



GEO THERMAL HOT LINE

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Valles Caldera Demonstration Project Gets DOE Funds

In July, the Department of Energy (DOE) adopted a proposal under which Union Oil Company and Public Service Company of New Mexico will build the first geothermal power plant in the United States to use hydrothermal fluids instead of steam. The 50 MW flash process plant will demonstrate the technical and economic feasibilities of the flash process over a 30-year period. The DOE will contribute half of the \$100 million construction and operation costs. The plant is scheduled to be completed in 1982. The Valles Caldera resource contains

geothermal fluids²⁴⁴⁶ at a temperature of about 230°C (550°F). The water will be disposed of by injection for environmental reasons.

The only other proposal for DOE funds came from San Diego Gas and Electric Company for a binary cycle plant at Heber in Imperial County. The proposal did not satisfy all the requirements of the DOE and was designed for a shorter time span. Proponents of the California plan cited Heber as a much more representative resource (high-solids brine) than Valles Caldera.

California

New Geothermal Fields in California

The Brawley, Heber, and East Mesa areas in Imperial County were designated geothermal fields, effective September 1, 1978, by the State Oil and Gas Supervisor. A 1978 revision of Division of Oil and Gas maps G2-3, G2-4, and G2-5 will show the administrative field boundaries.

Bureau of Reclamation Completes Study in East Mesa

The Bureau of Reclamation has ended a 10-year study on the feasibility of Colorado River flow augmentation. The study showed the East Mesa reservoir is inadequate to significantly increase the flow of the Colorado. However, the tests demonstrated that fresh water and electricity can be produced from the geothermal resource. Factors tested were fluid production rates, fluid handling and treatment in plants, and disposal of spent brine by injection.

The study was conducted at the DOE test site and results will be evaluated in a report prepared by the Lawrence Berkeley Laboratory.

San Diego Gas and Electric Company Plans East Mesa Plant

A 50 MW flash steam power plant will be built by San Diego Gas and Electric Company in the East Mesa Geothermal field. The plant, designed by Ralph M. Parsons Co., will use turbine generators built by General Electric. Negotiations are underway with Republic Geothermal, Inc., to supply geothermal water for the project scheduled to begin operation in 1980.

Union Oil Company to Sell Power to Southern California Edison

Union Oil Company has signed an agreement to sell steam produced from geothermal

resources in the Brawley Geothermal field to Southern California Edison Company. A 10 MW plant, built by Edison, will use the flash steam method. The plant is expected to be completed in 1980. Union recently discussed brine injection and subsidence monitoring and control plans with the California Division of Oil and Gas. Future expansion in the field is expected to boost the power output to 460 MW.

Demonstration Project at Mammoth Lakes

A space-heating and snow-melting demonstration project is underway near the town of Mammoth Lakes. The project was contracted by the Ben Holt Company of Pasadena from the California Energy Commission.

Two Magma Power Company wells are used in the project: one for production, and one for injection. The production well provides about 130 gpm using a downhole pump. Only 3 gpm are used for the heat exchanger. The remaining water is by-passed for injection. Geothermal water is produced at 168°C (335°F) and injected at 88°C (190°F). Water in the freshwater loop leaves the heat exchanger at 93°C (200°F) and returns at 65°C (150°F).

A fresh-water loop, used to convey heat from the well fluid, is heated by a concentric pipe heat exchanger. This water heats a 130 square meter (1,400 square foot) lumber store showroom, then flows through pipes under a sidewalk to melt snow.

The demonstration project began operating in the winter of 1977-78 and will continue through the coming winter. The project could show the value of large-scale geothermal space heating and snow melting in the Mammoth area.

Study of Kelly Hot Spring.

A report on Kelly Hot Spring, near Canby, has been published by the California Division of Mines and Geology. The Modoc County spring is a few miles southeast of the center of a large, fault-bounded basin.

Small anomalies throughout the basin suggest either the presence of intrusive magma or minor horsts and grabens. The hot spring itself is associated with an anomaly. The spring may be a significant low-temperature geothermal resource.

The report is available for \$3.00 from the Division of Mines and Geology, 2815 "O" Street, Sacramento, CA 95816.

College Graduates Work in Geothermal Industry

The geothermal industry has hired many graduates from the Department of Geology at California State College, Sonoma, in Rohnert Park. Department Chairman Dr. William Wright says a strong background in structural geology and petrology gives the graduates an advantage in the job market. Furthermore, college proximity to The Geysers field encourages faculty and student field work in that area.

