

CONTRACTOR: State of Utah
Utah Geological and Mineral Survey

APPENDIX A

For the Contract Period July 1, 1977 through June 30, 1978

Article A-I RESEARCH TO BE PERFORMED BY CONTRACTOR

(a) The scope of the work under this contract is unclassified, and the Contractor under this agreement with the Energy Research and Development Administration will perform research to advance the utilization of low temperature geothermal heat in the State of Utah, which in general will consist of the following:

- ✓ 1. Accomplish a preliminary synthesis of the data presently available concerning the distribution of the potential low and moderate temperature geothermal resources in the State of Utah.
- ✓ 2. Conduct preliminary field surveys of promising sites identified on the basis of existing information. This initial study phase at each site may include any or all of the following activities: geologic mapping, recording water and soil temperatures, profiling well temperatures, measuring electrical resistivity and the drilling of 70 to 100 meter geothermal gradient holes.
- ✓ 3. Subcontract for preliminary environmental assessments of areas being examined as potential reservoir confirmation sites.
- ✓ 4. Provide a project coordinator who will be responsible for the integration of related State and Federal geoscience research projects potentially contributing to the low and moderate temperature geothermal resource inventory.

(b) The scope of work shall include such other studies, investigations, and services as may be mutually agreed upon.

Article A-II WAYS AND MEANS OF PERFORMANCE

(a) Items for which support will be provided as indicated in A-III below:

1. Project Manager	-0-
2. Principal Investigator	\$15,000.00
3. Project Geologist	-0-
4. Geologic Aide	8,000.00

5. Employee Benefits	\$1,600.00
6. Travel	5,175.00
7. Per diem	2,075.00
8. Maps and Airphotos	2,000.00
9. Power Auger	250.00
10. Down-hole Thermometer, Reel and Cable	3,000.00
11. Drafting and Reproduction	2,200.00
12. Computer Time	500.00
13. Thermal Gradient Holes (20 @ \$2,000 each)	40,000.00
14. Water Analyses	2,330.00
15. Environmental Analysis	7,000.00
16. Overhead	<u>4,500.00</u>
TOTAL	<u>\$93,630.00</u>

(b) Items, if any, significant to the performance of this contract, but excluded from computation of Support Cost and from consideration in proportioning costs:

None

(c) Time or effort of Principal Investigator(s) including indirect costs and fringe benefits contributed by the Contractor but excluded from computation of Support Cost and consideration in proportioning costs:

\$28,440.00 for time of Project Manager, Principal Investigator, and Project Geologist, plus fringe benefits.

Article A-III FUNDING

The total estimated cost of items under A-II(a) above, for the contract period stated in this Appendix A, is \$93,630.00. ERDA will pay 100% of the actual costs of these items incurred during the contract period stated in this Appendix A, subject to the provisions of Article III and Article B-XXVIII. The estimated ERDA Support Cost for the contract period stated in this Appendix A is \$93,630.00.

The estimated ERDA Support Cost is funded as follows:

(a) Estimated unexpended balance from prior period(s)	\$ <u>- 0 -</u>
(b) New funds for the current period	<u>\$93,630.00</u>

RECEIVED

FEB 14 1978

J. L. Griffith

Modification No. A001
Supplemental Agreement to *File # 35*
Contract No. EG-77-S-07-1679 : # 1679

File 4m29

SUPPLEMENTAL AGREEMENT

GEOHERMAL ENERGY
BRANCH

THIS SUPPLEMENTAL AGREEMENT, entered into the 9th day of February 1978, (effective as of the 1st day of December 1977) by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the DEPARTMENT OF ENERGY (hereinafter called "DOE")(formerly the Energy Research and Development Administration "ERDA"), and UTAH GEOLOGICAL AND MINERAL SURVEY, an agency of the State of Utah, Department of Natural Resources with its principal office at Salt Lake City, Utah (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, on August 19, 1977, effective as of the 1st day of July 1977, the Government and the Contractor entered into Contract No. EG-77-S-07-1679 for the Contractor to perform certain research work; and

WHEREAS, the parties desire to modify said contract as hereinafter provided; and

WHEREAS, DOE certifies that this Supplemental Agreement is authorized by and executed under Section 302(c)(5) and (15) of the Federal Property and Administrative Services Act of 1949, as amended, and the Department of Energy Organization Act of 1977 (Public Law 95-91), and other applicable laws;

NOW, THEREFORE, said contract is hereby amended as follows:

A. ARTICLE II, "THE PERIOD OF PERFORMANCE," is amended as follows:

"The period of performance for the research set forth in Appendix A is hereby extended from June 30, 1978 to December 31, 1978. The period of performance may be further extended by mutual written agreement of the parties."

