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DOE/RA/50076--T19

Monthly Report #1

for

DE-FC03-80RA50076

Amendment M007

DOE/RA/50076--T19

DE85 000284

to

Department of Energy
San Francisco Operations Office
1333 Broadway
Oakland, California 94612

MASTER

from

Arizona Solar Energy Commission
Capitol Tower, Room 502
1700 West Washington
Phoenix, Arizona 85007

Under the direction of:

James F. Warnock
Executive Director

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T.H.W. An Improved Silica Geothermometer for
Low Temperature Geothermal Resource Assessment

Monthly Progress Report
January - February, 1983

Work began on the geothermometer project named above on January 3, 1983. During the first month, three tasks have been started.

1. Literature search: Stone and Witcher have completed the literature search, which resulted in somewhat over 50 references (written since 1955) pertaining to low-temperature chemical reactions between natural waters and aluminosilicate minerals that add silica to ground water. The papers cover such specific topics as the chemical weathering of silicate minerals, the kinetics of silica-water reactions, the solubility of amorphous silica at 25°C, and chemical characteristics and equilibrium in natural water-felsic rock-CO₂ systems.

The Commission will be receiving from Stone and Witcher a complete description of the data analysis methods to be used. A review of the methodology and the assumptions will be made by the Commission staff to search for consistency in the method and unwanted bias.

2. Collection of available lithologic and drillers' logs: Stone and Witcher have reviewed the well files at the State of Arizona, Department of Water Resources, Phoenix and at the U. S. Geological Survey, Water Resources Division, Tucson. To date

they have identified more than 110 wells greater than 250 feet deep, for which partial or complete logs are on record. Some wells are more than 2,000 feet deep. Approximately 22 wells are in the immediate area of Buena Vista and 66 are in the Cactus Flat-Artesia area. This distribution is to be expected since the latter area is much larger than the former. The remaining wells cover the large region surrounding Buena Vista and Cactus Flat-Artesia. Information from the surrounding wells is essential also, as it will enable us to better understand subsurface formations as they lens and pinch out beneath San Simon Valley, and how such formations affect the reservoirs underlying the two areas of interest.

3. Field work: Stone and Witcher have ordered and taken delivery on the following equipment that is needed for collecting water samples:

- a. 80 Nalgene water bottles (two samples are taken at each site: one is acidified and one is left pure).
- b. Nalgene hand-operated vacuum pump for filtering water samples.
- c. 4 pH and 7 pH buffers.
- d. alkalinity and carbon dioxide kits for analysing these constituents in the field.

Water sampling has been delayed due to bad weather. Field work is expected to resume this week, however, and to finish before the end of February.

A tentative schedule from Stone and Witcher for completing tasks over the contract period follows:

February - March: complete literature review and compile bibliography, complete well log search and review complete water sampling in the field, complete progra of data analysis methodology.

March - April: complete water-chemistry search and compilation from the literature, construct geologic cross sections from well logs.

April - May: analyze temperature, pH, CO₂ relationships for published and new water chemical analysis, modify the silica geothermometer for low-temperature applications, determine reservoir temperatures at Buena Vista and Cactus Flat-Artesia with modified geothermometer and check for precision and accuracy.

May - June: write final report.

**Arizona
Solar
Energy
Commission**

Bruce Babbitt
Governor

James F Warnock Jr.
Executive Director

ABOVE ALL...SOLAR ENERGY.

February 15, 1983

Invoice #1

for

DE-FC03-8RA50076

Amendment M007

Period January 1, - February 11, 1983

Salaries.	\$ 9,083.33
Travel (field work)	101.96
Miscellaneous Supplies.	338.03
 Total Direct Cost	 \$ 9,523.32
Indirect Cost at 16%.	1,523.73
 Total Cost.	 \$11,047.05

Frank P. Mancini, Ph.D., P.E., C.E.M.
Associate Director for Engineering

Date