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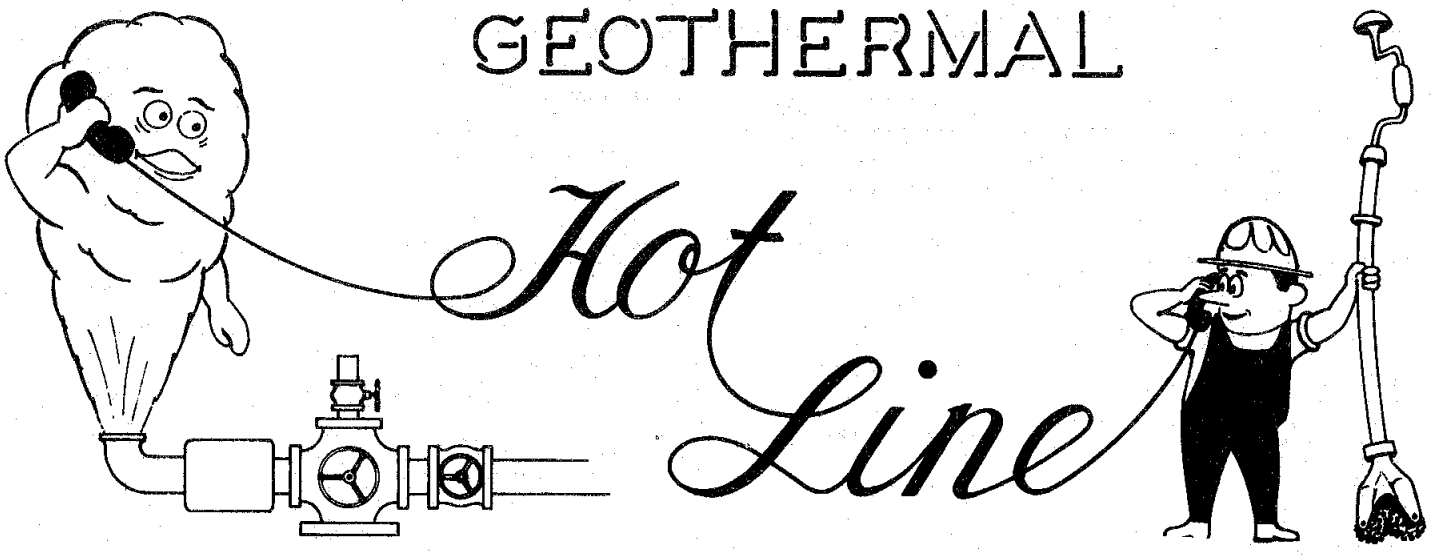

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September 1975

UNIVERSITY OF DENVER TO PRODUCE DESIGN MANUAL FOR GEOTHERMAL PRODUCTION WELLS

Improving the efficiency of geothermal energy operations will be the objective of a $378,399 research program to be conducted at the University of Denver Research Institute. The two and one-half year project, sponsored by Energy Research and Development Administration, is aimed at providing a manual for the design of geothermal production wells. Since the geothermal industry lacks sufficient information with which to evaluate plant designs and specifications for this type of flow system, the design manual is of major importance to industry development.

Dr. Laurence W. Ross, research engineer in DRI's Laboratory for Applied Mechanics, is project manager. Dr. Glenn E. Coury of Coury and Associates, Inc., consulting engineers, is responsible for the collection and analysis of field data and the establishment of a field research station. Computer modeling and analyses of alternative geothermal operations will be done at the University of Houston under the supervision of Dr. Abraham E. Dukler.

The manual will permit optimum design specifications of the entire geothermal system, including selection of the producing stratum well diameter profiles, and selection of wellhead pressure and temperature. The calculation procedures will also provide a basis for deciding whether the costs of a pumped system can be justified in any particular case.

The design manual will be developed on the basis of the latest technologies used on geothermal wells which operate in the two-phase flow system.

