



GEOHERMAL

Hot Line



A publication of the State of California - Division of Oil and Gas

Volume 2, Number 5

September 1972

"HE THAT WAITS UPON FORTUNE, IS NEVER SURE OF A DINNER."

--BEN FRANKLIN

DEPARTMENT OF THE INTERIOR

The final Leasing, Operating and Unit Regulations should be published by September 15, 1972. The four Environmental Impact Statements, which include a general statement, and three separate statements on the Imperial Valley, Mono-Long Valley, and The Geysers, should be published by the end of September. The law requires a 30 day waiting period after the final publication so the regulations, etc., will not become effective until the end of October or the first part of November. It is expected that a lease sale on the "Granddaddy Land" in the three areas mentioned above can be held before the end of the year. Leasing in other areas can take place only after impact statements have been prepared by the Department. All new statements will require a hearing and a call for comments which could mean a six month delay for each. However, several statements could conceivably be processed concurrently.

BUREAU OF RECLAMATION DEEP TEST

The Bureau has completed their geothermal deep test well in the Mesa heat anomaly of the East Mesa area, Imperial Valley. The total depth was 8,030 feet. A string of 9 5/8-inch casing was cemented at 7,262 feet, and a 7-inch slotted liner was hung from 7,262 to 8,016 feet. The well is now under extensive test. Tem-

peratures exceeding 400° ARE EXPECTED. The well will flow naturally and is presently being produced into a large plastic-lined holding pond.

Plans are being made to drill an injection well in the near future, and a pilot desalination unit should be installed late this fall.

IMPERIAL WILDLIFE AREA IMPERIAL VALLEY

On August 31, the State Lands Commission granted Atlantic Oil Company and Southern Pacific Land Company a three-year permit to explore for geothermal resources under the Wister Unit of the wildlife area. The land is owned by the state of California. The operators plan to drill exploratory wells from sites at least 400 feet from the eastern boundary of the Wister Unit. No date has been set for the start of drilling.

The Conservation Committee of the Sierra Club sent a telegram to the State Lands Commission stating that the drilling could "jeopardize wildlife and wildlife habitat". However, an environmental impact statement prepared by the Commission's staff declared, "Prospecting in the Imperial Wildlife Management Area for geothermal sources of power will not have a significant detrimental environmental effect."

THE GEYSERS GEOTHERMAL FIELD

In 1973, with the completion of Power Plant No. 5, The Geysers Geothermal field will be the world's

leader in power produced from geothermal energy. The present capacity of 298,000 kw will be augmented by 106,000 kw, making a total of 404,000 kw. This new capacity will be generated by two identical 53,000 kw units which are now being constructed in Japan by the Toshiba Corporation. At present the world's largest power producing geothermal area is near Larderello, Italy, just south of Pisa, with a capacity of 390,000 kw.

In July 1972, the Pacific Gas and Electric Company applied for a permit with the State Public Utilities Commission to construct Unit No. 12. The new unit will have a capacity of 106,000 kw and should go on the line in 1975.

IMPERIAL VALLEY, CALIFORNIA

Southern Pacific Land Company

The Southern Pacific Land Company has announced the acquisition of a 1300-acre lease near the south end of the Salton Sea from the Imperial Irrigation District. The land was previously held by Imperial Thermal Products, a subsidiary of Morton International of Chicago who had leased it from I.I.D. in the early 1960's.

The terms include, among other items, the payment to the Imperial Irrigation District of \$65,000 annually in lease fees, which works out to \$5.00 per acre. Southern Pacific Land Company plans to construct a 440,000 kw power plant in the area to electrify their rail line between Yuma, Arizona, and Banning, California.

Magma Power Company

Magma Power Company and San Diego Gas and Electric Company have started detailed geologic and reservoir engineering studies on their holdings just south of the Salton Sea near Niland. The studies will be used to determine the optimum locations for two injection wells which will be used to test the two existing producing wells and the reservoir characteristics. Magma and San Diego Gas and Electric plan to construct an 8,000 kw binary-type power plant (MagmaMax) which is scheduled to be in operation by late 1973 (see "Hot Line", Vol. 2, No. 3).

