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"NOTHING WILL EVER BE ATTEMPTED IF ALL POSSIBLE OBJECTIONS MUST BE FIRST OVERCOME".

Samuel Johnson

CHANGE IN FORMAT

As you will note, the format of the Hot Line has changed from a printed to a mineograph sheet. The primary reason for the change is to eliminate the time lost in word processing, paste-up and printing. The information contained in the Hot Line will not change.

Editor

COSTA RICA

San Jose

On November 25, 1975, the Rogers Engineering Co., Inc. of San Francisco, announced that they have executed a contract with I.C.E. (the Costa Rican Institute of Electricity) to assist them in a first-phase effort directed at installing the first geothermal-electric power plant in Costa Rica. This contract will be partially financed with a loan from the Inter-American Development Bank.

The first-phase effort involves an evaluation of all scientific data on geothermal resources collected by I.C.E. in the Pailas-Hornillas Zone of the Cordillera Volcanica de Guanacaste, which is in the northwestern part of Costa Rica, not far from the border of Nicaragua. This zone has active surface manifestations which indicate a prime geothermal resource. Following the first-phase data evaluation, geologic and geophysical surveys will be conducted by I.C.E. and Rogers. The objective of the surveys is to locate sites where exploratory wells can be drilled during the next phase of the program.

As managers of this project, ROGERS has engaged specialists to assist in implementing this first-phase effort in geology, geophysics, geohydrology and geochemistry. These specialists include GeothermEx, Inc. of Berkeley, California and Dr. Henry J. Ramey, Jr. of Stanford University.

If the results of this first effort appear positive, the project will proceed through drilling and testing of exploratory wells, reservoir assessment and a feasibility study for installation of a geothermal electric power plant.

ICELAND

Krasla (North Central Iceland) (New 60 MW Geothermal Power Plant - See Hot Line Vol. 4, No. 4).

Rogers Engineering of San Francisco and their associates in Iceland, Thoroddsen and Partners, have worked diligently throughout the summer to complete, on schedule, the construction of the power plant building. The building was erected first to allow the construction of the machinery bases during the winter. The machinery is now being fabricated and deliveries to the site should start in early 1976.

When completed, the plant will produce 60 MW of electrical power and will be supplied by a geothermal reservoir that is now under development.

NEVADA

Churchill County

Chevron Oil Company

A permit to conduct geothermal test drilling in the Soda Lake area has been unanimously approved by the Churchill County Planning Commission. Chevron operator supervisor, Basil Garrett, said the first well would be drilled to a depth of 1067 m. This well would give information on how much heat there is, he said. He said also that a number of wells will be dug, but assured the commission that all holes will be capped and that the area would be fenced for safety.

Washoe County

Steamboat-Wabuska Geothermal Sale

A BLM news release states: "BLM has accepted bids of over \$109,000 for geothermal leasing rights to about 7200 acres of national resource lands in the Steamboat Springs area south of Reno, Nevada, and the Wabuska area north of Yerington, Nevada. The high bid at the September 23 lease sale in Reno was \$50,000 for leasing rights to 1550 acres in the Steamboat Springs Known Geothermal Resource Area. It was a joint bid by Phillips Petroleum Company and Gulf Oil Company. The other high bidder was Southern Union Production Company of Dallas, Texas, which offered about \$59,150 for leasing rights to 5650 acres split into 3 separate leasing units in the Wabuska Known Geothermal Resource Area. Southern Union is represented locally by Hydro-Search, Inc. of Reno.

Low-Temperature Geothermal Water: - Nevada Bureau of Mines and Geology has announced a new publication, entitled "Evaluation of Geothermal Activity in Truckee Meadows Washoe County, Nevada". It is listed as Report 25, and was published in cooperation with the Center for Water Resources Research of the Desert Institute.

The report, describing the geothermal waters of the Truckee Meadows, in which Reno is located, provides an accounting of present geothermal installations, outlines areas where the hot water occurs, and discusses the various factors involved in designing efficient heating systems.

Copies are available for \$2.50 from the Bureau office (Room 310, Scrugham Engineering-Mines Building, University of Nevada, Reno campus) or by mail (Nevada Bureau of Mines and Geology, University of Nevada, Reno, NV. 89507).

OREGON

Klamath Falls

Oregon Institute of Technology, Klamath Falls

In October 1975, the Geo-Heat Utilization Center at O.I.T. announced that ground was broken for a 30' X 60' greenhouse which will utilize the waste water effluent from the campus's geothermal heating system. The structure will be a part of the Oregon Agricultural Experimental station complex of facilities which are located throughout the state. Funding and supervision of construction is sponsored by the station while the operation and experimental use of the facilities will be shared by Oregon State University and O.I.T. faculty and students.