U. S. GEOLOGICAL SURVEY OPEN FILE REPORT

The Minor and Trace Elements, Gas, and Isotope Compositions of the Principal Hot Springs of Nevada and Oregon: August 1975, by R. H. Mariner, T. S. Presser, J. B. Rapp, and L. M. Willey. Copies are available from:

Robert H. Mariner
U. S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

OPEN FILE DATA

Geothermal test-hole data; water levels, temperature logs and profiles, and lithologic, gamma, gamma-gamma (density), neutron, and resistivity logs; for 132 holes, generally less than 30 m deep, are open for inspection. Areas covered are: Carson Desert, Buffalo Valley, Brady Hot Springs, Grass Valley, Ruby Valley, and Beowawe, all in north-central Nevada. The files may be inspected at U. S. Geological Survey, Water Resources Division, 345 Middlefield Road, Menlo Park, California; and Nevada District Office, Federal Building, Room 229, 705 North Plaza Street, Carson City, Nevada.

RAFT RIVER PROJECT

Two deep geothermal wells have recently been completed in the Raft River Valley of Southern Idaho. As part of the Energy Research and Development Administration's Geothermal Program at the Idaho National Engineering Laboratory, the wells are delivering water approximating the temperature previously predicted by geochemistry (145°C). The following table briefly describes the two wells.

	RRGE No. 1	RRGE No. 2
Total Depth	1,520 m	1,825 m
Peak Downhole Temperature	146°C	147°C
Production Zones	1,130 to 1,370 m	1,300 to 1,585 m
Depth of Production Casing (13-⅜in. casing)	1,134 m	1,290 m
Peak Flow - No Back Pressure (Measured with subcooled water head)	38 m/sec	50 m/sec
Shut-in Pressure	Hot ≈11 atm / Cold ≈3 atm	Hot ≈10 atm / Cold ≈3 atm

Neither well has been flowed for long periods because of the limited reserve pit capacity. The two wells are 1,220 meters apart and the 30 centimeter pipeline is now being installed between them. Pumps will be used for reinjection-disposal capability so that long term testing of first one well and then the other well can be conducted. Dissolved solids to date have been less than 2000 ppm.

Along with the Idaho National Engineering Laboratory, the Project has involved the cooperation of the Energy Research and Development Administration's Nevada Test Site, the U.S. Geological Survey, the State of Idaho, the Raft River Rural Electrical Cooperative, the Northwest Public Power Association, and several universities.

The goal is to develop economical methods of using medium temperature geothermal resources both for producing electricity and for the direct utilization of geothermal energy.

KGRA'S IN THE WESTERN UNITED STATES

Alaska

	Number of acres
1. Geyser Spring Basin	20,960
2. Okmok Caldera	44,800
3. Pilgrim Springs	22,400
	88,160

Arizona

1. Clifton	780
2. Gillard Hot Springs	2,460
	3,240

California

1. Bodie	640
2. Brawley	28,885
3. Coso Hot Springs	51,760
4. Dunes	7,680
5. East Mesa	38,365
6. Ford Dry Lake	7,687
7. The Geysers - Calistoga	374,910
8. Glamis	25,505
9. Glass Mountain	33,287
10. Heber	58,568
11. Knoxville	14,702
12. Lake City - Surprise Valley	72,446
13. Lassen	78,641
14. Little Horse Mountain	1,196
15. Love Lady Ridge	6,879
16. Mono-Long Valley	460,256
17. Salton Sea	95,824
18. Sespe Hot Springs	7,034
19. Wendel-Amedee	17,292
20. Witter Springs	18,152
	1,399,709

Colorado

1. Alamosa County	6,761
2. Mineral Hot Springs	5,765
3. Poncha	3,200
4. Valley View Hot Springs	5,099
	20,825

Idaho

1. Bruneau	5,120
2. Castle Creek	79,722
3. Frazier	7,680
4. Mountain Home	9,520
5. Vulcan Hot Springs	3,836
6. Yellowstone	14,164
	120,042