NCPA Lake Co. Project Hits Roadblock

The Lake County Planning Commission refused to issue a use permit to the Northern California Power Agency for drilling geothermal wells in Cobb Valley without 90 percent hydrogen sulfide abatement. According to Fayne Tucker, Air Pollution Control Officer, lower H₂S abatement levels would allow the project to exceed state air standards. NCPA has appealed to the Lake County Air Pollution Hearing Board, and the issue is scheduled to be heard on September 15, 1978. Hearing results were not available by press time.

Geothermal Resources Board Workshops

The California Geothermal Resources Board (GRB) has submitted a contract proposal

to the federal Department of Energy for funding for four workshops on geothermal energy. The purpose of the workshops is to discuss (1) low-temperature geothermal opportunities, (2) transmission corridors for geothermal-produced electricity, (3) federal leasing of geothermal lands in California, and (4) county planning for geothermal development. Workshop dates have not been finalized.

UPDATE: New California Energy Commission Regulations (Hotline, July 1978)

Geothermal power plant siting regulations proposed by the California Energy Commission are in the final review process. A hearing was held before the commissioners on August 21 where last-minute comments and changes were proposed. Final modifications are underway and adoption is scheduled for September 20.

Energy and Mineral Resources Engineers Needed by CDOG

Persons with the equivalent of college graduation with major work in geology, petroleum engineering, or a closely related field (or with qualifying experience) are eligible to apply to take the test for the position of Energy and Mineral Resources Engineer (EMRE).

An EMRE working for the California Division of Oil and Gas performs engineering tasks used for the regulation of oil, gas, and geothermal operations. The EMRE class is a recruiting and developmental class for work in either the Oil and Gas Engineer or Mineral Resources Engineer series.

Applications for the EMRE test must be received by the State Personnel Board by October 19. For an application form or a specification sheet further describing the EMRE position, call the California Division of Oil and Gas (916) 445-9686, or the California State Personnel Board (916) 322-2530.

Hawaii

Department of Energy Upholds Rights of Islanders

Dr. Ronald Toms, Pacific regional manager of geothermal development for the Department of Energy (DOE), pledged to stop action on any federally-funded geothermal project in Hawaii if the rights of the Hawaiian people are not considered. The announcement was made in July after Toms met with representatives of Hawaiian

Islander groups and the United Indian Planners Association.

The Hawaiians felt the state had taken advantage of them on the question of who owns the geothermal resource, and asked for federal support. Funding will be provided for one or two staff planning positions to allow the Islanders to state their concerns on geothermal development.

Nevada

Nevada to Study Direct Geothermal Uses

The Nevada Bureau of Mines and Geology is studying direct, low-temperature uses of geothermal resources for space heating, agriculture, aquaculture, and industrial process heat. The purpose of the work is to identify and evaluate each potential resource area and determine the type of application best suited for each area.

The study will start with a one-year

investigation of low- to moderate-temperature geothermal areas. Data already on file with the USGS will be used, and data gaps will be filled by conducting field investigations. A map of Nevada showing geothermal areas suitable for direct use applications and a computer data file will be the final products of the study. The U.S. Department of Energy funded the study with a contract for \$124,000.

Texas

UPDATE: Geopressure Test Well (Hotline, April 1978)

Drilling began in July on the General Crude Oil Company geopressure test well near Houston. This is the first time a well has been drilled specifically for high flow rate and long-term production from a geopressure reservoir.

The 4900m (16,000') well, GCO-DOE Pleasant

Bayou No. 1, will be drilled in Brazoria County, south of Houston. The well is expected to produce hot water and methane gas under high pressure.

Along with General Crude and the DOE, the University of Texas Center for Energy Studies will analyze the geothermal fluids for gas and mineral content.

Federal

UPDATE: DOE East Coast Drilling (Hotline, April 1978)

In early July, the DOE started drilling the first of about fifty 300m (1,000 ft.) temperature gradient holes along the

Eastern seaboard. The drilling program is aimed at locating geothermal resources. The holes will be evaluated and the drill site for one 2100m (7,000 ft.) hole determined. The project is expected to be completed in one year.

Competitive Lease Sales Schedule as of 8/23/78

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.

