DEVIATION OF ANION - CATION BALANCE =0.16 SIGMA

LABORATORY PH	7.89	TOTAL HARDNESS AS CaCO3	62.
FIELD TEMPERATURE	9.0 C	TOTAL ALKALINITY AS CaCO3	65.
CALCULATED DISSOLVED SOLIDS	124.9	SODIUM ADSORPTION RATIO	0.2
SUM OF DISS. CONSTITUENTS	165.2	RYZMAR STABILITY INDEX	8.8
LAB SPEC. COND. (MICROMHOS/CM)	147.1	LANGLIER SATURATION INDEX	-0.4

ADDITIONAL PARAMETERS

CNDUCTVY, FIELD MICROMHOS	113.7	TEMPERATURE, AIR (C)	16.25
ALUMINUM, DISS (MG/L=AL)	.05		

REMARKS: C+G 75 CENTENNIAL VALLEY GEOTHERMAL PROJECT*H2O TAKEN FROM
 TAP OUTSIDE CABIN 3*SPNG DEVELOPED W/ RAM=ROD PUMP

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVILENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED: TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M = METERS

PROCESSING PGM: GWANAL (FORM 153)

FUND: CG75/

PERCENTAGE REACTANCE VALUES									
CA	MG	NA	K	CL	SO4	HCO3	CO3	NO3	
65	16	12	6	7	3	89	0	2	

NOTE: IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 78M0476

Personnel changes since the last report consist of Wes Bermel leaving the project and the Bureau to accept a position with industry.

Work schedules through September 30, 1978, includes:

- (1) Printing and distribution of the Hardrock report.
- (2) Field work in the Centennial and Madison Valleys. Primary emphasis will be hydrologic measurement and geologic mapping.
- (3) Finishing the initial warm spring inventory and submitting the coded forms to the U.S.G.S. by July 1, 1978.
- (4) Geophysical investigations in the Deer Lodge Valley and elsewhere to increase knowledge of hot spring areas and to promote drilling to better define the nature of the resource.
- (5) Investigate warm wells and areas that may contain warm springs, which could not be included in the work due by July 1 because of the short time available.