Montana

1. Boulder Hot Springs	6,343
2. Corwin Springs	20,349
3. Marysville	19,200
4. Yellowstone	12,763
	58,655

Nevada

1. Beowawe	33,225
2. Brady Hot Springs-Hazen	98,446
3. Darrough Hot Springs	8,398
4. Double Hot Springs	10,816
5. Elko Hot Springs	8,960
6. Fly Ranch	20,662
7. Gerlach	8,972
8. Hot Springs Point	8,549
9. Leach Hot Springs	8,957
10. Moana Hot Springs	5,120
11. Monte Neva	10,302
12. Steamboat Springs	8,914
13. Stillwater-Soda Lake	225,211
14. Wabuska	11,520
	486,052

New Mexico

1. Baca Location No. 1	152,863
2. Gila Hot Springs	3,202
3. Kilbourne Hole	25,134
4. Lower Frisco Hot Springs	5,760
5. Radium Springs	9,813
6. San Ysidro	1,915
	198,687

Oregon

1. Alvord	176,835
2. Belknap-Foley Hot Springs	5,066
3. Breitenbush Hot Springs	13,445
4. Burns Butte	640
5. Carey Hot Springs	7,579
6. Crump Geyser	85,663
7. Klamath Falls	17,300
8. Lakeview	12,165
9. McCredie Hot Springs	3,659
10. Mount Hood	8,671
11. Vale Hot Springs	22,998
12. Summer Lake Hot Springs	13,631
	367,652

Utah

1. Cove Fort Sulphurdale	24,874
2. Crater Springs	8,320
3. Lund	3,840
4. Monroe-Joseph	16,364
5. Roosevelt Hot Springs	29,791
6. Thermo Hot Springs	26,019
	109,208

Washington

1. Indian Heaven	2,547
2. Kennedy Hot Springs	3,311
3. Mount St. Helens	29,755
	35,613

NUMBER OF KGRA'S: 80

TOTAL NUMBER OF ACRES: 2,869,843

UPCOMING COMPETITIVE GEOTHERMAL LEASE SALES

Date	Location
9/23/75	Steamboat Springs, Nevada Wabuska, Nevada
9/25/75	Vale Hot Springs, Oregon
11/3/75	Castle Creek, Idaho
12/8/75	Crater Springs, Utah
12/17/75	East Mesa, California
1/20/76	Gerlach, Nevada San Emido Desert, Nevada
2/26/76	Klamath, Oregon
3/5/76	Elko Hot Springs, Nevada Stillwater, Nevada
4/8/76	The Geysers - Calistoga, California
4/15/76	Mono-Long Valley, California
4/20/76	Darrough, Nevada Dixie Valley, Nevada
4/28/76	Boulder, Montana
5/6/76	Randsburg, California
5/20/76	Lightning Dock, New Mexico
5/27/76	Crane Creek, Idaho
6/8/76	Navajo Lake, Utah
6/15/76	Brady, Nevada Beowawe, Nevada Hot Springs Point, Nevada
6/29/76	Marysville, Montana
9/23/76	Baca Location No. 1, New Mexico

NEW MEXICO STATE UNIVERSITY ANNUAL ENERGY CONFERENCE

NMSU, Las Cruces, New Mexico has announced the program of its Annual Energy Conference. The topic is Geothermal Energy Resources. Topics included in the technical program include the federal leasing program, legislative aspects, hot dry rock technology, resources evaluation, geothermal exploration, and geophysical aspects, among others. For further information about the conference to be held October 10, contact:

Chandler A. Swanberg
Assistant Professor Physics/Earth Science
Department of Physics
New Mexico State University
Box 3D
Las Cruces, New Mexico 88003
Telephone: (505) 646-3831

GEO-HEAT UTILIZATION CENTER FORMED AT OIT

Oregon Institute of Technology in Klamath Falls has recently established the Geo-Heat Utilization Center, headed by Professor Paul J. Lienau. The Center will provide and distribute information to potential users of geothermal energy, in addition to writing applied research proposals relating to geothermal energy. The Geo-Heat Utilization Center recently published the first issue of a quarterly newsletter. It highlights local developments ("New Development in the Klamath Falls KGRA") as well as coverage of international progress (Ireland and France, in the first issue). To be placed on the mailing list of the Geo-Heat Utilization Center Newsletter, write:

