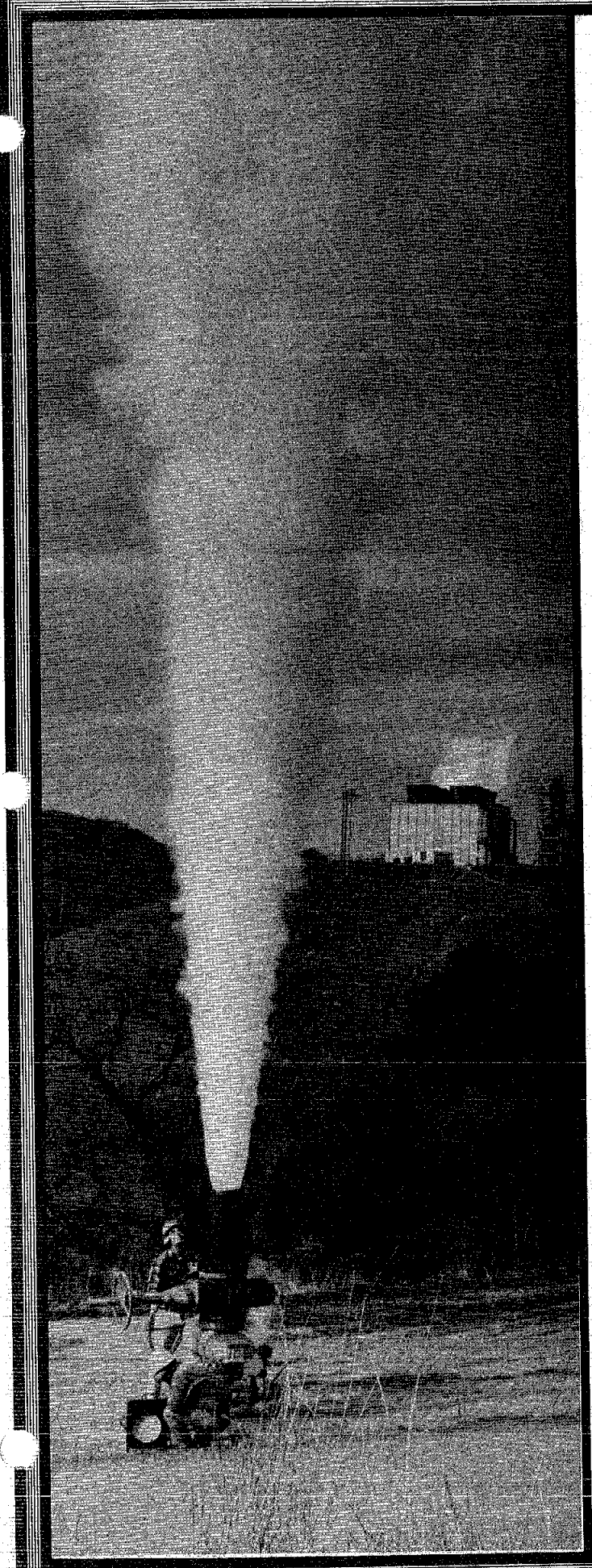

Periodical No. TR02

GEOTHERMAL HOT LINE

A Publication of the
California Division of Oil & Gas

Vol. 8 No. 2 July 1978

HOTLINE EDITORIAL

Geothermal energy is proven energy. Today, in The Geysers Geothermal field near San Francisco, steam generators produce 502 MW net of electricity. In the Imperial Valley, technology is being developed to harness another vast geothermal area. A disturbing event may delay this development: the Federal Government may not finance the construction of a 45 MWe binary cycle hot water research power plant now slated to receive federal funds.

The plant is critical because, in the Imperial Valley, prototypes of power plant designs must be built and tested to find how energy from hot water anomalies can supply electricity in an economical manner. The California Geothermal Task Force recommended to Congress and the President that the Federal Government fund the construction and early use of such a plant.

Federal support may be withdrawn because a survey presumably indicates that industry is able to finance the power plant

itself. This is not true. Without federal funding, industry will reassess its position and construction will be delayed.

A successfully operating binary cycle power plant in the Imperial Valley will provide needed information to attract investors to the geothermal industry. Without federal funding for such research and development, prospects of geothermal resources making a significant contribution to our total energy needs are reduced.

