D. Foley

GL04238

A PROPOSAL TO CONTINUE THE INVESTIGATION OF UTAH'S LOW TEMPERATURE GEOTHERMAL RESOURCES

INTRODUCTION

Under contract with the U.S. Department of Energy (DOE), the Utah Geological and Mineral Survey (UGMS) has been conducting research to advance the utilization of low temperature geothermal heat in the state of Utah. The original contract, designated as no. EG-77-S-07-1679 but later changed to no. DE-AS07-77ET28393, started on July 1, 1977. After two extensions, this contract will end on May 31, 1979. The amount of funding allocated to Utah Geological and Mineral Survey, by DOE, for the contract period was $175,130.00.

As a result of Utah Geological and Mineral Survey work on this contract, a PON has been awarded to the Utah State Energy Office for continued investigation of the Crystal Hot Springs resource as a source of heat for the Utah State Prison. Utah Geological and Mineral Survey has committed three man month towards the PON work.

To date, Utah Geological and Mineral Survey has provided the following documents to DOE:

1. Technical Report for 7-1-77 to 10-22-77
2. Environmental Assessment of Proposed Shallow Temperature Gradient Holes at Crystal Hot Springs in Southern Salt Lake County, Utah, by P. J. Murphy, 1-20-78
3. Environmental Assessment of Proposed Shallow Temperature Gradient Wells near Midway, Wasatch County, Utah, by James F. Kohler, 1-13-78
4. Technical Progress Report for 10-21-77 to 1-31-78
5. Technical Progress Report for 2-1-78 to 5-31-78
6. Environmental Assessment of Proposed Shallow Temperature Gradient Holes, Northern Utah Sites, by P. J. Murphy, 1978
7. Technical Progress Report for 6-1-78 to 12-31-78
8. Thermal Waters of Utah, by H. D. Goode, November, 1978

THIS PROPOSAL

Utah Geological and Mineral Survey proposes to concentrate its efforts in the north-central portion of the state, along the Wasatch Front, where both the majority of Utah's population and the existence of apparent low temperature geothermal resources coincide (see figure 1).

Work during the proposed contract period will be directed towards the following:

I. Evaluation of the potential geothermal resources of the Jordan Valley (see the shaded area in figure 1).
II. Additional studies on specific hot spring areas
III. Continued work on GEOTHERM file
IV. Continued work on State Geothermal Resources Map
V. Report writing

TECHNICAL DISCUSSION

I. Evaluation of the potential geothermal resources of the Jordan Valley.

Both hot springs and warm water wells are found within the Jordon Valley, which includes much of Salt Lake County and in which a large portion of the population of the state of Utah resides. Water temperatures as high as 30.5°C have been reported in water wells completed to depths of less than 1,000 feet, and spring temperatures as high as 85°C have been measured. Such occurrences may indicate the existence of a much warmer source at depth that is being masked by the near surface hydrologic systems. It has been noted that elevated ground water temperatures are found in those regions of the valley where the depth to bedrock is relatively shallow. To determine the source, distribution, and potentially useful thermal energy of these waters, the following study is planned:

a. Compile all existing geological and geophysical data. Expected time required will be one man month.
b. Compile all existing water data including analyses, temperatures and pertinent well records. Expected time required will be three man months.
c. Collect water samples and prepare them for analysis, collect water temperatures and gradient information. Expected time required is four man months.
d. Plan, contract for, and interpret gravity and ground magnetic surveys as needed to supplement existing work. Expected time required is two man months.
e. Plan, contract for flying, and interpret aeromagnetic surveys to assist in structural interpretation (approximately 450 square miles). Expected time required is one man month.

f. Contract for drilling three to four deep (to 1,000 feet) temperature gradient holes. Expected time required is three man months.

