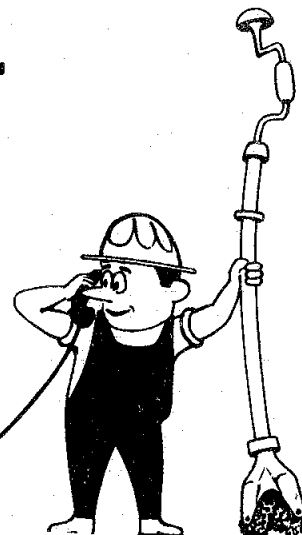
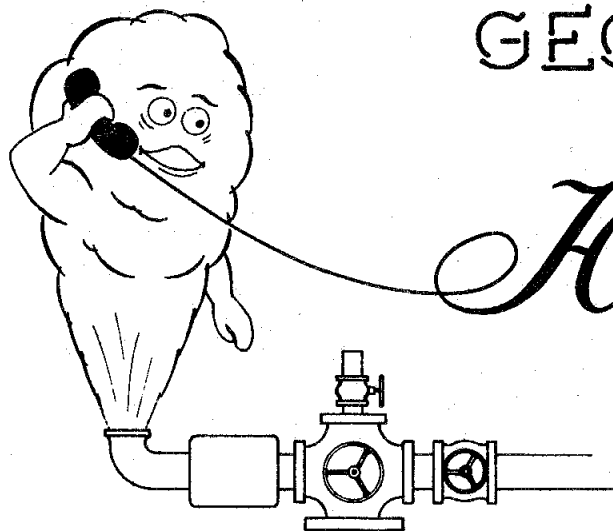


GEO THERMAL

Hot
Line

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

Volume 4, Number 4

December, 1974

**THE SECOND UNITED NATIONS SYMPOSIUM
ON THE
DEVELOPMENT AND USE OF GEOTHERMAL RESOURCES**

SAN FRANCISCO, CALIFORNIA

20-29 May 1975

The symposium is being organized by the United Nations Secretariat in cooperation with United States authorities (U.S. Department of the Interior; U.S. National Science Foundation; and U.S. Atomic Energy Commission), the State of California Resources Agency, and the University of California. In addition, the Geothermal Resources Council, the American Association of Petroleum Geologists, and public and private development corporations are providing assistance.

This symposium like its predecessor will undoubtedly be a landmark in the development of geothermal resources throughout the world and its proceeding, which will be rapidly published, will serve as a reference for years to come. This will be one of the rare occasions where all of the great and near-great names in the geothermal world will be in one place at one time. Attendance at this symposium will provide the exposure, contacts, and background that will be of use for years to come.

For additional information and a second circular containing registration forms, applications to submit papers, and pertinent information contact:

Symposium Coordinator
United Nations Geothermal Symposium
P.O. Box 7798
San Francisco, California 94120

If you are on the "Hot Line" mailing list, you have already received copies of the first and second circulars.

Please note: If you have not completed and submitted the registration form contained in the second circular and you plan to attend, please do so as soon as possible. Registration can only be accomplished by sending the form to the Symposium Coordinator.

NOTICE

The "Geothermal Hot Line" only published four issues in 1974 due to a lack of personnel. Because so few issues were published in 1974, all subscriptions are being continued through 1975.

M.J.R.

CITY OF SANTA CLARA

On September 12, 1974, the Santa Clara City Council voted to approve, in concept, a \$670,000 appropriation toward the exploration for steam in the Geysers geothermal area, California. Santa Clara's appropriation will be part of a \$2 million proposed package to be put together by the Northern California Power Agency, which is an association of 11 cities in Northern California. The 11 cities are Santa Clara, Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, and Ukiah.

THERMAL AND CHEMICAL PROBLEMS OF THERMAL WATERS

International Union of Geodesy & Geophysics

A symposium for exchanging experiences of thermal and chemical problems of geothermal development will be held as part of the Sixteenth General Assembly of I.U.G.G. at Grenoble, France on Aug. 29 and Sept. 1, 1975. This symposium is being organized by the International Association of Hydrologic Sciences, the International Association of Hydrogeologists, and the International Association of Volcanology and Chemistry of the Earth's Interior. The program will consider the following topics:

1. Thermal-water distribution patterns
2. Geochemistry of thermal waters
3. Utilization of thermal waters

Abstracts of offered papers must be submitted before Feb. 1, 1975, in both English and French; and provisional registration for the symposium must be submitted before April 1, 1975. For further information contact:

Arnold I. Johnson
U.S. Geological Survey, MS-417
Reston, Virginia 22092

M.J.R.

CALIFORNIA GEOTHERMAL UNIT

In September 1974, the Geothermal Unit of the California Division of Oil and Gas was joined by Mel Schrecongost. Mel filled the vacancy created when Glen Campbell resigned in June.