CALIFORNIA

Energy Commission Adopts Geothermal Policy

The California Energy Commission (formerly the Energy Resources Conservation and Development Commission) has adopted as policy the report of its Geothermal Policy Committee. The new policy decreases power plant permitting time from 18 to 12 months. The commission will encourage persons proposing to construct geothermal power plants to obtain permits at one time for all plants planned for an area instead of seeking permits on a unit-by-unit basis.

The committee recommended leaving regulation of wells and pipelines to the California Division of Oil and Gas and local authorities; a position confirmed by the Attorney General's Office (Hotline, April 1978).

Copies of the Geothermal Policy Report are available from the California Energy Commission, Publications Office, 1111 Howe Avenue, Sacramento, CA 95825.

New California Energy Commission Regulations

The California Energy Commission Geothermal Policy Committee released one draft of proposed regulations in May and a draft of other proposed regulations in June. The proposed regulations released in May describe the geothermal power plant site certification process and establish procedures for the Notice of Intention (NOI) process. This is the first step for persons wishing to construct a power plant. The proposed regulations released in June describe the second step of the siting process, called the Application for Certification (AFC) process.

Copies of both proposed drafts may be obtained by writing the California Energy Commission, Publications Unit, 1111 Howe Avenue, Sacramento, CA 95825 or by calling (916) 322-3725 or toll free (800) 852-7516. Public hearings for review and comment on the regulations will be held at a later date.

California Division of Mines and Geology Contracts with DOE

The Department of Energy will sign a contract with the California Division of Mines and Geology (CDMG) for a study of low-temperature geothermal resources in California. Phase I of the study includes creating a hot springs and well data map derived largely from the fault map of California. The map will include longitude and latitude locations of the resources and water temperatures.

EIR for Wilbur Hot Springs, Colusa County

Sunoco Energy Development Company (Sunedco) plans to drill four geothermal exploratory wells in the Wilbur Hot Springs area. A draft Environmental Impact Report for the project was written by VTN, Inc. of Irvine, California. Presently, Colusa County is looking for a firm to review the draft EIR and compile a report outlining necessary project mitigations. A representative of Gennis Associates of Sacramento offered to complete the work at a cost of $75,000. The work would include (1) reviewing the initial study, (2) preparing the draft EIR, (3) integrating changes made after draft reviews and public hearings, and (4) writing a final EIR. Sunedco would be responsible for all costs of the EIR preparation.

Colusa County Opposes AB3009

The Colusa County Board of Supervisors feels that Assembly Bill 3009 is unnecessary, not feasible and a deterrent to solving the energy crisis. AB3009 would prohibit drilling geothermal wells or constructing electrical power plants within a one-mile radius of a hot spring.

Opposition to proposed drilling near Wilbur Hot Springs has come from the owner and supporters of the Wilbur Hot Springs Resort. These people feel that the project would cause air pollution and noise, and ruin the area as a resort.

New Geothermal Project Planned In Imperial County

Union Oil Company, Southern Pacific Land Company, and the Mono Power Company (subsidiary of Southern California Edison Company) jointly plan to explore and develop geothermal energy resources in the Niland geothermal reservoir near the southern tip of the Salton Sea in Imperial County, California. Union has a 50 percent interest in the lands and will act as production operator for the project.

The Niland geothermal reservoir is believed to be one of the largest known geothermal energy resources in California, but unique problems are associated with it. Reservoir fluids contain up to 30 percent salt and are extremely hot and corrosive. During the next two years, Union will conduct tests to determine the best techniques for producing, handling, and injecting these geothermal fluids.

When these techniques have been determined, Southern California Edison Company plans to construct a 10 megawatt electrical generating plant near Niland, California. Edison expects the plant to begin operating in the early 1980's.

Environmental Appeal Squelched in Lake County

The Lake County Board of Supervisors halted an environmental appeal that sought to end geothermal exploration of Cobb Mountain.

The Lake County Energy Council, the Sierra Club, and Friends of Cobb tried to prevent Union Oil Company from drilling four exploratory wells within the Cobb Mountain Estates of Lake and Sonoma Counties. The environmentalists claimed that current technology cannot prevent destruction of the scenic and natural values and residential/recreational uses, that the environmental documents are inadequate, and that such development is not within the county general plan.

The Cobb Mountain exploratory program was approved by the Lake County Board of Supervisors after they concluded that the planning commission use permit provides for any problems that may arise from the drilling.

