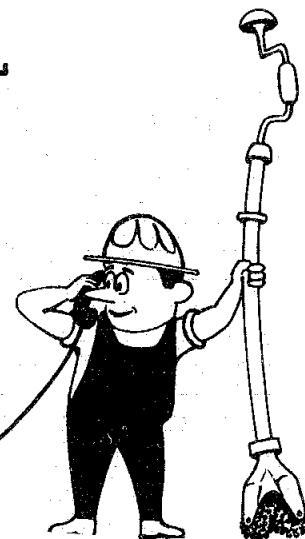
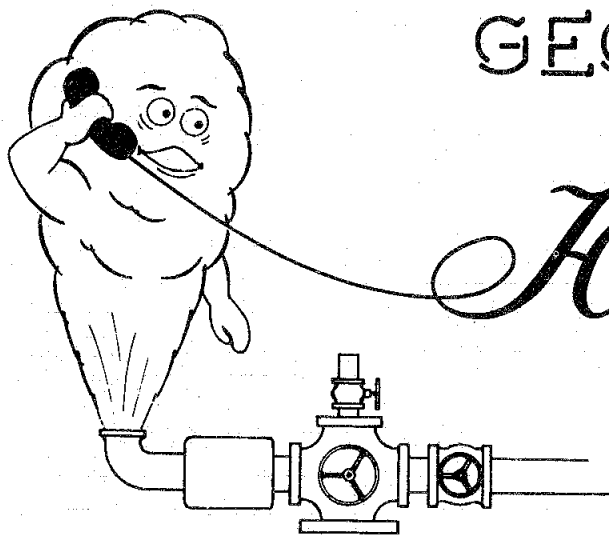


# GEO THERMAL

## Hot Line



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

Volume 3, Number 6

November, 1973

"The primary role of the geologist is to recognize the existence of phenomena before trying to explain them."

B. M. Keilhan

### U. S. GEOTHERMAL LEASING REGULATIONS

On October 23, 1973, the U. S. Bureau of Land Management filed the final environmental impact statement for the development of geothermal resources with the Council on Environmental Quality. The comment period on the proposed geothermal leasing and operating regulations has been extended to a date 24 days after the EIS filing (now November 16, 1973). The final regulations will be released on November 22, and they will become effective 30 days after that date.

M.J.R.

### NATO/CCMS GEOTHERMAL MEETING

The Committee on Challenges of Modern Society (CCMS) of the North Atlantic Treaty Organization held a geothermal meeting in California and Baja California on October 1 through 5. CCMS is concerned with development of new energy sources and has, so far, considered joint research on solar and geothermal energy problems.

The Lawrence Livermore Laboratory of the University of California at Berkeley, funded by the Atomic Energy Commission, was host for the meeting of scientists and engineers from eight NATO countries (Canada, France, Germany, Iceland, Italy, Portugal, Turkey, and United States) and three guest countries (Japan, Mexico, and New Zealand). Business sessions were held in Livermore and San Diego and field trips were taken to The Geysers, Imperial Valley, and Cerro Prieto.

Out of this conference came proposals of international geothermal cooperation for geothermal resources development to be considered at the CCMS plenary session October 23 and 24 in Brussels. The most popular proposal considered was the establishment of an information exchange and data bank system.

M.J.R.

### HOMESTEAD LAND GEOTHERMAL SUIT

Federal Judge George B. Harris ruled on October 30, that the U. S. Government does not own the rights to geothermal steam on homestead land. The judge decided that geothermal resources belonged with the homestead water rights, and not with the mineral rights reserved to the Government.

In the suit, the Department of Interior sought control of the geothermal resources on homestead land at The Geysers Geothermal Field in Sonoma County (see "Hot Line" v. 2, n. 7, Dec. 1972). The decision may be appealed.

M.J.R.

### STATE OF CALIFORNIA ENERGY POLICY STATEMENT

Governor Reagan has approved an Energy Policy statement for California and, by executive order, has established an Energy Planning Council to coordinate state activities. The Energy Policy makes general recommendations for conservation of energy resources and outlines state actions to support the program.

Included in the policy is the following:

The State will support development of geothermal resources to include encouraging the opening of federal lands for this type development, together with necessary environmental impact report, encouraging the federal government to conduct research and development programs, streamlining permit granting procedures, and consideration for faster depreciation of power plants.

For copies of the policy statement contact:

Earl Parker, Press Secretary  
Office of the Lt. Governor  
Sacramento, California 95814  
916-445-0680

M.J.R.