II. Study of other hot spring areas

Six hot spring areas have been investigated under contract DE-AS07-77ET 28393. Two of these areas, Crystal Hot Springs and Warm Springs fault, fall within the proposed Jordon Valley study. It is proposed that knowledge of the other four areas--Utah Hot Springs, Crystal Madsen Hot Springs, Little Mountain South and Udy Hot Springs--be expanded through gravity and aeromagnetic surveys to help define the structural controls beneath the alluvium. The time expected to plan, conduct, and interpret the surveys is two man months.

UGMS will add: other appropriate geoscientific studies

III. GEOTHERM file

Utah Geological and Mineral Survey has submitted over 650 entries to the GEOTHERM file of the USGS under contract DE-AS07-77ET28393. All of the records pertain to waters 20°C or greater. The greater portion of all published water data within this temperature range has been entered. Future GEOTHERM work will include (1) correction of data already submitted, (2) updating with new or overlooked data, and (3) the submission of approximately 1,600 records dealing with waters in the temperature range of 15.5 to 19.5°C. The time expected to complete the work is two man months.

IV. State Geothermal Resources Map

Two maps will ultimately be provided by NOAA, through the DOE geothermal resources program; a public interest type and a scientific type. Under contract DE-AS07-77ET28393, the main contribution to the state map effort by Utah Geological and Mineral Survey was the data submitted to the GEOTHERM file. The main thrust of Utah Geological and Mineral Survey this year will be to provide data to complete the public interest map; however, data for the scientific map will be collected. Data for the public interest map will include the following: areas within the state favorable for potential low temperature geothermal resources, thermal wells and springs, on KGRA's. The map will probably be 1:500,000 scale on a shaded relief of Utah and have explanatory notes in areas of special interest. The time expected to complete the work is one man month.

V. Report Writing

Report writing will consist of quarterly progress reports and a final report covering the various phases of the year's work. The estimated time required for analysis and report writing will be four man months.

VI. Cost Estimate

PERSONNEL:			DOE	UGMS
J. W. Gwynn, Ph. D.	40% time	5 months		$10,123.00
P. J. Murphy	100% time	12 months		16,680.00
P. A. Sturm	10% time	1 month		1,530.00
Benefits	25%			7,083.00
Geologic Aide		8 months	$6,000.00	
Benefits	10%		600.00	
Total personnel costs		26 months	$6,600.00	$35,416.00

TRAVEL:	8,000 mi @ 0.25/mile	$2,000.00
PER DIEM	30 days @ $27.50 /day	825.00

EQUIPMENT* - for use in Jordon Valley investigation and at other hot spring locations.

PH - selective ion meter and probes, etc.	$2,000.00
Replacement cable, temp. probe	1,200.00
Pygmy current meter	650.00
Water sampling pump and filters	570.00
	$4,420.00

*Cost of these items may be taken up by DOE - Idaho Falls funding.

Miscellaneous supplies (maps, pipe, photos, etc.)	1,000.00
Printing, reproductions, drafting, etc.	2,500.00

Contracted or Purchased Services

Drilling - 3500' @ $25/foot	$ 87,500.00	
Aeromagnetic and reduction - 2,500 line miles @ $8.00/line mile	20,000.00	
Gravity and reduction - 1500 stations @ $40/station	60,000.00	
Computer services	500.00	
Water chemistry - 40 samples @ $100/sample	4,000.00	
Overhead (42% x 42,016)	17,647.00	
Total	$ 206.992.00	$ 35,416.00
	85%	15%

VII. Work Schedule

Work under this proposal will commence on June 1, 1979 and continue through May 31, 1980.