Milford M. Schrecongost
B.S. in Geology, 1961, Bowling Green State University
M.S. in Geology, 1963, Bowling Green State University
Navy flight, weather forecaster, 1953-57; engineering geologist, California Department of Water Resources, 1963-70; oil and gas engineer, California Division of Oil and Gas, Inglewood and Santa Maria, 1970-74.

Specialities: engineering geology and water injection.

LASSEN COUNTY RESEARCH CENTER

The Lassen Community College, in the city of Susanville, has announced the formation of a Geothermal Research Center under the auspices of the California State University, Chico. The center will be housed in the science building now under construction on the campus.

The new center will be directed by Philip W. Gutman, a founder of Hobo Wells Hydroponics, Inc., which is a firm actively involved in raising tomatoes with geothermal heat at Wendel Hot Springs in Lassen County.

The center's first order of business will be to take an active role in the review of the Susanville Geothermal Energy Project, which involves a grant proposal to the National Science Foundation by C.S.L. Associates of Sacramento for the development of the geothermal potential in and near the city of Susanville.

For additional information on the center, call (916) 257-4101.

GEOTHERMICS COURSE

The International Institute for Geothermal Research of Pisa, Italy, will hold the Sixth International Post-Graduate Course in Geothermics. Beginning February 1, 1975, the nine month course will present

theoretical lectures and seminars in Pisa, and practical geothermal training at specialized research centers and producing steam fields. Topics covered in the course include: heat and thermodynamics, general geothermics, volcanology, hydrology and geohydrology, hydrothermal systems, isotopic geology applied to geothermal research, reservoir engineering, methods of geophysical and mathematical models, drilling technology, utilization of low and high enthalpy fluids, and monitoring of production in fields.

For further information contact:

Secretariat
Istituto Internazionale per le
Ricerche Geotermiche
Lungarno A. Pacinotti, 55
56100 Pisa, Italy

M.J.R.

CALIFORNIA GEOTHERMAL RESOURCES BOARD

The Geothermal Resources Board of the State of California held a two-day meeting in Sonoma County on August 8 and 9, 1974. The first day of the meeting consisted of a tour of The Geysers by the board, followed by a formal meeting in Santa Rosa on the last day.

The purpose of the meeting was to observe first hand, and to hear testimony on the problems related to the development of geothermal energy in California and in particular The Geysers area. As a result of the meeting, the board has forwarded the following recommendations to the Governor's cabinet for its consideration:

1. The state should provide a full-time on-the-site representative in The Geysers area for those state agencies with an interest in the area.
2. The state should develop Area Environmental Impact Reports for geothermal areas as the need arises.
3. The state Energy Policy pertaining to geothermal energy should be revised.

COUNTIES CONTRACT FOR INSPECTIONS IN THE GEYSERS

Lake County has contracted with Ruzicka Engineers of Lakeport for inspection during surface operations of 3 wells in The Geysers area. The county public works department lacks the personnel to make these inspections and has assessed the geothermal operators for the contracting expense. In order to enforce the county land use permit, an inspector is present during the construction of drilling pads, sumps, access roads, and attendant drainage facilities. The 3 use permits with this requirement are Burmah Oil & Gas Co. (and Natomas) well "Davies Estate" 1 in Sec. 36, T.11N., R.8W., M.D.B.&M. and Union Oil Co. wells "Horner State 4596" 1 in Sec. 6, T.11N., R.8W., and "Chas. Binkley" 1 in Sec. 36, T. 12N., R.9W., M.D.B.&M.

Sonoma County has attached a provision for inspection to land use permits for 2 Pacific Energy Corp. wells located near areas of habitation. Ecoview Environmental Consultants of Napa have been contracted to monitor compliance with the use permits. Of greatest interest to inspectors are the provisions on noise, reseeding, and erosion control. The geothermal operator is assessed for the cost of inspection.

M.J.R.

ICELAND PLANS 50 MW POWER PLANT

Rodgers Engineering of San Francisco in cooperation with Thoroddsen and Partners Consulting Engineers of Iceland have been selected to design and build the plant - Rodgers Engineering to handle electrical work and Thoroddsen and Partners the civil engineering.

Rodgers Engineering, according to Jim Kuwada, has already begun work on the project which is to be a 50 MW, double flash, mixed-pressure turbine system consisting of 2 units. The plant will be constructed in north-central Iceland near Krafla.

Site work is scheduled to start in May 1975. It is expected that grading and turbine pedestals will be completed next summer and the plant will be on-line within 30 to 36 months.

Present geothermal development in Iceland consists of a municipal

heating system begun in 1930 which now heats 90% of the homes in Reykjavik, and a 2.5 MW electric generating plant and diatomaceous earth drying plant at Namafjall.

M.M.S.