<u>Location of KGRA</u>	<u>Latest Sale Date Scheduled</u>	<u>Original Sale Date</u>
Stillwater-Soda Lake, NV	09/26/78	03/22/78
Ruby Valley, NV	09/26/78	09/26/78
Gerlach, NV	09/26/78	10/18/77
Fly Ranch, Beowawe, NV	09/26/78	12/13/77
Alvord Desert, OR	10/19/78	02/09/78
Breitenbush Hot Sp., OR	10/19/78	07/14/77
The Geysers (MRL), CA	10/31/78	10/31/78
Indian Heaven, WA	11/ /78	03/19/79
M. Hatton, UT Reoffers, UT	12/ /78	12/ /78
Marysville, Boulder HS, MT	12/15/78	04/05/76
Mt. Hood, OR	01/15/79	07/07/78
Mono-Long Valley, CA	02/ /79	02/ /79
East Mesa, CA	04/ /79	08/17/78
The Geysers (MRL), CA	05/ /79	05/ /79
Beckworth Peak, CA	06/ /79	06/ /79
Nevada Reoffers, NV	06/ /79	06/XX/79
Gillard H.S., Clifton, AZ	08/ /79	08/ /79
Belknap-Foley H.S., OR	09/27/79	07/06/78
Island Park (ID & MT), ID	10/ /79	10/ /79
Mt. St. Helens, WA	03/27/80	03/27/80
Gerlach NE, Double HS, NV	04/ /80	04/XX/80
Fly Ranch NE, NV	04/ /80	04/XY/80
Newberry Caldera, OR	05/01/80	05/01/80
McCredie, OR	10/23/80	10/05/78
Knoxville, CA	12/ /80	12/XX/80
Coso, CA	12/ /80	12/XY/80
Corwin Springs, MT	12/ /80	12/YY/80

Department of Energy Aids Drilling Technology

The Department of Energy (DOE) is seeking ways to improve drilling technology and increase drilling rates to lower costs and stimulate drilling. Three projects under this program are currently underway. One project is development of improved drilling bits, including the Stratapax bit. The Stratapax has man-made, diamond teeth for faster penetration.

A second project is a DOE-General Electric study of a downhole motor system known as Electrodril, which has good potential for increasing drilling speeds.

A third project is a joint DOE-Teleco, Inc. study to develop a downhole telemetry system that automatically transmits directional data to the surface. Temperature, pressure, and oil, gas, or water detectors can be included in the system. A conventional directional survey is not necessary when this device is used. The reduced drilling time will lower downtime costs for oil, gas, and geothermal wells. The project was funded with \$2 million from the DOE and \$2 million contributed by oil companies.

Federal Agencies to Simplify Geothermal Leasing and Permitting

Government agencies interested in geothermal energy, including the Departments of Energy, Interior, and Agriculture, have formed a Geothermal Streamlining Task Force. A series of public workshops were held to find ways to simplify the geothermal leasing and permitting process on federal lands. Ideas were gathered from industrial, governmental, and environmental groups at five summer workshops.

The agencies wish to reduce costs, time, and vagueness in the permitting process.

Energy and Interior Form Leasing Liaison Committee

The secretaries of the Departments of Energy and Interior have created a leasing liaison committee at the executive-level to aid interdepartmental cooperation on federal energy leasing issues. The committee, consisting of eight members and two chairpersons, will seek to solve problems between the departments on energy leasing matters and encourage cooperation in preparing reports and technical intercommunication.

Nicaragua

Nicaragua Develops Geothermal Energy

Since 1975, the California Energy Company, Inc., of Santa Rosa, has drilled 26 geothermal wells at the Momotombo volcano site in Nicaragua. The wells are 80 km (50 mi.) from the capital city of Managua. One of the wells is the world's largest geothermal producer, flowing at the rate

of about 910,000 kg/hr. (2,000,000 lbs/hr). The deepest well to date was drilled to 2250m (7,384 ft.).

Presently, the wells can produce enough steam for a 100 MWe power plant, a saving of \$26 million per year in fossil fuel costs. A total of 200 megawatts of power production is projected for 1981.

Technology

Department of Energy Plans Power Plant Project

Lawrence Berkeley Laboratory, under contract with the Department of Energy (DOE), will direct the operation of an experimental binary power plant project in East Mesa. The .5 MW plant components are being constructed in Arvada, Colorado, by Barber-Nichols Engineering.

A direct-contact, heat-exchange process should eliminate plant heat-exchanger scaling. In the process, hot brine from a resource well will be pumped into the top of an open, heat-exchange tower 11.5m (38 feet) high by 1.0m (3 feet) in diameter. Simultaneously, isobutane is injected at the bottom of the steel tower. The isobutane, heating and vaporizing, rises to the top of the tower, where it is piped to a turbine generator. The isobutane will then flow through a condenser and return to the bottom of the tower. Hot brine at the bottom of the tower will be collected and piped to injection wells.