## METRIC MAPS

The California Division of Oil and Gas has converted the maps of geothermal fields to a metric scale. Maps G6-1, The Geysers, and G5-1, Casa Diablo, are printed at a scale of 1:20,000 so that 1 cm = 200 m. These maps include revisions and corrections up to August 31, 1973, and can be purchased for \$1.00. The field map G1-1, Salton Sea, should be available in revised form in early December. Division field maps show well locations, major roads, and the section-township land survey system. *M.J.R.*

### \* COMING MEETINGS \*

#### American Geophysical Union

The annual meeting of the AGU will be held December 10-14, 1973 in the Jack Tar Hotel, San Francisco, California. Three geothermal symposia have been scheduled for Monday, December 10. The registration fee for one day of the meeting is \$10.00 for non-members and \$7.50 for members. The U. S. Geological Survey will open file all of the Long Valley data after it is presented at the meeting.

Program for geothermal symposia on Monday, December 10, in the Eldorado Room, Jack Tar Hotel:

8:30 a.m. Geothermal Resource Investigations I  
Long Valley, California Symposium

CHAIRMAN: D. E. White

1. Volcanism and Geochronology of Long Valley Caldera, Mono County, California  
R. A. Bailey, M. A. Lanphere, G. B. Dalrymple
  2. Structure of the Long Valley Caldera from Detailed Seismic Refraction Measurements  
D. P. Hill, S. McHugh, L. C. Pakiser
  3. Gravity and Magnetic Anomalies in Long Valley, California  
M. F. Kane and D. R. Mabey
  4. Prospecting for Heat in Long Valley  
A. H. Lachenbruch, R. E. Lewis, J. H. Sass
  5. Geochemistry of Thermal Waters in Long Valley, California  
L. M. Willey, J. B. Rapp, Ivan Barnes
- Coffee Break
6. A Total-field Resistivity Map of Long Valley, California  
W. D. Stanley, D. B. Jackson, A. A. R. Zohdy
  7. Direct Current and Electromagnetic Soundings in Long Valley, California  
D. B. Jackson, W. D. Stanley, A. A. R. Zohdy
  8. Audio-magnetotelluric Sounding as a Reconnaissance Exploration Technique in Long Valley, California  
D. B. Hoover, F. C. Frischknecht, C. L. Tippens
  9. The Application of the Self-potential Method in the Exploration for Geothermal Energy in Long Valley, California  
L. A. Anderson, G. R. Johnson
  10. A Seismic Noise Survey in Long Valley, California  
H. M. Iyer and T. Hitchcock
  11. Microearthquakes in and near Long Valley, California  
D. W. Steeples and A. M. Pitt

12. Geophysical Evidence of Caldera Structures in the Harney Basin of Central Eastern Oregon  
H. R. Blank, Jr. and M. E. Gettings
13. Structural Interpretation of Aeromagnetic and Gravity Data from Steens Mountains, Oregon  
M. E. Gettings and H. R. Blank, Jr.

2:00 p.m. Geothermal Resource Investigations II  
General Session

CHAIRMEN: P. A. Witherspoon  
L. J. P. Muffler

1. Volcanic Rocks as Geologic Guides to Geothermal Exploration and Evaluation  
R. L. Smith and H. R. Shaw
2. Heat Flow Studies in the State of Oregon  
R. G. Bowen and D. D. Blackwell
3. Exploration for Geothermal Systems in the Imperial Valley Area, California, Using the Na-K-Ca Technique  
T. B. Coplen
4. Microearthquake Investigation of the Mesa Geothermal Anomaly, Imperial Valley, California  
J. Combs and D. M. Hadley
5. Thermal and Electrical Resistivity Investigations of the Dunes Geothermal Anomaly, Imperial Valley, California  
W. E. Black, J. S. Nelson, J. Combs
6. Petrology of Silicified Cap Rocks in the Dunes Geothermal Anomaly, Imperial Valley of California  
D. K. Bird and W. A. Elders
7. The LASL Geothermal Energy Program: A Summary of In Situ Experiments in the First Exploratory Hole  
D. W. Brown and R. M. Potter
8. Heat Flow of the Jemez Plateau  
R. M. Potter
9. Geohydrology of the Jemez Plateau  
F. G. West
10. Vertical Two-Phase Steam-Water Flow in Geothermal Wells  
T. L. Gould
11. Flashing Flow in Hot Water Geothermal Wells  
M. Nathenson
12. Radioactivity of Nevada Hot Spring Systems  
H. A. Wollenberg
13. Requirements for Assessing the Climatic Impact of Geothermal Development in Lake County, California  
R. B. Coleman and K. P. MacKay
14. Preliminary Results of Geothermal Well Mesa 6-2, Mesa Anomaly, Imperial Valley, California  
C. Swanberg