NEW MEXICO STATE LEASES

In the first competitive geothermal bidding held by the State of New Mexico, \$146,000 in bonus bids were accepted. Amax was the highest bidder and obtained a 2.6km² (640 acre) tract in Hidalgo County for \$16,684.80. Amax was high bidder on 21 of the 92 tracts put up for lease.

The next state geothermal leasing may be held in January, 1975. For further information contact:

Jack Kennedy
State Land Office
Santa Fe, New Mexico 87501

M.J.R.

THE GEYSERS RADON EMISSIONS

Radon, an inert radioactive gas found naturally over any land mass on earth, is emitted from The Geysers geothermal power generating units. In 1973, PG&E and Union Oil Company began investigating the emission of naturally occurring radioactive materials within geothermal steam. Results in April of 1974 indicated the levels of radon and its decay products are typical of ambient concentrations elsewhere in the United States. County and state officials were informed of the preliminary study results, and continuing research programs now in progress will assure that concentrations remain within applicable standards.

PG&E Week

AQUACULTURE CATFISH FARM

Calaqua, Inc., located near Paso Robles, California, is developing a catfish farm using thermal water. Their 314 m well produces 5.3 cubic meters per minute of water at a temperature of 47°C. In a 2270 cubic meter holding tank, the water is cooled to 30°C before being supplied to the spawning tanks and raceways. The company hopes to be in full operation in 1976 with a production of 12,000 kg/week of processed catfish. Other products will be smoked catfish, live fingerlings, and fish for stocking other farms.

Fish Farming

INTERNATIONAL LOW-TEMPERATURE CONFERENCE

An international conference on non-electrical uses of geothermal energy was held on October 7 - 9 at Oregon Institute of Technology in Klamath Falls, Oregon. (see "Hot Line" v. 3, n. 6, June, 1974) A very positive attitude toward the potential for utilization of low-temperature geothermal resources was expressed by most of the nearly 500 attendees.

The 3 day program featured speakers from the world's major geothermal energy utilization areas. Papers were presented on geothermal energy applications in food, agriculture, chemical, pulp, and paper processing, and in commercial-residential space heating and cooling.

A hardbound compendium of 17 to 20 papers presented at the conference will be published in about 6 months. See future issues of the "Hot Line" for release date.

M.M.S.

U. S. GEOLOGICAL SURVEY GRANTS

The U. S. Geological Survey has announced a geothermal research program involving the awarding of grants to industrial and small business concerns, non-profit organizations, educational institutions, and other organizations having the capability for performing scientific research investigations of geothermal resources. Interested parties are invited to submit proposals for research projects pursuant to grants and contracts within the U.S.G.S.

Information may be obtained by requesting brochures from:

Don Klick
Extramural Geothermal
Research
Mail Stop 906
12201 Sunrise Valley Drive
Reston, Virginia 22092
(703) 860-6581

Proposals must be submitted no later than January 13, 1975. Since this program is expected to be a continuing one, proposals received after this date will be considered for funding support toward the end of fiscal year 1975, but only if funding is available.

**U. S. GEOLOGICAL SURVEY
OPEN FILE REPORTS**

The Geological Survey has released the following reports in open file. Copies are available for inspection in U.S.G.S. libraries: 12201 Sunrise Valley Dr., Reston, Va. 22092; Bldg. 25, Federal Center, Denver, Co. 80225; and 345 Middlefield Rd., Menlo Park, Ca. 94025. Extra depositories are listed with each report.

1. Search for geothermal seismic noise in the East Mesa area, Imperial Valley, California: Rept. 74-96, by H. M. Iyer. Also available at U.S.G.S. offices, Rm. 504 Custom House, San Francisco, Ca. 94111; 300 N. Los Angeles St., Los Angeles, Ca. 90012; and California Division of Mines & Geology, 1416 Ninth St., Sacramento, Ca. 95814; Ferry Bldg., San Francisco, Ca. 94111; 107 S. Broadway, Los Angeles, Ca. 90012.

2. Preliminary geologic map of The Geysers steam field and vicinity, Sonoma County, California: Rept. 74-238, by Robert J. McLaughlin. Material for copying is available in the above mentioned California offices of the U.S.G.S. and California Division of Mines & Geology.

3. Report on direct current soundings over a geothermal prospect in the Bruneau-Grand View area, Idaho: Rept. 74-240, by Dallas B. Jackson. Material for copying is available at U.S.G.S. offices, Rm. 1012 Federal Bldg., Denver, Co. 80202; Rm. 8102 Federal Office Bldg., Salt Lake City, Utah 84111; Rm. 678 U.S. Court House, Spokane, Wa. 99201; and at Idaho Bureau Mines & Geology, Moscow, Id. 83843.