VIII. Personnel

Project Manager	J. Wallace Gwynn, PH. D.	- 50% time
Principal Investigator	P. J. Murphy	100% time
Investigator	P. A. Sturm	10% time
Geologic Aide	D. Postle (contract)	66% time

DONALD T. MC MILLAN
Director

J. WALLACE GWYNN
Project Manager

PETER J. MURPHY
Principal Investigator

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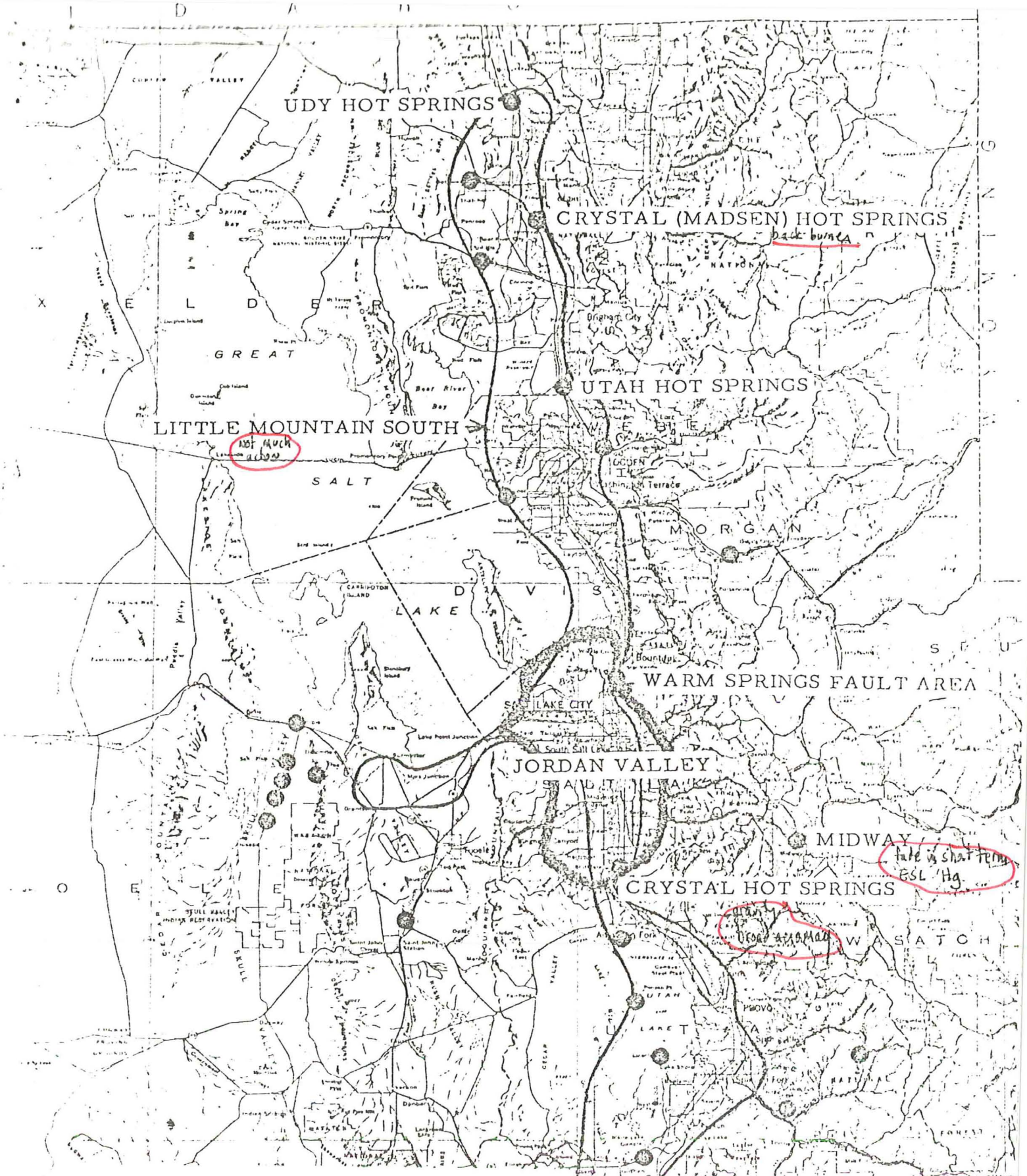

AREA OF APPARENT GEOTHERMAL RESOURCES

GEOTHERMAL SPRING

Figure 1