Geo-Products and Water Resources Plan Power Plant in Lassen County

California Resources Secretary, Huey D. Johnson, Director of Water Resources, Ronald B. Robie, and Chairman-of-the-Board for Geo-Products Corporation, Alexander Black, announced plans to build a 55 MWe hybrid demonstration power plant in the Wendel-Amedee geothermal resource area of Lassen County. The plant will be built about 20 miles east of Susanville, near Honey Lake. Funding for the $45 million plant will be provided by the Department of Water Resources and Geo-Products. Geo-Products will also seek a federal grant from the Department of Energy. Projected costs for power generation will be less than 30 mills per KW hour.

The cogeneration plant will use heat from flashed geothermal steam to dry wood-waste containing about 50 percent moisture, then preheat boiler feedwater in a heat exchanger. The heated feedwater flows to the boiler where the dried wood-waste is burned, producing super-heated steam to drive the turbine generator. The spent steam is condensed and returned to the heat exchanger. The geothermal water is

utilized for heating greenhouses.

Should this type of power plant succeed, the concepts could be used in many other low-temperature geothermal areas throughout California and the western United States.

Napa County

Amax Exploration Inc. has received approval from the Napa County Board of Supervisors to drill the first deep (3050m or 10,000 foot) geothermal resource exploration well in the county after a negative declaration satisfied CEQA requirements. The well site will be about two miles east of State Highway 29, just south of the Lake-Napa county line near Livermore Road.

NEW MEXICO

New Fuel Idea Proposed

Scientists at Sandia Laboratories, Albuquerque, have developed a new technique that demonstrates the possibility of producing hydrogen when water is pumped into subsurface molten rock. The hydrogen is produced as a result of a reaction between hot water and hot iron in magma. If oxygen atoms are removed from the water molecules, the iron oxidizes, freeing a portion of the hydrogen atoms held in the water. About 76m^3 (20,000 gallons) of water can be pumped into a large magma body to produce approximately 230 Kg (500 lbs.) of hydrogen. Remaining water is converted to steam.

The greatest hinderance to this technique appears to be the depth of the magma chambers. However, some chambers within 1800 to 3050m (6,000 to 10,000 feet) of the ocean floor should be reachable by extending current drilling technology.

Developers view this idea as a long-range means of expanding geothermal uses, currently concentrated on electrical generation.

OREGON

Oro-Ida Foods, Inc.

Oro-Ida Foods, Inc., of Ontario, Oregon, processors of frozen potato products, has received funds from the Department of Energy, Geothermal Division, to begin conversion of the process heating plant to geothermal energy. The Oregon Institute of Technology Geo-Heat Utilization Center recently completed a conversion feasibility study for the project.

Downtown District Steam Heat

A proposal by the city of Klamath Falls, to design, construct, and operate a geothermal, space-heated business district has been accepted by the Department of Energy. Work on the $1,026,000 project began this spring. The project will provide heating for 14 city, state, and federal office buildings. The projected completion time is 18 months.

The system will include one new production well, one existing supplemental production well, one injection well, about two miles of pipeline, 14 retrofitted buildings, and appropriate control equipment.

The second phase includes the identification of pumping district boundaries for the metropolitan area and a detailed conversion plan for over 100 downtown commercial buildings.

SOUTH DAKOTA

Space Heating Conversion

- Edgemont, South Dakota has received a contract to study converting a conventional school heating system to geothermal space heating.
- The towns of Box Elder and Philip, South Dakota have applied to the DOE for a 1977 Program Opportunity Notice (PON) contract to convert school heating systems to geothermal space heating.
- St. Mary's Hospital at Pierre, South Dakota, has applied for a PON contract to convert the hospital heating system to geothermal space heating.
- The South Dakota School of Mines and Technology (SMT) has applied for a PON. The school plans to use low-temperature geothermal resources to heat ranch buildings, dry grain, and provide warm stock water. Recently, the SMT completed a contract on the uses of the Madison Limestone aquifer geothermal waters.

WASHINGTON

Borehole Sealing Patent

James N. Hartley (Battelle Chemical Technology Dept.) and Dr. George Jansen, Jr. (Exxon Nuclear Co., Richland, WA) submitted an idea for a new method of borehole sealing to the Department of Energy. The idea originated from research conducted by Battelle's Pacific Northwest Laboratories.