4. An evaluation of thermal water in the Bruneau-Grand View area, southwest Idaho, by H.W. Young and R.L. Whitehead, with a section on reconnaissance audio-magnetotelluric survey, by D.B. Hoover and C.L. Tippens. Also available at U.S.G.S., Rm. 365 Federal Bldg., Boise, Id. 83702.

5. An evaluation of thermal water in the Weiser area, Idaho: Rept. 74-249, by H. W. Young and R. L. Whitehead. Also available at U.S.G.S., Rm. 365 Federal Bldg., Boise, Id. 83702.

6. Geothermal systems of northern Nevada: Rept. 74-271, by

Richard K. Hose and Bruce E. Taylor. Also available at U.S.G.S. offices in San Francisco, Los Angeles, Salt Lake City, Denver, and at Mackay School of Mines Library, Reno, Nv. 89507. *M.J.R.*

**NEVADA
GEOHERMAL REPORT**

The Nevada Bureau of Mines and Geology has published "Geothermal Exploration and Development in Nevada through 1973" by Larry Gar-side. This report is a description of the state geothermal potential with information on the exploration wells drilled (1920 through 1973) and the areas designated KGRA by the federal government. Copies of this paper (Report 21) are available for \$1 each from:

Nevada Bureau of Mines
and Geology
University of Nevada
Reno, Nevada 89507
Phone: 702-784-6691

M.J.R.

**U.S. BUREAU OF MINES
MATERIALS RESEARCH**

The Bureau of Mines, Electrometallurgy and Corrosion Lab, in College Park, Maryland, has been researching the materials problem associated with geothermal development. Laboratory experiments and field tests in the Salton Sea Geothermal Field led to two papers presented to the Electrochemical Society meeting this fall. The presentations were "The Solubility of Oxygen in Geothermal Brines" and "Corrosion Resistance of Some Commercially Available Metals and Alloys to Geothermal Brines". Construction is underway on several trailer-mounted test units and a portable laboratory for use in the Imperial Valley of California.

At a "materials workshop" meeting in College Park on December 3 and 4, problems facing the geothermal industry were presented and needed research was discussed. Future work will try to solve the problems of corrosion of casing in saline brines, silica scaling of surface pipes, and turbine blade corrosion.

M.J.R.

**NEW GEOTHERMAL
EXPLORATION
GROUP**

"A group comprised of AMAX Exploration Inc., LVO Corp., Earth Power Corp., and Thermal Resources Inc. has been formed to explore and possibly develop five geothermal properties in Oregon and two in Washington. AMAX is to execute all surface exploration prior to 1976.

"Leases and lease applications involved cover 112,000 acres in Malheur, Lake, and Harney counties in Oregon, and Skamania and Lewis counties in Washington."

Petroleum Engineer

**EXPLORATION IN
NICARAGUA**

A joint Nicaragua - United Nations geothermal project has progressed to the stage of exploration drilling. The prime area of interest is the valley between the volcanoes Momotombo and El Oyo, a short distance northwest of Managua. It is possible that the two cones are fed from the same magma chamber which may lie beneath the valley. Four exploratory holes will be drilled to depths between 550m and 915m (see also "Hot Line" v. 4, n. 1, Feb. 1974).

M.J.R.