8:00 p.m. Geothermal Resource Investigations III  
Discussion Session

CHAIRMEN: J. B. Combs  
M. J. Reed *A. Truesdell*

#### Geothermal Resources Council

The annual meeting of the GRC will be held at 8 p.m., Sunday, December 9, 1973 in the Jack Tar Hotel, San Francisco, California. This will be a business meeting primarily for the election of officers. The meeting is being held in conjunction with the AGU convention so that interested persons may attend both. *M.J.R.*

## U.S.G.S. OPEN FILE REPORTS

U. S. Geological Survey reports in open file are available for inspection in the U.S.G.S. Libraries, 1033 SA Bldg., Washington, D. C. 20244; Bldg. 25, Federal Center, Denver, Colo. 80225; 345 Middlefield Rd., Menlo Park, Calif. 94025; and in other offices listed.

"Temperature gradients in Harney County, Oregon" by J. H. Sass and R. J. Munroe. Available at: 678 U. S. Court House Bldg., Spokane, Wash. 99201; 504 Custom House, San Francisco, Calif. 94111; 7638 Federal Bldg., Los Angeles, Calif. 90012; Oregon Dept. Geology & Mineral Industries, 1069 State Office Bldg., 1400 S. W. Fifth Avenue, Portland, Ore. 97201. *M.J.R.*

### RESISTIVITY STUDY COSO HOT SPRINGS AREA

The China Lake Naval Weapons center has recently released "Progress Report on Electrical Resistivity Studies, Coso Geothermal Area, Inyo County, California" by Robert B. Furgerson. In this study, Furgerson used dipole mapping to define areas of low resistivity and Schlumberger sounding to penetrate to greater depth.

A limited number of copies are available from:

G. W. Leonard  
Propulsion Development Department  
Naval Weapons Center  
China Lake, California 93555 *M.J.R.*

### SENATE GEOTHERMAL BILL

Senator Bible and eleven other senators introduced bill S. 2465 on Sept. 21, 1973, which was referred to the Committee on Interior and Insular Affairs. The bill authorizes the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy. It also directs the Secretary to carry out exploration for all forms of geothermal resources and to coordinate this exploration with the research and development program of the Atomic Energy Commission. The Administrator of the National Aeronautics and Space Administration is directed to propose the use of space technology and NASA facilities for the geothermal exploration program. Appropriations of funds are included for the work of the three agencies. *M.J.R.*

### GEOTHERMAL ACTIVITY IN ITALY

In March, 1973, the total generating capacity of geothermal plants in Italy was increased to 405.6 MW. The average production of Italian geothermal plants was 2.5 billion kW hr/yr. Drilling activity has been fruitful in the Travale-Radiocondoli area 20 km east-southeast of Larderello. Well 22, completed this year, produced 326,000 kg/hr of 180°C steam. The well has 34 cm diameter casing and a shut-in pressure of 60 bars. A 15 MW generator began operations in this area in March, 1973.

Monti Volsini is a new field 80 km northwest of Rome. A well completed in August produced steam at 300,000 kg/hr and had a shut-in pressure of 33 bars. Two wells have been drilled in the Viterbo-Monti Cimino hot water system 50 km northwest of Rome. The wells are now being tested for production and reinjection in a zone below 700 m.

Exploration for geothermal resources is continuing in a 30,000 km<sup>2</sup> area along the west coast of Italy and the islands of Sicily and Sardinia. This geothermal prospect area represents 10% of the Italian territory. *P. Ceron*

## GEOPHYSICAL SURVEYS - NEVADA

The Lawrence Berkeley Laboratory and the University of California, Berkeley campus are engaged in a joint program of geophysical measurements in potential geothermal resource areas in north-central Nevada. Included in the program will be electrical resistivity, magnetic, micro-earthquake, telluric, infrared, and radiometric surveys. Electrical resistivity measurements are now underway in the Whirlwind Valley area (Beowawe Hot Springs) and Buffalo Valley.