Initial experimentation with the facilities will be efficiency and cost analysis studies for various methods of utilizing the 135°F (57°C) effluent waters. A primary hot water line (directly from the wells) (190°F or 87°C) to the facilities will permit experimentation in high temperature ranges. The initial thrust of experimental work will be engineering in nature.

CALIFORNIA

Imperial Valley

On December 16, 1975, the Ben Holt Company of Pasadena, California and Procon Inc., of Des Plaines, Illinois announced the acceptance of a \$600,000 contract from the Electrical Power Research Institute of Palo Alto, California. The contract calls for a 12-month study to determine the technical, economic and environmental feasibility of a 25 to 50 MW electrical power demonstration plant for a low salinity geothermal reservoir in the Heber area of the Imperial Valley, California.

The contract calls for the Ben Holt Company to do the engineering design work and the Procon Company the environmental assessment. A third firm, Geonomics, Inc. of Berkeley, California, under contract to Ben Holt and Procon, will make an assessment of the reservoir.

The geothermal reservoir is being developed jointly by Magma Energy Company and Chevron Oil Co. In addition, San Diego Gas and Electric Co. has a considerable investment in utilization test equipment and test runs.

Imperial County

Dr. Jeff Wiegand, Project Administrator, announced that on June 26, 1975, the National Science Foundation awarded the County of Imperial a grant in the amount of \$364,000 for the development of a geothermal element to the County's general plan. A secondary product of the study will be a general "Utilization Plan" that can be used by other governmental entities in planning for the development of natural resources. The

grant represents a departure by the N.S.F.; this is the first time that a county has been awarded such an intergraded study.

The county has sub-contracted with the University of California at Riverside and California Institute of Technology to perform the relevant research which includes sections on: resource assessment, engineering, geology, environmental impact analysis, economics, sociology and political science/legal.

Three steering committees have been appointed. They are as follows:

1. Industry Council - composed of recognized leaders and experts in industry and government,
2. Management Review Committee - composed of the heads of various county departments, and
3. External Management Review Committee - composed of individuals from other areas where geothermal resources are being developed, i.e. Montana and Hawaii.

The study is scheduled for completion by June of 1977.

Sacramento - Department of Water Resources

On December 2, 1975, Assemblyman Charles Warren, Chairman of the Resources, Land Use, and Energy Committee announced in a news release that he has asked the Director of Water Resources, Ronald B. Roble, to seriously consider the possibility of his department developing power generation capacity from geothermal energy.

The power is needed by the department to pump water in its various projects throughout the state. Current contracts for power from privately owned electrical utility companies terminate in 1983. Warren feels that geothermal power has a number of economic and environmental advantages and should be seriously considered before investing in planned power generation facilities that will use nuclear energy.

He also asked that the department consider sharing the cost of building power lines out of The Geysers which he feels would stimulate activities and make geothermal power more realistic to some smaller utility districts.

FEDERAL GOVERNMENT

U.S.G.S.

The U.S.G.S. extramural geothermal research (grants and contracts) program has been extended through FY76. Applications that fall into the following categories will be accepted at anytime:

1. "The search for new scientific knowledge, the expansion of scientific principles and phenomena-oriented investigations to characterize the various kinds of geothermal reservoirs,
2. the nature and distribution of these resources throughout the United States,
3. the development of techniques to locate and describe these resources; and
4. The effect of the development of these resources on earthquake incidence,

land subsidence, ground water distribution, and rock-mineral-water interactions with the reservoir rock."

"This program does not include the development of concepts, techniques, and devices to utilize these resources, studies of the environmental impact of geothermal development upon the atmosphere or surface waters, nor research dealing with the legal and institutional problems of geothermal development, as these are elements of geothermal energy development that are within the scope of programs of other agencies."

Unsolicited proposals can be submitted at any time throughout the year and, if of utmost priority, they can be funded on an individual basis provided they meet all other criteria. Most proposals, however, should be submitted in response to general program announcements which are published during the year, for evaluation as a group at two or three times during the year. The next evaluation period will begin the end of December 1975. Proposing organizations are therefore urged to submit their proposals by mid-December 1975 to be sure of their considerations at the next evaluation period.

Instructions for preparation and submission of proposals are contained in a brochure titled "Grants for Scientific Research" which has been prepared by the Branch of Procurement and Contracts of the U. S. Geological Survey and which can be obtained by writing this Branch at USGS National Center, Mail Stop 205A, Reston, Virginia 22092.