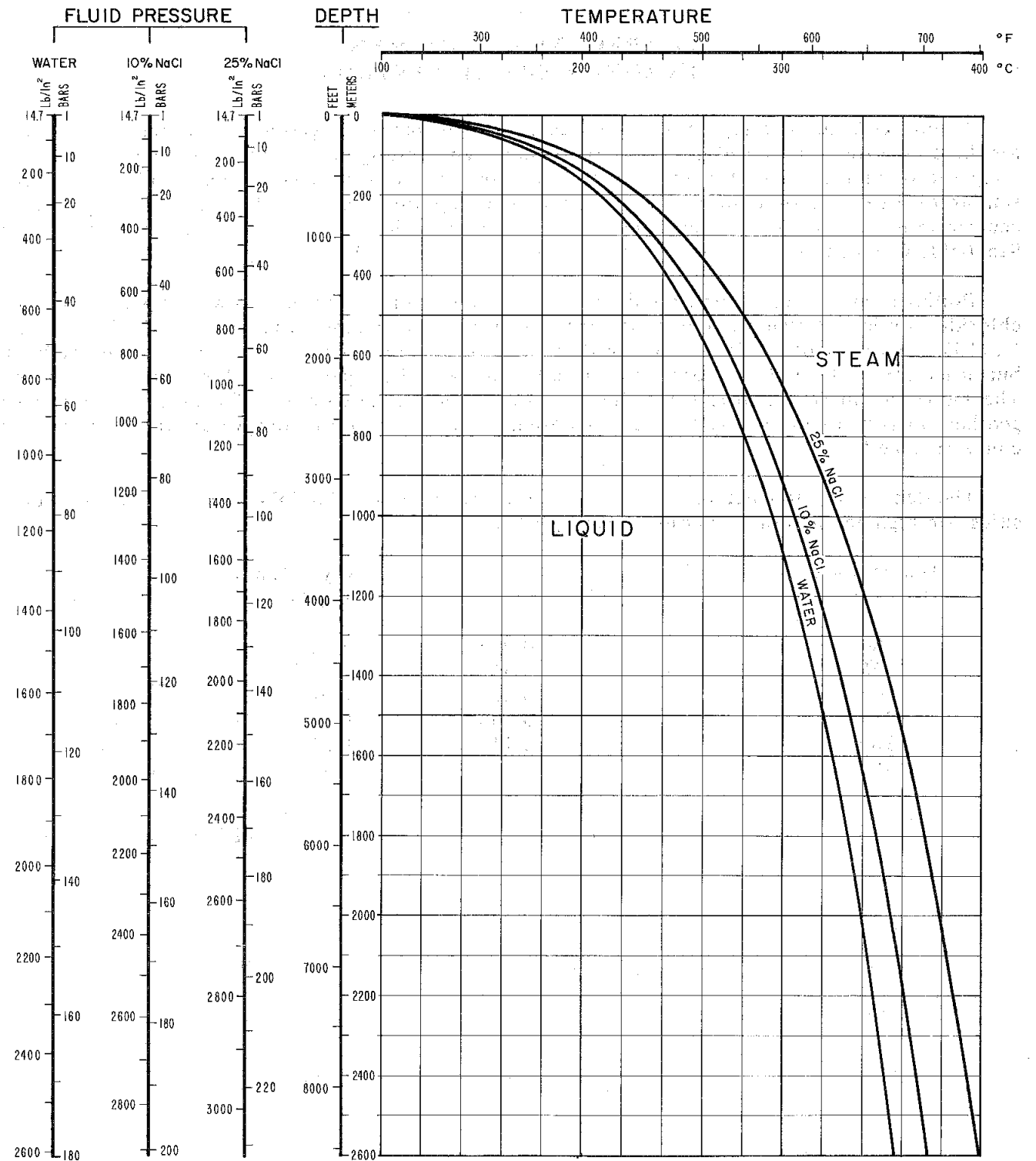
**U.S. GEOLOGICAL
SURVEY GEOHERMAL
BUDGET**

The U.S. Geological Survey has been given an appropriation of \$10,861,000 for geothermal investigations in the current fiscal year (to June 30, 1975). This is an increase of \$7,914,000 over last year. A major effort will be aimed at developing useful exploration methods to locate geothermal resources. Also of high priority will be the development of methods for evaluating individual fields as to size, energy potential, and longevity. The U.S.G.S. is involved in continuing projects to estimate the national potential of geothermal resources and to evaluate the federal lands being leased for private exploration and development.

M.J.R.

STATE OF CALIFORNIA
DIVISION OF OIL AND GAS
GEOHERMAL UNIT

**BOILING CURVE FOR WATER
AND NaCl SOLUTIONS**



CALCULATED FROM: J.L. Hass, Jr. 1971, Econ. Geol., V.66, P.940-946

TEMPERATURE GRADIENTS IN GEOTHERMAL SYSTEMS

A knowledge of the temperature and pressure at any depth in a geothermal system is important for the exploration and development of the system. The boiling curve defines the physical limit of temperature and pressure for any liquid or two-phase reservoir. Geothermal fluids are usually similar to water solutions of sodium chloride. The explored geothermal fields may vary in concentration from less than 0.2 weight percent (Hverageri, Iceland) to over 25 weight percent (Salton Sea field, California).

Boiling point curves are presented here for pure water and for 10 and 25 weight percent sodium chloride solutions. Calculation of these curves is based on the mathematical model of John L. Haas, Jr. (1971, Econ. Geol., v. 66, p. 940-946). The curves are for a constant composition of the fluid, but in natural systems the concentration usually increases with increasing depth and temperature. The model assumes a hydrostatic column of water for the calculation of pressure; however, in geothermal systems there may be pressures greater than hydrostatic, and water may be moving in convection cells.

The density of water decreases as the temperature increases. The following are calculated densities for high temperature solutions (Haas, 1971):

Temperature (°C)	Density (g/cm ³)		
	Water	10% Soln.	25% Soln.
100	0.958	1.029	1.144
150	0.917	0.990	1.106
200	0.865	0.944	1.063
250	0.799	0.889	1.019
300	0.712	0.820	0.977
350	0.573	0.721	0.932

M.J. REED
HOTLINE, VOL. 4, NO. 4

NEVADA FEDERAL LEASING

More than 12,000 acres in the Brady Hot Springs area of Churchill County, Nevada were put up for bid September 11, 1974 but there were only 6 bids on 5 of the leasing units, and offers were low. Southern Union Production Company submitted the top bid, \$15,108, for 1 unit. Geothermal Resources International offered bids for 2 units at \$6,500 each and another at \$1,000. Magma Power Company bid \$5,993 for 1 unit, but it was not accepted.