Paul J. Lienau
Geo-Heat Utilization Center
Oregon Institute of Technology
Klamath Falls, Oregon 97601

EPA WORKSHOP ON SAMPLING OF GEOTHERMAL EFFLUENTS

The U. S. Environmental Protection Agency is sponsoring the First Workshop on Sampling Geothermal Effluents, on October 20 and 21, 1975 at the Environmental Monitoring and Support Laboratory, Las Vegas, Nevada. Dissertations will cover "Sampling of Vapors and Liquids, The Need for Standard Methods, Sampling Hazards, and Sampling Methods and Procedures in Use by Various Organizations." Attendance is limited to 100 persons, and there is no attendance charge. Any person with a unique approach to geothermal sampling, please contact:

George B. Morgan
Environmental Monitoring and Support Laboratory
P. O. Box 15027
Las Vegas, Nevada 89114
(702) 736-2969

FINANCIAL SHORT COURSE TO BE OFFERED

The Geothermal Resources Council has scheduled Special Short Course No. 3 to be held October 23-24 at the Holiday Inn on Fisherman's Wharf, San Francisco. The short course is entitled "Financial Aspects of Geothermal Resources Development". The two-day session will highlight a number of topics, including exploration; environmental, legal, and institutional barriers; investment opportunities; tax considerations and shelters; formation, funding, and development of a small exploration company; twenty-year potential of geothermal energy; non-electrical uses of geothermal energy; federal loan guarantee program; and agricultural uses of geothermal heat. Registration is limited to 100 persons and the fees are: $140 for non-members, $126 for members, and $25 for students.

For further information and registration, contact:

Bev Hall
Geothermal Resources Council
P. O. Box 1033
Davis, California 95616
(916) 758-2360

U.S.G.S. RELEASES GEOTHERMAL RESOURCES ASSESSMENT PUBLICATION

The Department of the Interior has recently announced the publication of U.S.G.S. Circular 726, "Assessment of Geothermal Resources of the United States," edited by D. E. White and D. L. Williams. The 155-page report includes a breakdown of prospective areas of geothermal development, identifying over 60 geothermal systems in the western United States with temperatures above 150°C; and over 200 geothermal systems with temperatures from 90-150°C. Chapters cover such areas as: igneous-related geothermal systems, hydrothermal convection systems, recoverability of geothermal energy directly from molten igneous systems, and assessment of offshore geopressured-geothermal resources in the Gulf of Mexico basin.

Recoverable geothermal reserves with present technology and economic situation are estimated to be capable of providing 12,000 MW for 30 years. If economics change and the price obtainable per MW is doubled, it is estimated that recoverable reserves would jump to 125,000 MW installed capacity for 30 years, with *near* present technology (using mostly the geopressured areas in the Gulf of Mexico).

The report is free of charge, and can be obtained by requesting it from the U.S. Geological Survey, National Center, Reston, Va. 22092

USGS OPEN FILING GEOPHYSICAL DATA FOR KGRA'S SCHEDULED FOR LEASE SALES

The U. S. Geological Survey has instigated a new policy of opening up geophysical records of KGRAs to the public, 30 days prior to a lease sale. Records may be viewed at U.S.G.S. offices in San Francisco, Menlo Park, Denver, and Reston. By contacting the public inquiries offices of the U.S.G.S. in Denver and San Francisco, the public can determine when geophysical material will be open filed, to prepare for geothermal lease sales. Geophysical data for Vale Hot Springs, Oregon is already open filed. Data for Steamboat Springs, Nevada is not yet open filed but will be, before the date of the sale (probably about 10 days prior to the sale).

Information available on Steamboat Springs will include: gravity, spontaneous potential, audio-magnetotelluric, and telluric data. Steamboat Springs information will also be available from the Nevada Bureau of Mines office in Reno. Masters available for copying will be available at the San Francisco and Denver offices of the U.S.G.S.