The apparatus described in the patent can be positioned in a borehole, heating powdered rock and other material. Powdered rock and sealants melt and a continuous seal occurs when the machinery is raised. The potential advantage of this method over other approaches is the formation of a seal of the same rock as the surrounding formation. As yet, no experimental work has occurred to test technical feasibility of the process.

DOE Study of Low-Temperature Resources in the Northwest

The Department of Energy (DOE) and Battelle's Pacific Northwest Laboratory will conduct a study of low-temperature geothermal resources in the Northwest. The project will consist of a review of available data followed by field measurements to assess the low-temperature potential. Hot springs and many recent volcanoes indicate the geothermal potential of the area.

DOE will be helped by the Geology and Earth Resources Division of the Washington State Department of Natural Resources. The program will be coordinated with the U.S. Geological Survey's geothermal program. Battelle Pacific Northwest Laboratories is overall project manager.

FEDERAL

DOE Geothermal Loan Guarantee Program

The Department of Energy Geothermal Loan Guarantee Program (GLGP) has been in effect for two years. This program supports the development and use of geothermal energy. It minimizes financial risk to certified lenders by guaranteeing loans. The program will end in 1984; thereafter, no additional loans will be guaranteed.

Under the program, the DOE can guarantee 75 percent of a project's total estimated cost up to $25 million per project or $50 million per borrower. Amendments now in Congress could raise the limits to $100 million and $200 million.

Projects using geothermal energy directly receive priority, but loans are also guaranteed for research and development

and exploratory projects. Preference is given to applications from small businesses, projects undertaken on federal lands, and projects where the lender carries part of the loan on a nonguaranteed basis.

The San Francisco Operations Office (SAN) processes all GLGP applications and recommends application approval or disapproval to the Secretary of the DOE.

The DOE can guarantee up to $300 million in loans through Fiscal Year 1978. Presently, nine applications have been received, and three approved, with loans totaling about $14 million.

The first loan guarantee ($9 million) was to the Bank of America and Republic Geothermal, Inc. to drill and test additional wells at East Mesa, California. The project goal is to supply steam to a generating plant producing between 15 to 50 MWe.

The second guarantee loan was for $2.6 million to the Nevada National Bank and Geothermal Food Processors, Inc. (GFP). The proposed work includes testing an existing well at Brady Hot Springs, Nevada, and constructing a vegetable dehydration plant that uses geothermal resources.

The third loan guarantee went to the Bank of Montreal (California), Geothermal Kinetics, Inc., and McCulloch Oil Corp. The $1.8 million loan was for drilling and testing two exploratory wells in Brawley, California. If successful, the wells will provide steam for one or more 50 MWe power plants.

GLGP is one way the DOE helps promote the development and use of geothermal energy. Anyone may apply to the GLGP for a loan. Applicants supply 25 percent of the costs. The SAN evaluation lasts from 4 to 6 months. Processing time depends on the scope of the project and on the amount and sufficiency of application data.

Send questions and applications to the Office of the Geothermal Loan Guarantee Program, Department of Energy, San Francisco Operations Office, 1333 Broadway, Oakland, CA 94612.

The Navy Looks at Geothermal

The Navy has undertaken a program to harness and develop geothermal energy at some naval bases. The naval geothermal program started with geologic review of all navy bases. Many good prospects were located and development is active now at four sites; namely, Adak, Alaska, China Lake, California, Lualualei, Hawaii, and Keflavik, Iceland.

At Adak, Alaska, the geology is favorable, with possible resources near Mount Adagdak and Finger Bay. Results were inconclusive from two holes drilled to 2,000 feet to determine temperatures, heat flow, and subsurface conditions. Deeper wells will be drilled. Due to the remote location, the project is funded entirely by the navy.

In Lualualei, Hawaii, the Naval Magazine is in a volcanic caldera on the island of Oahu. The structural geology is favorable for geothermal resources to exist and a joint industry and navy development program is planned. Care will be taken to protect local agriculture.

The Coso geothermal resource at the China Lake Naval Weapons Center, California, has a potential for producing electricity. A well drilled to 147.7m (4,845 feet) in 1977 discovered 193°C (380°F) water. A joint effort with the Department of the Interior may lead to leasing land under the Geothermal Steam Act for industrial development.