In the second federal lease sale for Nevada, held December 19, 1974, bids were made on 21,603.16 acres with the total high bids of \$1,001,063.74. High bids for the leasing units were the following:

Beowawe K.G.R.A., Eureka County

Unit	High Bid
1. Chevron Oil Co.	\$ 15,074.89 (\$7.76/acre)
2. & 3. no bid	
4. Chevron Oil Co.	\$505,088.77 (203.77/acre)
5. Getty Oil	\$ 45,371.16 (\$18.00/acre)
6. Chevron Oil Co.	\$ 75,490.92 (\$30.59/acre)
7. no bid	
8. Getty Oil	\$ 30,231.63 (12.50/acre)

Hot Springs Point K.G.R.A., Eureka County

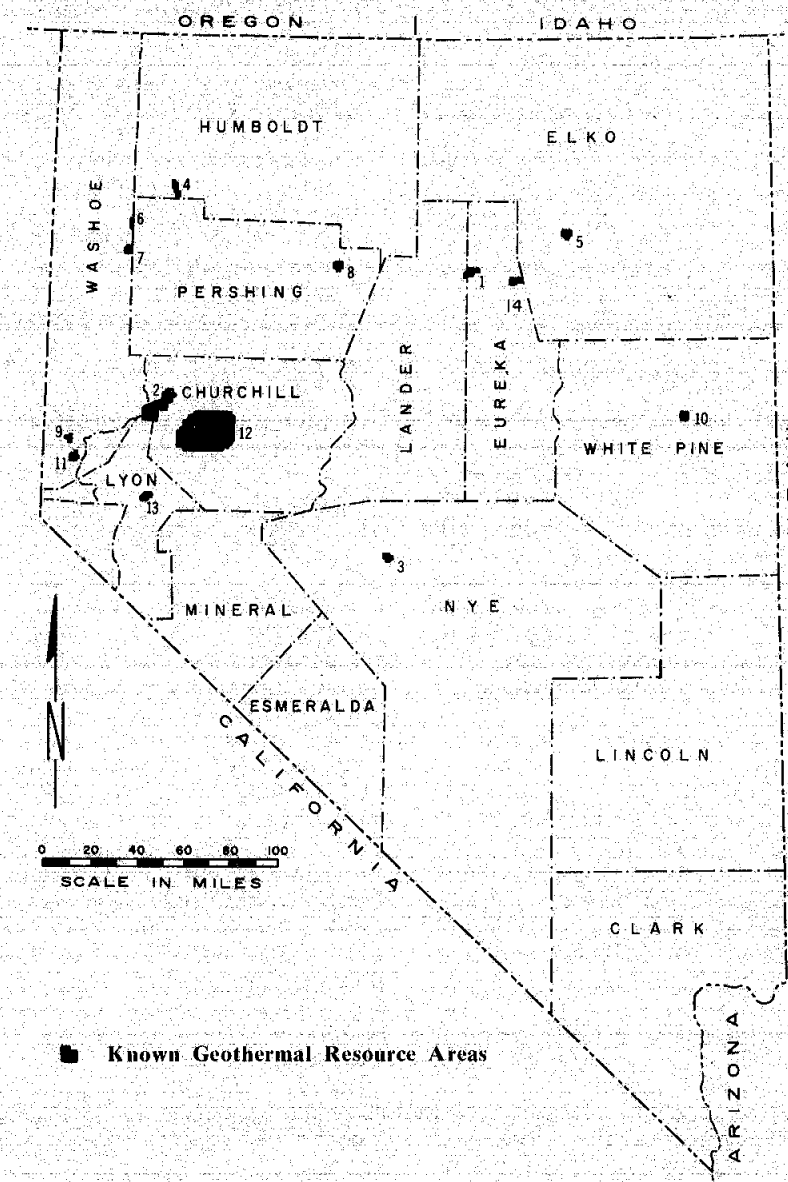
1. no bid	
2. Chevron Oil Co.	\$115,274.67 (\$53.84/acre)
3. Chevron Oil Co.	\$125,619.20 (\$49.07/acre)

Rebid of Brady-Hazen K.G.R.A.

1 & 3 no bid	
2. Natomas	\$ 51,224.00 (\$20.00/acre)
4. Natomas	\$ 37,688.40 (\$15.00/acre)

Unit 2 is a rebid after the Sept. 11 Magma Power Co. bid of \$1/acre was rejected as too low. Union Oil's grandfather claim on this unit was rejected and Union has a suit pending. The next

The next federal sale in Nevada will be April 8, 1975 for the Fly Ranch and Double Hot Springs K.G.R.A.'s in northwestern Nevada. It is expected that the first non-competitive lease in Nevada will be issued the first week in January, 1975. M.J.R.