POSSIBLE GEOTHERMAL DEVELOPMENT POTENTIAL IN THE DIABLO RANGE

The Diablo Range, east of Gilroy, California, may be the site of geothermal exploration by Diablo Exploration Inc., of Oakland, if a grant before the Energy Research and Development Administration is approved. The grant would make available $350,000 to aid in exploration of geothermal resources within three counties: Santa Clara, Stanislaus, and Merced. Pete Castellanos, president of Diablo Exploration Inc., plans to direct studies to the feasibility of piping hot waters from potentially productive wells to the Gilroy area for use by the canning industry. However, much preliminary work needs to be done to delimit the extent of the resources before realistic projections about the applications can be made. The area of investigation will range southwards from the Alameda-Santa Clara county line to the Mercy Hot Springs area. The City of Santa Clara is a cosponsor of the project, and coinvestigators are James B. Koenig and Tsvi Meidav.

VALE HOT SPRINGS KGRA LEASE SALE, OREGON

The Bureau of Land Management is receiving sealed bids for 6 tracts of land totaling 12,573.83 acres within the Vale Hot Springs KGRA in Malheur County, Oregon. Bids must be submitted to the State Director, Bureau of Land Management, P. O. Box 2965, Portland, Oregon 97208 by 1:00 p.m. September 25, 1975. Copies of lease forms, bond forms, regulations, special stipulations, and optional bid forms may be obtained from the Bureau of Land Management, at the above address.

KGRA LEASE SALES LAKE CITY - SURPRISE VALLEY June 23, 1975

Only 5 tracts out of 16 offered were bid upon in the Lake City -Surprise Valley geothermal lease sale June 23. Bidding information follows in the table below:

Tract No.	Bidder	Acres	Total Bids $	Bid/Acre $	High Bids $
1- 4	No Bids				
5	Getty Oil Co.	1,586.52	29,747.25	18.75	29,747.25
6	Getty Oil Co.	2,527.76	19,590.14	7.75	19,590.14
	Dow Chemical	2,527.76	7,965.00	3.15	
7	Dow Chemical	2,083.36	6,565.00	3.15	6,565.00
8	Getty Oil Co.	1,799.52	22,943.88	12.75	22,943.88
9	Southern Union Production Co.	2,586.46	55,686.48	21.53	55,686.48
10-16	No Bids				
	TOTAL	10,583.62	142,497.75		134,532.75

STILLWATER-SODA LAKE June 26, 1975

Twenty-one tracts of land were offered at the competitive geothermal lease sale of the Stillwater-Soda Lake KGRA; 6 tracts were bid upon. The following table summarizes the bidding activity:

Tract No.	Bidder	Acres	Total Bids $	Bid/Acre $	High Bids $
1- 3	No Bids				
4	Phillips Petro.	2,528.00	12,058.56	4.77	12,058.56
5	Phillips Petro.	2,560.00	9,139.20	3.57	9,139.20
6	Phillips Petro.	2,536.26	10,424.02	4.11	10,424.02
7	Chevron	2,319.50	93,545.44	40.33	93,545.44
8	Chevron/Phillips	2,472.00	111,536.64	45.12	111,536.64
9-18	No Bids				
19	Union Oil Co.	842.94	5,007.06	5.93	5,007.06
	Phillips Petro.	842.94	2,621.54	3.11	
20-21	No Bids				
	TOTAL	13,258.70	244,332.46		241,710.92

CRUMP GEYSER July 31,1975

Of 18 tracts of land offered at the competitive lease sale of Crump Geyser KGRA July 31, only 4 were bid upon. Chevron Oil Company was the sole bidder on tracts 8, 9, 11, and 14. Total amount bid on 9,462.19 acres was $37,016.21. Average bid per acre was $3.91.

U.N. GEOTHERMAL SYMPOSIUM

World-wide interest, research, and development of geothermal energy is progressing at a significant rate, as evidenced by the volume of papers submitted (nearly 300) and the attendance (over 1,200) of the Second United Nations Symposium on the Development and Use of Geothermal Energy held in San Francisco, April 20-29. Registrants from 59 countries attended the Symposium and 129 papers were presented in Spanish, French, and English.