Elsewhere, the navy is negotiating the purchase of geothermal fluids in Keflavik, Iceland. The spent fluids will be returned to the producer for disposal. The navy will extract and use heat from the fluids.

Competitive Lease Sale Schedule as of 4/28/78

Lease sale dates are provided by the State Directors of the U.S. Bureau of Land Management (BLM). Lease sale dates are tentative until public notice is issued 30 days prior to sale. Lease sale notices may be obtained by contacting the appropriate BLM state office.

LOCATION OF KGRA	LATEST SALE DATE SCHEDULED	ORIGINAL SALE DATE
Wendel-Amedee, CA	08/15/78	01/20/77
Randsburg, CA	09/05/78	05/06/76
Breitenbush Hot Sp., OR	09/14/78	07/14/77
Marysville, MT	09/20/78	04/05/76
Stillwater-Soda Lake, NV	09/26/78	03/22/78
Gerlach NE, Gerlach, NV	09/26/78	10/18/77
Fly Ranch, Trego, NV	09/26/78	12/13/77
Fly Ranch Northeast, NV	09/26/78	12/14/77
Lower Frisco, Gila bend, NM	09/27/78	09/27/78
Vulcan, ID	10/12/78	07/15/76
Alvord Desert, OR	10/19/78	02/09/78
Geysers, Knoxville, CA	10/31/78	10/31/78
Belknap-Foley H.S., OR	01/08/79	07/06/78
Mt. Hood, OR	01/15/79	07/07/78
Carey Hot Springs, OR	02/13/79	01/01/79
McCredie, OR	02/13/79	10/05/78
Indian Heaven, WA	03/13/79	03/19/79
East Mesa, CA	07/01/80	08/17/78

FOREIGN

Geothermal Graduate Training Program in New Zealand

The University of Aukland will establish a one-year geothermal graduate training program. In 1979, about 25 students are expected to enroll and study geothermal exploration and utilization. Successful candidates will qualify for a master's degree and a "Diploma in Energy Technology (Geothermal)".

Geothermal Postage Stamp

New Zealand has issued a postage stamp ($1.00) showing the Wairakei plant near Taupo, N.Z. The Wairakei plant develops 120 MW of electricity and is one of the first geothermal power plants in New Zealand.

TECHNOLOGY

Sepiolite Mud Used for Hot Wells

According to the Oil and Gas Journal, many operators are using sepiolite clay muds in hot wells for temperature stability, fluid loss control, viscosity control, and reduction in costs.

Regardless of the water used, sepiolite provides viscosity while preventing bottom-hole gelation due to high temperatures. In addition, it remains stable in down-hole conditions over 450°F; temperature flocculation is not a problem as with sodium bentonite.

Sepiolite is a magnesium-rich clay mineral with lath-shaped particles that split off when shear stress is applied to a slurry. The laths bundle together to provide the thixotrophic properties, rather than the cohesion of thin plates found in layered swelling clays. Sepiolite holds water in zeolitic channels along the laths and is relatively unaffected by electrolytes. In addition, it retains its gel characteristics after heating, does not thicken excessively, and doesn't allow weighting material to settle.

PUBLICATIONS

California Geology

The July 1978 issue of California Geology will feature two articles about The Geysers Geothermal field. Titles of the articles are "Well Site Safety at The Geysers" and "Geology and Slope Stability of The Geysers Geothermal Resources Area." Individual issues of California Geology cost $.35. A subscription is priced at $3.00 a calendar year. Address all orders to the California Division of Mines and Geology, P.O. Box 2980, Sacramento, CA 95812. Checks and money orders should be made payable to the Division of Mines and Geology.

Geothermal Heat Refrigeration -- Freezing, Cooling, Air Conditioning, by Edward F. Wehlage, P.E., September 1978 is the publication date of this new 300 page book covering direct geothermal utilization for refrigeration and heat pump operation.

With payment received before August 15, 1978, books will cost $22.50 per copy. After August 15, the price will be $30.00 a copy plus postage and handling. California orders add sales tax. Available from International Society for Geothermal Engineering, Inc., P.O. Box 4743, Whittier, CA 90607, U.S.A.

Transactions I.S.G.E., Vol. 3, No. 2, (April, 1978). There are over 20 pages in this detailed report and a photographic layout. The United States Department of Energy Direct Utilization of Geothermal Energy Symposium, held in conjunction with the Geothermal Resources Council at San Diego, California, January/February, 1978

is described. Available from International Society for Geothermal Engineering, Inc., P.O. Box 4743, Whittier, CA 90607, U.S.A. $14.00.