KNOWN GEOTHERMAL RESOURCE AREAS IN NEVADA

1. Beowawe	16,530 acres
2. Brady - Hazen	approx. 65,000 acres
3. Darrough Hot Springs	8,398 acres
4. Double Hot Springs	10,816 acres
5. Elko Hot Springs	8,960 acres
6. Fly Ranch	5,125 acres
7. Gerlach	8,972 acres
8. Leach Hot Springs	8,926 acres
9. Moana Springs	5,120 acres
10. Monte Neva	10,302 acres
11. Steamboat Springs	8,914 acres
12. Stillwater - Soda Lake	225,211 acres
13. Wabuska	11,520 acres
14. Hot Springs Point	5,341 acres

CALIFORNIA GEOTHERMAL LEGISLATION

Following is a brief summary and status of the more important bills pertaining to geothermal energy that were submitted during the last two year session of the California legislature. Although most of the bills had a short life, they serve to indicate some of the problem areas in the field of geothermal energy development.

SENATE BILLS

No. 563 Senator Dills, March 28, 1973

Eliminates the value of geothermal resources from the assessment of land at full cash value, for purposes of property taxation. Contains mechanism for reimbursement of property tax revenues that would be lost. Status Dropped (Would have required a constitutional amendment)

No. 564 Senator Dills, March 28, 1973

Extends the percentage depletion allowance permitted for oil and gas to geothermal energy. Status Dropped (Big tax liability is a federal matter and the passage of such a bill would have little impact as a fiscal incentive on the state level.)

No. 577 Senator Dills, April 2, 1973

Directs the Public Utilities Commission to establish a schedule of rapid amortization of the cost of public utility facilities (electrical generating) utilizing geothermal resources, based upon their estimated useful life.

Status Died in committee (See S.B. No. 1673 below)

No. 1673 Senator Nejedly, February 4, 1974

Permits the Public Utilities Commission to establish a schedule of rapid amortization of the cost of public utility facilities (electrical generating) utilizing geothermal resources, based upon their estimated usable life, or the estimated useful life of the geothermal resource, whichever is the shorter, to permit the full recovery of the cost of such facilities. Declares the cost of such facilities to be a recognized cost of operation in rate proceedings.

Status Approved by the legislature and signed by the Governor.

No. 2092 Senator Dills, April 15, 1974

Changes existing state law pertaining to prospecting permits, leasing, and royalty rates on state lands and increases the membership and adds to the duties of the Geothermal Resources Board.

Status Referred to interim study. A revised bill will be submitted by Senator Dills in the 1975-1976 session of the legislature.

WELL OPERATIONS

SANDOVAL COUNTY, NEW MEXICO

Los Alamos Scientific Lab

The Los Alamos Scientific Lab operating on a contract from the U.S. Atomic Energy Commission completed drilling on their second test well for "hot dry rock" in September, 1974. Well GT-2 is in the Santa Fe National Forest on the Jemez Plateau of New Mexico at a distance of 30km west of Los Alamos. Drilling reached a total depth of 2042m, and the well was completed with 34cm casing to 488m, 27cm casing to 773m, and a 25cm open hole to total depth. Although the surface temperature gradient was high, the maximum temperature in the well was only 146°C. The rocks in the area consist of Pleistocene rhyolite at the surface, Paleozoic sediments to a depth of about 600m, and a Precambrian basement of granite gneiss, amphibolite, and biotite schist.

Large water bearing fractures occur between 990m and 1085m. Experiments in hydraulic fracturing of the rock are planned for next spring. (See also "Hot Line" v.3, n.7, Dec. 1973).

M.J.R.

LEWIS AND CLARK COUNTY, MONTANA

Marysville Project

Battelle-Northwest Institute and their consultant Rogers Engineering Co. completed drilling on a National Science Foundation sponsored test for "hot dry rock". At a depth of 297m the well entered the Empire plutonic stock, and drilling continued in granitic rock to the total depth of 2070m. Major zones of water

producing fractures were encountered between depths of 550m and 730m, and between 945m and 1035m. Another major fracture zone at the total depth contained fluid at less than hydrostatic pressure and presented problems as a lost circulation zone. Maximum temperature in the hole was 96°C. (See also "Hot Line" v. 4, n. 3, June 1974).

M.J.R.

ELMORE COUNTY, IDAHO

Gulf Energy & Minerals

In the first week of August, 1974, Gulf reentered the well "Bostic" 1-A in SW/SW¹/₄, Sec. 25, T. 4S., R.8E., Boise B&M, to the southeast of Mountain Home, Idaho. In 1973, Standard American Company drilled the oil and gas test to a depth of 2950m, and hot water above 180°C was encountered. Gulf has run drill stem tests and temperature surveys to evaluate the hot water reservoir.