B. ARTICLE III, "CONSIDERATION," is hereby revised to increase the contract Support Ceiling to a total of One Hundred Seventy-Five Thousand One Hundred Thirty Dollars (\$175,130).

C. APPENDIX A is hereby revised as follows:

(1) Article A-II, "WAYS AND MEANS OF PERFORMANCE," is revised by adding the following two new paragraphs:

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br:CC-A-16

CONFORMED COPY

CONTRACTOR: STATE OF UTAH
UTAH GEOLOGICAL AND MINERAL SURVEY

APPENDIX A2

For the Contract Period May 31, 1979, through May 31, 1980.

Article A-1 - RESEARCH TO BE PERFORMED BY CONTRACTOR

(a) The scope of the work under this contract is unclassified and the Contractor under this contract with the Department of Energy will perform the following:

1. Determine the source, distribution, and potentially useful thermal energy of geothermal resources in the Jordan Valley by performing the following research:
 - 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.
2. Conduct gravity and aeromagnetic surveys to help define the structural controls beneath the alluvium at Utah Hot Springs, Crystal Madsen Hot Springs, Little Mountain South and Udy Hot Springs. The time expected to plan, conduct, and interpret the surveys is two man months.
3. The Contractor 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. The Contractor

shall revise data in the GEOTHERM file including (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.

(b) The scope of work shall include such other studies investigations and services as may be mutually agreeable to the parties.

Article A-II - WAYS AND MEANS OF PERFORMANCE

(a) Items for which support may be provided as indicated in Article A-III below:

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% - 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
 PER DIEM: 30 days @ \$27.50/day

EQUIPMENT:

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 filter	570.00
	<u>\$4,420.00</u>

MISCELLANEOUS SUPPLIES (maps, pipe, photos, etc.): 1,008.00

PRINTING, REPRODUCTION, 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 - total Salaries, Wages & Benefits)	<u>17,647.00</u>	
	\$207,000.00	\$35,416.00

(b) Items, if any, significant to the performance of this contract, but excluded from computation of Support Cost and from consideration in proportioning costs:

None

(c) Time or effort of Contractor personnel contributed by the Contractor but excluded from computation of Support Cost and consideration in proportioning costs:

\$35,416.00 for time of J. W. Gwynn, P. J. Murphy, and P. A. Sturm plus fringe benefits.

Article A-III - FUNDING

The total estimated cost of items under A-II(a) above, for the contract period stated in this Appendix A1 is \$242,416.00. DOE \$207,000.00 of the actual costs of these items incurred during the contract period stated in this Appendix A1, subject to the provisions of Article III and Article B-XXVIII. The total DOE share of \$207,000.00 is subject to downward adjustment based upon overhead rate that is approved by Department of Interior, Office of Inspector General, Sacramento, California.

The estimated DOE Support Cost is funded as follows:

(a) Estimated unexpended balance from prior period(s)	\$	<u>-0-</u>
(b) New funds for the current period	\$	<u>207,000.00</u>

Article A-IV - ADMINISTRATION AND REPORTS

- (a) Project Manager - J. W. Gwynn
Principal Investigator - P. J. Murphy

UTAH Geological and Mineral Survey

Contract # DE-ASO7-77 ET 28393

Mod. No. A002

Present Action: No-Cost time EXTENSION from 5/31/80
to 12/31/80

Effective DATE: April 1, 1980

Way and Means: Propose to delete from Scope of
work Task 1.F (drilling \$87,500) and
redistribute money to new proposed work
as follows:

(1) Add to Task 1e that a subsurface map
will be produced based on all geophysics
developed under TASK 1.

(2) Write in a whole new task NUMBERED "4" to
include:

4. Determine the source, distribution, and
potentially useful thermal energy of geothermal
resources in the Utah Valley, which is
SOUTH of the Jordan Valley, and that por-
tion of the Wasatch Front which lies
NORTH of the Jordan Valley to the
Utah-Idaho state line by performing
the following research:

a. Examine state well log records, and plot
locations of wells on 7.5 minute quadrangle

- maps and on 1:100,000 scale maps.
- b. Verify location, well status, ownership, water temperature, and collect water chemistry samples for analysis as part of a field reconnaissance study.
 - c. Initiate thermal gradient work on selected wells in promising locations within the study area.

Please incorporate this proposal into the SOW to cover the increased efforts proposed for existing tasks 1, 2, 3.