NORTHERN CALIFORNIA POWER AGENCY

Following is an excerpt from the "Electrical Week" dated July 24, 1972: "NORTHERN CALIFORNIA MUNICIPALS EXPECT TO SELL A \$35-40-MILLION BOND ISSUE before year-end in their continuing efforts to develop a geothermal power supply. The municipals, through their Northern California Power Agency, hope to use the financing to build four

55-Mw units powered by steam from fields near The Geysers area, which supplies Pacific Gas & Electric plants. NCPA probably will issue bonds as a nonprofit organization; Bartle Wells Associates of San Francisco is NCPA's financial adviser."

"NCPA would prefer to use tax-exempt revenue bonds, but the California legislature again this year, for the third time in a row, has refused to pass legislation permitting issuance of such bonds for power development. For the previous two years the senate has passed similar bills only to see them die in the state assembly."

But even as it nears financing, NCPA must deal with what looms as a major obstacle to the development. The agency has to use Bureau of Reclamation transmission lines to deliver power to the municipal and a joint study has indicated the 220-Mw load can be handled without modification to existing lines. The Bureau seems willing, but under an existing contract with PG&E, the Bureau can't wheel power over these lines without PG&E approval. NCPA and PG&E have long been foes and municipal sources say they expect the company to fight the plan. Within a few weeks, an official says, all other details of transmission-line use will be cleared up "and then we'll have a little argument with PG&E."

"The eleven municipal members of NCPA currently have a 400-Mw peak and forecast a 1,000-Mw peak by 1980. They expect to use geothermal power from fields developed by Signal Oil, which has proved capacity to supply 100 Mw and much larger unproved holdings."

PISA, ITALY

The International Institute for Geothermal Research of Pisa has announced an international postgraduate course in geothermics to be given in 1973. The course will be given under the auspices of the National Research Council of Italy, the Italian Ministry for Foreign Affairs, and UNESCO.

The course will be held at Pisa and at the Larderello Geothermal field where geothermal energy has been used to produce power for more than 50 years. The period of instruction will run for nine months from January 15, 1973 to October 15, 1973 with a one month break during August. The number of course participants will be limited to approximately 12. Applications are open to those who have a university degree or equivalent in geology, physics, chemistry, or engineering. Scholarships are available, but preference will be given to holders of scholarships granted by national or international organizations. Applications should be submitted by October 15, 1972.

For additional information and application forms, contact the "Hot Line" editor.

ARIZONA

The Oil and Gas Conservation Commission of Arizona adopted on July 1, 1972 a comprehensive set of rules and regulations governing the conservation of geothermal resources. A copy can be obtained by writing:

Oil and Gas Conservation Commission
State of Arizona
4515 No. 7th Avenue
Phoenix, Arizona 85013

CRITICALLY NEEDED TOOLS AND MATERIALS

As the geothermal industry grows, so will its demand for special tools and materials needed to drill and produce high temperature geothermal wells. In an effort to hasten research in several areas, the State Division of Oil and Gas held a meeting in Los Angeles on September 7, 1972 to discuss the major problem areas. Approximately fifteen service companies and operators were represented at the meeting and all left with a keener insight into the future of geothermal development and a better picture of the future economic base that justifies the high cost of research.