Resource, Technology, and Environment at The Geysers, by Oleh Weres, Karen Tsao, and Byron Wood, (June, 1977). Prepared at Lawrence Berkeley Laboratory, this publication gives in layman's terms an overview of The Geysers geothermal resources and development, with emphasis on the H_2S problem and abatement. Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. $12.00 (printed), $3.00 (microfiche).

Geothermal Resource Development: Laws and Regulations, by James C. Wharton, 1977. Booklet contains federal and California laws governing geothermal development, comparison of the federal and California statutes, and trends in California legislation. Available from National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. $5.25 (printed), $3.00 (microfiche).

Energy: A Guide to Organizations and Information Resources in the United States, Second edition, (January, 1978). Indexes of organizations, subjects, acronyms, and initials. Chapters include: "Energy in General", "Oil and Gas", "Coal", "Water Power", "Nuclear Fission", "Alternate Sources of Energy", "Electric Utilities", "Energy Conservation", "Environmental Impacts", and "Consumer Aspects". The book describes more than 1500 public and private organizations, including names, addresses, programs, and publications. Available from Public Affairs Clearinghouse, Claremont College, P.O. Box 30, Claremont, CA 91711. $20.00.

Geothermal Policy Report, Recommendations for a Geothermal Resource Development and Power Plant Siting Program, Commissioners Suzanne Reed and Alan Pasternak. This report will serve as the basis for drafting amendments to the Energy Commission's NOI/AFC regulations applicable to the process for siting geothermal power plants. The first copy of this report is free, with additional copies costing $1.00 each. Copies may be obtained by writing the California Energy Commission, Publications Unit, 1111 Howe Avenue, Sacramento, CA 95825 or phoning (916) 322-3725 or toll free (800) 852-7516.

Energy Information Locator. Contains more than 200 public and private data banks that specialize in energy information, more than 400 energy journals and newsletters, over 100 lead-building directories, and lists over 700 sources covering the entire energy field. Available from EIC, Inc., Corporate Subscriptions Dept., 292 Madison Avenue, New York, N.Y. 10017 at a cost of $35 on a 10-day approval.

CONFERENCES

July 25-28, 1978:

The second annual meeting of the Geothermal Resources Council will be held in Hilo, Hawaii at the Hilo Lagoon Hotel. The scheduled agenda is considered by geothermal experts as one of the strongest ever presented and includes the most current information available.

Three sets of special sessions will be offered at the meeting; regular session, extra day sessions, and an extra night session. Times and places for all special sessions will be provided in the official program. Also offered as part of the meeting is a tour of the Hawaiian Geothermal Project Well on the Puna Rift, the Volcano Observatory, and the Kilauea Crater.

For additional information, contact the Geothermal Resources Council, P.O. Box 98, Davis, CA 95616, (916) 758-2360.

September 20-22, 1978:

A symposium summarizing the first year of a cooperative project between the United States Department of Energy and The Comision Federal de Electricidad of Mexico will be held at the Town and Country Hotel, San Diego, CA. A field trip accomodating 120 people to the Cerro Prieto geothermal field will follow on September 23, 1978. For information, contact Werner Schwarz, Lawrence Berkeley Laboratory, Earth Science Division, Berkeley, CA 94720. (415) 843-2740, ext. 6468.

September 27-29, 1978:

The Rocky Mountain Section of the Geothermal Resources Council will take its annual field trip in the Jemez Mountains of New Mexico. Highlights of the tour will include visits to the Los Alamos Scientific Laboratory Fenton Hill hot dry rock site, Union Oil's Valles Caldera Geothermal Field (Baca Location No. 1), Jemez Hot Springs (Soda Dam) New Mexico, and Mt. Princeton Hot Springs in Colorado.

Cost for the three-day trip is $90 which includes two nights lodging, two meals, and bus fare.

For further details contact Jay D. Dick, Chaffee Geothermal, Ltd. at (303) 759-3309 or (303) 534-4470. Reservation deadline is September 1, 1978.

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A periodic publication of the
California Division of Oil and Gas
1416 Ninth Street, Room 1316-35
Sacramento, CA 95814
(916) 445-9686