The Technical Program Manager for the extramural geothermal research program is Donald W. Klick, U. S. Geological Survey, National Center Mail Stop 906, 12201 Sunrise Valley Drive, Reston, Virginia 22092, phone (703) 860-6581.

All proposals should be submitted to Branch of Procurement and Contracts, USGS, National Center, Mail Stop 205A, Reston, Virginia 22092.

Competitive Lease Sale Schedule (12/16/75) (Tentative)

LOCATION OF KGRA	LATEST SALE DATE SCHEDULED	ORIGINAL SALE DATE
Gerlach, San Emidio; NV	01/20/76	01/20/76
Crater Springs; UT	02/03/76	12/08/75
Elko H.S., Stillwater; NV	03/05/76	03/05/76
Darrrough, Dixie Valley; NV	04/20/76	04/20/76
Boulder; MT	04/28/76	04/05/76
Randsburg; CA	05/06/76	05/06/76
Klamath; OR	05/13/76	02/26/76
Lightning Dock; NM	05/20/76	05/20/76
Brady, Beowawe, H.S.Pt.; NV	06/15/76	06/15/76
Crane Creek; ID	06/23/76	05/27/76
Marysville; MT	06/29/76	06/01/76
Vulcan; ID	07/15/76	07/15/76
Summer Lake; OR	07/22/76	07/22/76
Mono-Long Valley; CA	07/30/76	07/30/76
Monte Neva; NV	08/18/76	08/18/76
The Geysers - Calistoga; CA	09/15/76	03/25/75
Baca Location One; NM	09/23/76	10/21/75

ACADEMIA

Stanford University

On December 15-17, 1975, 65 professionals presented 50 papers at a Reservoir Engineering and Well Stimulation Workshop held in Palo Alto, CA. The Workshop was jointly sponsored by the Stanford University Geothermal Program and the National Science Foundation. The 50 papers covered the following subjects: reservoir physics, well testing, field testing, well stimulation and numerical modeling. Participation was by invitation only. The proceedings of the Workshop will be prepared by the Stanford University Geothermal Program. Watch the Hot Line for publication information.

LEGAL ACTIVITY

In many cases, the ownership of lands containing geothermal resources is divided into two estates, sometimes referred to as the mineral estate and the surface estate. In these cases the ownership of the geothermal resources is presently unclear.

California: In California, three law suits are pending concerning this problem. One of the cases has been heard and a decision is forthcoming. Following is a description of each and its status:

1. United States v. Union Oil Co., 369 F. Supp. 1289 (N. D. Cal. 1973) The United States has sold off lands in The Geysers containing geothermal resources, reserving to the U. S. "all coal and other minerals." The sole issue in this suit is whether geothermal resources are included in the reservation of "all coal or other minerals." On the basis of legal argument only, the District Court decided that geothermal resources are not included within the reservation.

This case has been appealed to the Ninth Circuit Court of Appeals and has been heard. A decision should be handed down within 4-6 months.

2. Pariani v. State of California (San Francisco Superior Court No. 657-291) This case is somewhat similar to the one above. The State of California patented lands containing geothermal resources in The Geysers reserving to itself "gas" and "mineral deposits" including "mineral waters". The question is whether geothermal resources are included in the reservation.

This case is now scheduled for a factual trial in March of 1976.

3. Geothermal Kinetics v. Union Oil Company, Sonoma County Superior Court No. 75314. This case is similar to both of the above cases and involves instruments of transfer between private parties.

A hearing on this case is scheduled for Tuesday, February 17, 1976.

The final resolution of these lawsuits will clarify problems concerning the ownership of geothermal resources. Incidental to the determination of the ownership of the resources in these three lawsuits, legal definitions or characterizations of geothermal resources may be forthcoming. Thus, the courts, in deciding the cases could characterize geothermal resources as "mineral", "gas" or "water". Such characterizations, however, would not necessarily have any effect other than upon the question of the ownership of the resource.

DRILLING ACTIVITY

Private Land

Lake County, Oregon

"Wolfson Ranch" 1-ST, Gulf Oil Company farm out to San Juan Oil Company, a division of Mapco Inc. of Tulsa, OK., NW $\frac{1}{4}$, Sec. 22, T. 39S., R. 24E., W.B.&M.-spudded 11/5/75, abandoned 12/13/75, T.D. 2286m (7500'). This well is 1.6km (1 mile) east of Adel in the Warner Valley. The new well is also 4.8km (3 miles) south of the geothermal test "Crump Valley" 1 drilled by Nevada Thermal Power Co. (Magma Energy) during June 1959 to a T.D. of 513m (1684'). The Gulf leases are surrounded by federal land of the Crump Geyser KGRA which was offered for lease on July 31, 1975. Chevron Oil Company was the only bidder and obtained leases at the south end of the KGRA.