A list of the needed tools and materials follows:

1. Pressure and Temperature Bombs (Amerada Type) that can withstand temperatures of 500° - 700° F for periods of up to 48 hours.
2. Cement that will not retrograde under high temperatures (500° - 700° F).
3. Rubber for rams and packers to be used in blow-out prevention equipment and down hole tools. Existing rubber compounds will begin to break down after the first or second use under temperatures higher than 200° - 250° F.
4. A high temperature coating (500° - 700° F) to be used on electrical logging lines.
5. A radioactive tracer that does not break down at high temperatures could be extremely useful.
6. A straight-through drilling muffler (for air drilling) that will reduce high frequency noise.
7. High temperature pipe dope (500° - 700° F) that will not harden and lock tool joints causing lost time during trips.
8. High temperature corrosion resistant cements are needed. A cement with these properties could provide an added safeguard in highly saline brine areas, such as the Salton Sea Geothermal field of the Imperial Valley.

GEOHERMAL RESOURCES COUNCIL

San Francisco Conference (1973)

Preliminary plans are being finalized for the 1973 conference to be held in San Francisco at the Sheraton-Palace Hotel on September 25-28, 1973. The conference date has been delayed to allow those few who are doing research in geothermics a chance to accumulate new information. A preliminary budget has been drawn up; costs are being kept to a minimum, however, the conference will be first rate.

The Conference Committee, at their last meeting, planned the program, set important dates, and appointed various chairmen. David Anderson of the California Division of Oil and Gas was selected as the General Chairman and James Koenig of the California Division of Mines and Geology will serve as Program Chairman. The section chairmen positions are being filled at this time, and their names will be announced as soon as possible. The field trip to The Geysers will be led by John Kilkenny of Union Oil Company of California, and the geologic trip to Lake County by Carter Hearn of the U. S. Geological Survey. Final plans for the conference registration applications, and a call for papers will be sent to the G.R.C. members in February 1973.

New Office

The Council will open an office in Davis, California, in mid-September. The staff will consist of a part-time secretary and eventually a student assistant. All office work will be carried on under the direction of the G.R.C. Secretary. The staff will handle the membership, publication sales, coordination of G.R.C. activities and printing of publications.

UNION OIL COMPANY DRILLS FIRST STEAM WELL IN PHILIPPINE ISLANDS

On June 23, 1972, Union Oil Company of California announced that a subsidiary had successfully completed the first geothermal steam well in the Philippines. The well was drilled on a 35,000-acre tract of the Bicol peninsula of Luzon by Philippine Geothermal Inc. The Union subsidiary completed the well at a depth of 4,984 feet. "Results of the initial tests are very encouraging and indicate a commercial power source," said Fred L. Hartley, president of Union Oil. During the remainder of 1972, additional wells will be drilled to delineate the size of the reservoir.

Mr. Hartley also stated, "The National Power Corp., a Philippine government-owned utility, is conducting engineering and feasibility studies designed to initiate power generation by the end of 1973. Union Oil's sub-

sidiary will develop the geothermal field's potential and be compensated by National Power Corp."

THE GEYSERS GEOTHERMAL FIELD

The U.S. Geological Survey has initiated a program to monitor possible ground movement in The Geysers area. Three types of control surveys are scheduled for the 1973 F.Y.:

1. A regional network of a dozen or so bench marks on mountain peaks and ridge tops, extending 10 to 20 miles out from the Geysers; the horizontal distance between these bench marks to be precisely surveyed biannually by geodolite (accuracy about 2×10^{-7}).
2. A local network of several dozen bench marks throughout the geothermal production area, precisely tied twice a year to reference bench marks of the regional network by electronic distance meter (accuracy about 2×10^{-6}).
3. A line of levels to first-order accuracies by the National Geodetic Survey, establishing accurate elevations for reference bench marks in the Geysers area.

The regional network, (1) above, will be established by the Survey's Office of Crustal Studies during October 1972. The local network (2), from which both horizontal and vertical changes will be monitored, will be established by the U.S.G.S. Subsidence Research office later this year. The level network (3), looped through the production area and tied to existing second and third-order level lines outside the production area, is scheduled for next spring.

Precise surveys by the Pacific Gas and Electric Co. have been run throughout the area. Where pertinent, these are being incorporated in the Survey's monitoring control network.