M.J.R.

CHURCHILL COUNTY NEVADA

Chevron Oil Co.

Chevron Oil Co. is drilling well "Chevron-Phillips" 1-29 in the Soda Lake - Stillwater KGRA. The location is 201m north and 201m west from the southeast corner of Sec. 29, T.20N., R.28E., M.D.B.&M. Surface casing has been set at 307.2m, and drilling will continue to a total depth of about 1830m.

M.J.R.

MODOC COUNTY, CALIFORNIA

American Thermal Resources

American Thermal Resources spudded a wildcat geothermal well, "Goodwin" 1-11 on November 22. The well is located approximately 335m south and 457m west of the NE corner of Sec. 11, T. 41N., R. 16E., M.D.B.&M. at an elevation of 1371m.

High-head fresh waters in the upper 300 m of the hole slowed penetration rates and caused difficulties in cementing operations, but after cementing the 24.4 cm casing at 390m penetration rates increased markedly. The well was abandoned on Dec. 19, 1974 at a total depth of 2135 m.

M.M.S.

MENDOCINO COUNTY, CALIFORNIA

Sun Oil Co.

Sun Oil Co. is drilling a geothermal exploration well "Macii-State" 1 in southeastern Mendocino County approximately 946m north and 1133m west of the southeast corner of Sec. 13, T. 12N., R. 10W., M.D.B.&M. at an elevation of 846m. The well is about 2 km north of Sun's well "Torchio-Ferro" 1, drilled and abandoned in 1972 by Cordero Mining Co.

M.M.S.

IMPERIAL COUNTY, CALIFORNIA

Brawley Area

Union Oil Company of California

Union Oil Company of California has filed with the state, notices of intention to drill five geothermal test wells on the Brawley anomaly. The proposed wells are all in T. 13 S., R. 14 E., S.B.B.&M., and are:

1. "Jiminez" 1, Sec. 15 - approximately 274 m S. and 564 m W. from NE corner.
2. "Benson" 1, Sec. 16 - approximately 155 m N. and 594 m E. from SW corner.
3. "Cox" 1, Sec. 15 - approximately 564 m N. and 137 m W. from SE corner.
4. "Veysey" 1, Sec. 15 - approximately 472 m N. and 107 m E. from SW corner.
5. "Veysey" 2, Sec. 21 - approximately 343 m S. and 267 m W. from NE corner.

These proposed wells are located 3 to 4 km north of the town of Brawley and about 2 km south and east of Amerada Hess "Veysey" 1, which was drilled as an oil prospect in 1945 to a total depth of 2540 m and which found abnormally high subsurface temperatures while drilling.

These new locations of Union's are near the center of the geothermal gradient anomaly reported by the U.C. Riverside - Bureau of Recla-

mation study published in 1972 and will be the first geothermal tests of the Brawley K.G.R.A.

D.P.L.

Heber Area Republic Geothermal

Republic Geothermal, Inc., Whittier, California, has filed notices with the state to drill three wells in the eastern portion of the Heber K.G.R.A. The proposed wells are "Silzle" 1 & 2, twin wells located in Sec. 33, T.16S, R.15E., S.B.B.&M.; and "Dobbelare" 1, Sec. 32. The two "Silzle" wells will be drilled 30 meters apart; one is intended to be used as a shallow injection well and the other is programmed as a producer. The wells are located on one of the geothermal gradient "hot spots" discovered as a result of the U.C. Riverside - Bureau of Reclamation shallow temperature hole survey the results of which were published in 1973. The area being investigated is located about 6 km (4 miles) northeast of Calexico and about 10 km (6 miles) east of the Heber geothermal area in which the Chevron Oil Company is currently conducting productivity, injection and equipment tests on five wells. (see "Hot Line" Vol. 4, n. 3 June 1974)

M.M.S.

Salton Sea Geothermal Field Geo-Energy Systems, Inc.

Geo-Energy Systems, Inc., Los Angeles, has filed with the state, a notice to drill a geothermal test well, "Rodde" 1, in Sec. 1, T. 12 S., R. 13 E., S.B.B.&M. This proposed test is located about 4 km east of production in the Salton Sea Geothermal field and is about 9 km from the Salton Sea. The well will be drilled under the supervision of Rogers Engineering Co., San Francisco, and is designed to test the patented heat transfer system called the Van Huisen Downhole Heat Exchanger. This device is designed to extract heat from the geothermal reservoir without producing any of the fluids from the reservoir, thus avoiding the corrosion and scaling problems encountered with production in this area.

D.P.L.

Merry Christmas and Happy New Year

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