Copies of the abstract volume (containing abstracts of each paper submitted) are available in English, French, or Spanish for $10.00 from:

Robert O. Fournier
U. S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

Checks should be made payable to U.N. Geothermal Symposium.

Editing of the entire proceedings is progressing on schedule by an editorial staff at the Lawrence Berkeley Laboratory. Watch the Hot Line for information on the cost and procedure for ordering copies of the proceedings.

OREGON LEGISLATION

HB 2040 Declares state policy on geothermal resources. Makes State Geologist responsible for administering laws relating to geothermal resources. Conflicts of jurisdiction between state agencies appear to be removed by this bill.

status: law, effective July 1, 1975

The revised law should encourage geothermal exploration in Oregon. -Ore Bin

CALIFORNIA LEGISLATION

AB 1293 Kapiloff and Suitt
content: Would authorize a tax credit for California taxpayers involved in pure research and study in preparing for the exploration of geothermal fields, in the applied research and development of such fields, and in the acquisition of machinery or equipment designed to use geothermal energy and convert that energy to electrical power.
status: In Revenue and Taxation Committee

AB 1496 Kapiloff et. al.
content: Transfers regulatory functions of the Division of Oil and Gas and certain functions of the Division of State Lands with respect to geothermal resources development operations to the State Energy Resources Conservation and Development Commission
status: In Energy and Diminishing Materials Committee

SB 105 Roberti
content: Would prohibit any oil company with more than $2 billion in assets from acquiring, owning or controlling many of the alternate energy resources (includes geothermal).
status: Failed in Public Utilities, Transit, and Energy committee 5/13.

SB 517 Dills
content: Would abolish Geothermal Resources Board and places its function with the State Energy Resources Conservation and Development Commission.
status: Passed Senate 6/24, passed Ways and Means Committee 8/28.

SCA 20 Dills and Alquist
content: Exempts properties containing unusable geothermal resources from property taxation until the resource becomes usable.
status: In Revenue and Taxation Committee

SJR 65 Nejedly
content: Recommends to President, Vice President, and Congress amendment to IRC (1954) to authorize deduction of intangible geothermal drilling costs.
status: Passed Senate; in Assembly Revenue and Taxation Committee

NEVADA LEGISLATION

SB 158 An act relating to geothermal resources; providing definitions; authorizing the state engineer to adopt regulations to control the development of geothermal resources; declaring that water or steam encountered during exploration is subject to certain appropriation procedures; and providing other matters properly relating thereto.
status: passed; now law.

Nevada's Division of Water Resources is currently in the process of drafting rules and regulations to carry out this new law. The regulations will hopefully be completed by the end of this year.

SCR 28 Directs the state engineer to appoint a committee to study existing and proposed government regulations and actions pertaining to the development, control and conservation of geothermal resources in Nevada.
status: passed, presently in effect.

WELL OPERATIONS
IMPERIAL COUNTY, CALIFORNIA

Salton Sea Test Project

San Diego Gas and Electric Company has started construction on its 10 MW pilot test facility in the Salton Sea Geothermal Field (Hot Line, May 1975). The U. S. Energy Research and Development Administration is sharing expenses of the project with S.D.G. and E., 50-50. The planned $2.5 million installation will utilize a 4-stage flash separation system and a binary cycle heat exchanger, using isobutane. The test facility is expected to begin operating in December. The nominal output of the plant would be 10 MW, but turbines and generators are not planned for the initial phases of testing. The 2 MW of electricity needed to operate the pumps and other electrical machinery of the plant will be purchased from the Imperial Irrigation District. The facility will use steam from 2 existing wells: Imperial Magma's "Magmamax" 1 and "Woolsey" 1. The separated produced brine will be injected into "Magmamax" 2 and 3. It is anticipated that testing will continue for a period of 1 1/2 to 2 years.

Brawley Geothermal Area

Union Oil Company of California has completed drilling its third well in the Brawley area (Hot Line, December 1974). Drilling operations have been temporarily halted, pending testing of the existing wells. Surface pipelines and testing facilities are being installed to determine production and injection characteristics of the three wells. No information has been released to date, concerning reservoir characteristics or flow potential. Union has filed for permits to drill 14 additional wells in the immediate vicinity.