UNITED SISCOE MINES TORONTO, CANADA

United Siscoe Mines Ltd. of Toronto, Canada, has purchased 927,250 shares of Geothermal Kinetics Systems Corporation of Phoenix, Arizona. The purchase price was \$1.08 per share or a little over \$1,000,000. In addition, Siscoe has options on an additional 1,000,000 shares exercisable over a four-year period. If the options were exercised, Siscoe could own 53.8 percent of Geothermal Kinetics. Siscoe's chairman, R. E. Fasken, believes there is a big dollar potential in geothermal development, and he compares it with the uranium situation in earlier days.

LAKE COUNTY

E. B. Towne, Operator plans to begin drilling operations on well No. "Sullivan" 1 located in the SW $1/4$ of the SW $1/4$ Sec. 18, T. 12 N., R. 8 W., M.D.B. & M., on or about September 8, 1972. The company has obtained permits to drill from both the state and the County of Lake. The location is approximately four miles north of producing wells in The Geysers Geothermal field.

TRAVALE, ITALY

The new steam discovery near Travale, covered in the April 1972 issue of the "Hot Line", has resulted in the discovery of a world's record dry steam producer. Well No. "Travale" 22 was tested at over 980,000 lbs. per hour. The total depth reached was 2,257 feet (688m). The maximum temperature recorded was 470° F (245° C) after 52 hours. Temperature measurement had to be cut short as the well was beginning to blow in.

SWITZERLAND

Felice C. Jaffe of the University of Geneva has recently published a paper on geothermics entitled "Geothermal Energy, a Review" in Vol. 38, No. 93, Bulletin of the United Swiss Petroleum Geologists and Engineers, October 1971. The 40-page paper briefly covers the world-wide occurrence of geothermal phenomena and short discussions on exploration, development and production techniques. Copies may be obtained by writing:

Professor Felice C. Jaffe
Department of Mineralogy
University of Geneva
11 rue des Marabouts
1211 Geneva 4, Switzerland

HAWAII

In early July the national Science Foundation announced the awarding of a \$462,500 research grant to the Colorado School of Mines for a one-year study of the hydrothermal systems of Kilauea Volcano on the Island of Hawaii. The study will be directed by George V. Keller of the Geophysics Department.

Plans call for a 3,000-foot test well to be used for the study of the ground water dynamics in the hydrothermal system above the Kilauea magma chamber.

Legislation to fund a Geothermal Research Institute in Hawaii and a proposal to the N.S.F. by the Center for Engineering Research, University of Hawaii, were previously covered in the "Hot Line" in the April and July 1972 issues.

GEOHERMAL RESOURCES RESEARCH CONFERENCE

The National Science Foundation is sponsoring a Geothermal Research Conference to be held at the Battelle Resources Research Center, Seattle, Washington, September 18-20, 1972. Attendance will be by invitation only.

The prime objective of the conference is to find ways in which the geothermal potential of the earth can be developed into usable energy. A "state-of-the-art" report will be prepared by the conference staff which will include recommendations for a federal budget augmentation for geothermal resources exploration and development.

Walter J. Hickel of Alaska is the conference chairman and Dr. Donald D. Dunlop, former scientific advisor in the Department of the Interior, is handling the conference organization. The public is invited to submit written recommendations which will be considered by the conference. Dr. Dunlop can be contacted at:

3508 Prince William Drive
Fairfax, Virginia 22030
(703) 273-8766

BEOWAWE, NEVADA

On the 20th of July 1972, three of Magma Power Com-

pany's wells were dynamited by an unknown party. Evidence indicated that the saboteur used prima-cord and other explosive charges to blow the well heads off just above the pads. At present the wells are out of control, blowing hot water and steam. The water is running into an adjacent pasture but is not expected to cause a pollution problem as its salinity is very low. Magma is making plans to abandon the wells as soon as possible. The incident is under investigation by the local authorities.

Geothermal Hot Line

A periodic publication of the California Division of Oil and Gas. Subscription price, January through December, \$3.

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