Federal Land

East Mesa KGRA, Imperial County, California

Republic Geothermal Inc.

"U.S." 16-29, spudded 11/4/75, completed 12/13/75; lease CA-966, T.D. 2445m (8021'); 456m (1495') N, 30m (100') E, from SW corner Sec. 29, T. 15S., R. 17E., S.B.B.&M.

Republic Geothermal Inc.

"U.S." 18-28, spudded 12/11/75, drilling; lease CA-1903; 30m (100') E, 53m (175') N, from SW corner Sec. 28, T. 15S., R. 17E., S.B.B.&M.

Geysers Calistoga KGRA, Lake and Sonoma Counties, California

Shell Oil Company

"U.S." 11A-1, spudded 7/31/75, completed 12/15/75; lease CA-949, greatest depth 2489m (8161'), T.D. last redrill 2139m (7016'), 1544m (5063') N, 1401m (4596') W from SE corner Sec. 1, T. 10N., R. 8W., M.D.B.&M.

Shell Oil Company

"U.S." 81-3, spudded 12/26/75, lease CA-950; 2672m (8764') N, 16m (54') E from SE corner Sec. 3, T. 10N., R. 8W., M.D.B.&M.

Burmah Oil & Gas Company

"U.S." 37-21, spudded 10/5/75, testing; lease CA-1862, T.D. 2359m (7739'); 335m (1100') N, 518m (1700') E from SW corner Sec. 21, T. 11N., R. 8W., M.D.B.&M.

Roosevelt Hot Springs KGRA, Beaver County, Utah

Phillips Petroleum Company

"U.S." 82-33, spudded 11/5/75, drilling; lease U-27386; 388m (1272') S, 29.5m (97') W from NE corner Sec. 33, T. 26S., R. 9W., S.L.B.&M.

NEW PUBLICATIONS

Division of Oil and Gas, State of California

The Division announces the publication of two new reports pertaining to geothermal energy:

Report No. TR13, "The Potential of Low-Temperature Geothermal Resources in Northern California" By Judith L. Hannah, price: \$2.50. This publication was written to encourage the use of low-temperature geothermal water as an energy source. The first section briefly covers the present uses of low-temperature geothermal energy in the western U.S. as well as other areas in the world. The second section covers 12 areas in Northern California. Included in the discussion of these areas are the basic parameters that must be considered prior to the development of a specific geothermal area: hot spring water temperatures and flow rates; general geology and hydrology; availability of flat land; the local labor force; transportation system and marketing centers; maximum, minimum and average annual temperatures; the number of sunlight days per year; and, where applicable, land ownership.

The publication will be a valuable reference document, not only for the general public, but for those parties who are interested in the development of low-temperature geothermal energy. The document contains 53 pages, 10 detailed hot springs maps, and 73 locations of hot springs and hot-water wells with temperature and flow information.

Report No. TR15 "Chemistry of Thermal Water in Selected Geothermal Areas of California." By Marshall J. Reed. Price: \$1.00

The publication discusses in detail the water chemistry of thermal springs and wells in selected areas of southern, eastern, and northeastern California. The areas and counties covered are: Imperial Valley, Imperial County; Sierra Valley, Plumas and Sierra Counties; Honey Lake Valley, Lassen and Plumas Counties; Surprise Valley, Modoc County; and portions of the Modoc Plateau in Modoc, Lassen, Shasta, and Siskiyou Counties.

The contents include: the location, name, ownership and if available the status, chemical analysis, and calculated subsurface temperatures of over 100 shallow and deep wells and 20 hot springs. The data are presented on 17 easily-read tables and 6 maps. The document contains 31 pages and numerous photographs.

This publication is an excellent companion to the above-mentioned publication on low-temperature geothermal energy as it provides a detailed chemical analysis of the hot springs covered in the report.

The publication not only provides background data for those preparing EIR's and for the general public, but is a definitive document for those exploring for geothermal energy.

United States, Department of the Interior

The U.S.C.S., Conservation Division has available at no cost a publication entitled: "Geothermal Steam Act of 1970 and Regulations on the Leasing of Geothermal Resources". A copy can be obtained by writing the: Area Geothermal Supervisor's Office, U.S.C.S.- Mail Stop 36, 345 Middlefield Road, Menlo Park, California 94025

GEO THERMAL HOT LINE

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