Heber Geothermal Area

Republic Geothermal has drilled "Silzle" 1, Sec. 33, T. 16S., R. 15E. (Hot Line, December 1974) to a depth of 11,015'. At present, drilling operations have been suspended while Republic Geothermal is "cogitating". At the main Heber area, about 10 km west, Chevron Oil Company has drilled 3 deep (915 m) observation wells after having conducted tests on surface and subsurface equipment and production and injection tests on 3 exploratory wells. Union Oil Company of California, which has not drilled any wells in the area, has taken a considerable block of acreage and has filed notices to drill 10 production wells on the Heber geothermal anomaly.

East Mesa Geothermal Area

Republic Geothermal has filed a notice of intention to drill 18 deep geothermal wells with the local state water quality control board. The wells are projected to have depths of 9,000 feet and are located on the northern portion of the East Mesa anomaly. Drilling is expected to commence in the fall.

The U. S. Bureau of Reclamation, which has drilled 5 wells on the anomaly, is currently reworking their VTE desalinization plant. The plant was shut down recently—partly because their injection well, "Mesa" 5-1, became fouled with wind-blown particles that settled in the holding pond from which they drew their injection water. They propose now to bypass the holding pond and inject directly from the desalinization plants to the injection well. In this way, they will hopefully eliminate their plugging problems.

The Bureau has a new site manager on location:

Dr. Harold Papzian
P. O. Box 416
Holtville, CA 82250

LAKE COUNTY, CALIFORNIA

Geysers - Calistoga KGRA

Burmah Oil and Gas Company has completed two producing wells on BLM lease CA-956. Well (1), located 956 m south and 234.5 m west from the northeast corner of Sec. 34, T. 11 N., R. 8 W., M.D.B.&M., was completed on April 18, 1975 at a depth of 2,172 m. Production during testing was 75,000 kg/hr of dry steam at 7.9 bars absolute pressure. Well (2), located 297.4 m north and 564.3 m west from the southeast corner of Sec. 34, T. 11 N, R. 8 W., M.D.B.&M, was completed on May 28, 1975 at a depth of 1,875 m. Production during testing was 136,000 kg/hr of dry steam at 7.9 bars absolute pressure.

Shell Oil Company is drilling its third well at The Geysers and its second well on BLM lease CA-949. Both of the wells on BLM lease CA-949 are on the same pad, located 1,418 m west and 1,542 m north from the southeast corner of Sec. 1, T. 10 N., R. 8 W., M.D.B.&M. Well 11-1 was completed on July 30, 1975 at a depth of 1514.6 m. Well 11A-1 was spudded the next day and is now being drilled. Shell's first well at The Geysers was abandoned.

BEAVER COUNTY, UTAH

Roosevelt Hot Springs KGRA

Phillips Petroleum Company is drilling its fourth well on federal leases in Utah. Well (9-1) located 305 m south and 780 m west from the northeast corner of Sec. 9, T. 27 S, R. 9 W, S.L.B.&M. on BLM lease U-27388 was suspended on April 17, 1975 at a depth of 2098.6 m. Well 55-3, located 937.3 m south and 777.2 m west from the northeast corner of Sec. 3, T. 27 S., R. 9 W., S.L.B.&M. on BLM lease U-27386, was completed on May 23, 1975 at a depth of 831.49 m. During testing, the well produced 94,000 kg/hr of mixed steam and water at a temperature above 200°C. Well 54-3, located 759 m south and 740.7 m west from the northeast corner of Sec. 3, T. 27 S., R. 9 W., S.L.B.&M. on BLM lease U-27386, was completed on August 4, 1975 at a depth of 878.4 m. Well 12-35, located 228.6 m south and 30.5 m east from the northwest corner of Sec. 35, T. 26 S., R. 9 W., S.L.B.&M. on BLM lease U-27386, was spudded on August 6, 1975 and is now being drilled.

NOTE: Federal geothermal wells will be numbered on a modified Kettleman system. Well numbers in parentheses will be changed.