After two months of tests in the spring of

1979, the plant will be moved to Raft River, Idaho, for further experimentation.

New Corrosion and Erosion Inhibitor Extends Drill Pipe Life

Conventional air drilling at The Geysers results in severe drill string corrosion, twist offs, and frequent stuck pipe caused by high-velocity, abrasive drill cuttings and by high-temperature steam, salts, and oxygen. Union Oil Company of California has developed an inhibitor to reduce the impact of the cuttings on the drill pipe. They developed an amine resin that adheres to steel and the particulates in the annular space to combat the abrasive, saline, acid steam. The heavy resin, called Unisteam, is an organic liquid. When mixed with air at the surface, Unisteam forms a water-soluble amine soap that polymerizes to a viscous, insoluble resin at about 120°C (250°F). Twist offs and fishing jobs are less frequent when the resin is used. Unisteam is also effective in liquid-dominated reservoirs.

Conferences

October 10-13, 1978

Lawrence Berkeley Laboratory (LBL) will hold a 4-day workshop at the Asilomar Conference Grounds in Pacific Grove, California. Workshop participants including LBL personnel, contractors, and representatives of industry, government, and universities, will review the LBL Geothermal Subsidence Research Management Plan. The Subsidence Plan is a four-year

program to control or mitigate subsidence associated with geothermal development.

November 13-17, 1978

The Penrose Conference on Heat Transport Processes in the Earth will be held at Los Alamos, New Mexico. For information, contact James W. Mercer, USGS National Center, Mail Stop 431, Reston, VA 22092.

Publications

Second Annual Report, Geothermal Energy Research Development and Demonstration Program, by the Interagency Geothermal Coordinating Council, published by the U.S. Department of Energy. This is the second annual report on the federal Geothermal Energy Program. It presents program accomplishments during fiscal year 1977 (October 1, 1976 - September 30, 1977) and program plans. The 150-page booklet is organized by geographic regions. For availability contact the DOE, Division of Geothermal Energy, Washington, D.C. 20545. Pub. Number DOE/ET-0039/1.

World Energy Resources, 1985-2020

This 264-page book was prepared under the auspices of the Conservation Commission of the World Energy Conference and published for the World Energy Conference by IPC Science and Technology Press, Ltd. It provides estimates of world energy supply and demand over the next four decades. Separate reports on many types of energy are included. Available from IPC Science and Technology Press, Ltd., 205 East 42nd Street, New York, N.Y. 10017. \$24.00 (paper), \$43.00 (cloth).

FLASH: Utah Geothermal Development Underway

McCulloch Geothermal Corporation and Roosevelt Hot Springs Corporation of Salt Lake City will work together to explore and develop any geothermal resources found on Roosevelt Hot Springs Corporation properties in Utah. McCulloch will drill one of three test wells during the first year of the agreement. Afterwards, McCulloch has an option to continue investing in the project with a minimum of \$2 million a year until a total investment of \$12 million is reached. Thereafter, each corporation will invest equally in the project and share equally in the profits.

Geothermal Energy: A Novelty Becomes Resource

Transactions of the Geothermal Resources Council Annual Meeting, July 25-27, 1978, Hilo, Hawaii. The text and slides for the papers presented at the 1978 annual meeting are published in 2 volumes, 747 pages. Available from the Geothermal Resources Council, P.O. Box 98, Davis, CA 95616. \$22.50.

UPDATE: Geothermal Task Force (Hotline, April 1978)

The report of the State Geothermal Resources Task Force, chaired by Dr. Priscilla C. Grew, is available. The volume contains recommendations covering geothermal legislative policy and regulation changes at federal, state, and local levels of government. Copies are available from the Department of Conservation, 1416 Ninth Street, Room 1335, Sacramento, CA 95814.

Geothermal Resources Council

Officers newly elected to the Geothermal Resources Council Board of Directors are Bob Greider, President; L. H. Axtell, First Vice President; Claire C. Heinzelman, Second Vice President; Ronald C. Barr, Third Vice President; Jay F. Kunze, Fourth Vice President; and Phillip N. LaMori, Secretary-Treasurer. Members-at-large elected to the Executive Committee are C. W. Berge, David R. Butler, Reid T. Stone, and Stanley H. Ward.

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