These are the initial stages of a program leading to the design, siting, and construction of a field-experimental powerplant with a generating capacity of approximately 10 MW. The entire program will be done under the auspices of the U. S. Atomic Energy Commission. *H. Wollenberg*

### \* WELL OPERATIONS \*

#### MARICOPA COUNTY, ARIZONA

##### Geothermal Kinetics Systems Corp.

GKS, after running a long series of tests in their two geothermal wells near Higley, Arizona, discovered that the wells are not producing fluids as well as expected because baked drilling mud clogged the formation. At this writing, their well, "Power Ranches" 2 (see Hot Line v. 3, no. 5) is being extensively logged. Following that, the hole will be acidized to clean out the baked-on drilling mud. If this operation is successful, the same will be done in "Power Ranches" 1. *G.E.C.*

#### LAKE COUNTY, OREGON

##### Gulf Oil Co.

On October 27, 1973, Gulf Oil Co. began drilling "Favell-Utley" 1-ST. The well is located in the NW¼ of the NE¼ of Sec. 17, T. 39S., R. 20E., W.B.&M., approximately 1½ km west of Lakeview, Oregon, and will be drilled to a depth of 1650 m.

This will be the first geothermal exploration well drilled for power production in Oregon. *G.E.C.*

#### SONOMA COUNTY, CALIFORNIA

##### The Geysers Geothermal Field Geothermal Kinetics Systems Corp.

Geothermal Kinetics has cemented surface casing at 1342 m in "Rorabaugh" 1, their first geothermal well in California. The hole was drilled ahead to 1347 m where a major lost-circulation zone was encountered and cemented-off with difficulty. Drilling is proceeding, using air as the circulating medium. *G.E.C.*

##### Pacific Energy Corporation

Pacific Energy well "Rorabaugh" A-7 in Sec. 14, T. 11N., R. 9 W., M.D. was completed on October 28, 1973. This well produces 138,000 kg/hr (304,000 lb/hr) of steam, making it one of the best wells in The Geysers Field. Steam is produced from the zone between the bottom of the casing at 1580 m and the total depth at 1880 m. *M.J.R.*

## LAKE COUNTY, CALIFORNIA

### The Geysers Geothermal Field

#### Signal Oil & Gas Co.

Signal spudded "Thorne" 2, a directional well, on October 21, 1973. This new geothermal well is located 113 m north and 114 m west from the southeast corner of Sec. 27, T. 11N., R. 8W., M.D.B.&M., which is about 10 m from "Thorne" 1 drilled in 1970.

"Thorne" 2 will be the last well drilled under Signal's 1973 Geysers Field drilling program. *G.E.C.*

#### Signal Oil & Gas Co.

Signal's 7th geothermal well, "McKinley" 6, was drilled to 2175 m total depth on October 17, 1973, and shut-in pending production. Preliminary tests indicate that the well is capable of producing over 45,500 kg/hr of dry steam, but extensive testing will not be done until December, when a specially made muffler is scheduled for delivery. *G.E.C.*

## PLUMAS COUNTY, CALIFORNIA

#### Phillips Petroleum Co.

On Oct. 25, 1973, Phillips Petroleum Co. applied to the California Division of Oil and Gas for permission to drill a geothermal well near Loyalton in Sierra Valley. The well a Getty Oil Co. farmout, will be located 137 m north and 490 m east from the southwest corner of Sec. 32, T. 22N., R. 15E., M.D.B.&M. The ground elevation at the location is approximately 1490 m.

Phillips plans to begin drilling in late November. *G.E.C.*

## MODOC COUNTY, CALIFORNIA

#### Magma Energy, Inc.

Magma's well, "Phipps" 2, near Lake City in Surprise Valley (see Hot Line v. 3, n. 4) will be deepened 150 to 300 meters and a liner will be set in the hole to total depth as soon as a drilling rig becomes available.

They hope to be able to complete this work before the end of this year, weather permitting. *G.E.C.*

STATE OF CALIFORNIA  
DIVISION OF OIL AND GAS  
1416 NINTH STREET, ROOM 1316-35  
SACRAMENTO, CALIFORNIA 95814

#### American Thermal Resources, Inc.

American Thermal expects to drill their first California geothermal exploratory well, next spring, somewhere in the south end of Surprise Valley. *G.F.C.*

#### Gulf Oil Co.

"Surprise Valley" 2-ST, Gulf's fourth geothermal test hole drilled in California in 1973, was plugged and abandoned on October 22nd at a depth of 1982m. *G.E.C.*

## IMPERIAL COUNTY, CALIFORNIA

#### QB Resources, International

QB Resources, International of Los Angeles, filed a notice of intention to drill with the California Division of Oil and Gas for a geothermal observation well. The proposed location is in Sec. 1, T. 9S., R. 12E., S.B.B.&M., near the San Andreas fault zone which runs along the east side of the Salton Sea. The proposed well will be sited about 3/4 km from a spa area where several hot water wells have been drilled, one of which produces 82°C water from a depth of about 100 m. *D.P.L.*

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#### *Geothermal Hot Line*

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

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