SANDOVAL COUNTY, NEW MEXICO

Union Oil Company

On July 15, Union Oil Co. of California conducted a press tour of its Baca Land Grant lease where Union has an exploration drilling program in the Redondo Canyon Area of the Valles Caldera. At that time, drilling was continuing in well "Baca" 16 at a depth of 885.4 m on the way to a proposed total depth of 1,830 m. This well is at an altitude of 2,933 m and is the twelfth well drilled by Union since entering the joint venture in 1970.

Three of the previous wells have commercial potential and are capable of producing at least 45,000 kg/hr of separated steam. Two other wells are marginal producers. At least 10 wells with commercial potential will be needed for a proposed 50 MW pilot plant. The area drilled so far, approximately 40.5 km² on the western edge of the 405 km² lease, will be evaluated by January 1, 1976. If the decision is made to develop the area, at least 3 years will be needed for completion of the power plant. Public

Service Company of New Mexico and Plains Electric Generation Co-op have both shown interest in building the electric generation facilities, or Union may build the entire system.

These exploratory wells have been drilled as deep as 2,740 m, and range in cost between $600,000 and $900,000 each. The geothermal reservoir contains hot water above 260°C. Steam is separated at the surface at a temperature of 180°C and with an absolute pressure of 10.5 bars. Union Oil Company has located a large reservoir of hot rock and hot water, but fractures must be intersected by the wells to provide the high flow rates needed. For more information see "Hot Line" v. 4, no. 1, Feb. 1974.

BAJA CALIFORNIA, MEXICO

Cerro Prieto Geothermal Field

Two geothermal wells drilled at Cerro Prieto have greatly increased the area of production. Well M-51 was drilled about 2 km south of the power plant during September 1973; and in March 1975, well M-53 was drilled approximately 2 km east of the power plant. M-53 produces from depths of 1,800 m to 2,000 m and has a recorded bottom hole temperature of 344°C. A maximum, flowing wellhead pressure of 75.2 bars and a separated steam flow of 68,000 kg/hr *have been reported* from separate tests on the well.

ANTOFAGASTA, CHILE

El Tatio Geothermal Field

Three large-diameter producing wells have been drilled into the 800 m to 900 m deep geothermal zone at El Tatio and separated steam equivalent to 18 MW of electricity was obtained. The productive zone consists of late Cenozoic ignimbrites and flows containing water at a temperature of 265°C. A low resistivity anomaly thought to reflect the presence of hot water covers an area of 30 km^2.

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

NORTHERN LATIUM, ITALY

Cesano Area

Ente Nazionale per L'energia Elettrica (ENEL) drilled well "Cesano" 1 in January 1975, 20 km north-northwest of Rome. This was the first well on the southern border of the Baccano Caldera. The well is producing from a sedimentary section beneath 1,000 m of volcanic rocks, and the reported bottom hole temperature is 210°C. Estimated flow rates are 50,000 kg/hr of separated steam and 150,000 kg/hr of separated water at a flowing wellhead gauge pressure of 10 to 12 bars. The separated water is a sodium, potassium, chloride, sulfate type with 356,000 mg/l dissolved solids.

SMALL GEOTHERMAL POWER PLANT WORKSHOP

NATO'S Committee on Challenges of Modern Society is holding its second Small Geothermal Power Plant Workshop September 8 - 11, 1975 at Sao Miguel, Azores. The workshop is jointly sponsored by the U. S. Energy Research and Development Administration and the government of Portugal. The plan is to lay ground work for a pilot geothermal plant to be constructed in the Azores. Tsvi Meidav of Geonomics, Inc.; James T. Kuwada of Rogers Engineering Co., Inc.; and Andy Lundberg of Lawrence Livermore Laboratory are among the slated speakers.

NEVADA GEOTHERMAL WELL LIST

An up-to-date list of geothermal exploration wells in Nevada is available, listing the name, location, API number, depth, and completion date. The list is available for $.50 from Arlene Kramer, Publications Office, Nevada Bureau of Mines and Geology, University of Nevada, Reno, Nevada 89507.

-Larry Garside