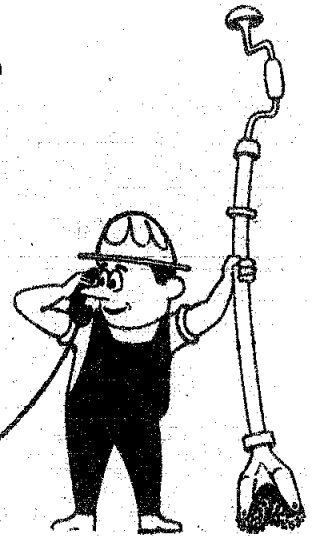
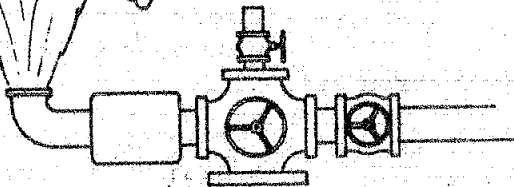


## GEO THERMAL

## Hot Line



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

Volume 6, Number 2

October 1976

"If there is magic on this planet,  
.....it is contained in water."  
Loren Eisly

Mel Schrecongost, editor of the Hotline and acting Geothermal Officer for the California Division of Oil and Gas has resigned to take a position as Energy Facility Siting Planner III at the California Energy Resources Conservation and Development Commission. Mel's working title is Program Manager and his work concerns power plant siting. Doug Stockton has been transferred to Sacramento from the Long Beach office of the Division of Oil and Gas and is the new Geothermal Officer. He will assume the duties as editor of the Hotline.

#### Early Test Results LLL Total Flow Program

The first laboratory test run of a total flow impulse turbine for geothermal energy applications has been completed. Early test results indicate that a total flow impulse turbine has a minimum engine efficiency of about 45%. More advanced designs may achieve higher efficiencies, in the 60-65% range. The program research goal is 70% engine efficiency for total flow system.

During August, experiments for reducing scale on nozzles were completed. The tests dealt with the reduction of the brine pH. Magmamax No. 1 brine was used and the duration of each test was about 24 hours. Reduction of pH to levels over the range of 5.0 to 1.6 resulted in complete elimination of scale over the temperature range 220°C (inlet) to about 105°C in the nozzles. In contrast, untreated brine (pH 5.4-5.8) resulted in scale deposits up to .020 inch thick over the entire nozzle surface. Scale accumulation in downstream components including stationary wear blades used to simulate turbine blades and elbows used to simulate a turbine chamber was also drastically reduced in the case of the reduced pH brine.

Titration of the brine indicates that the cost of HCl addition for a pH of 4 would be about .5mils/kwh. This is well within economic feasibility even for Magmamax No. 1 brine, highly buffered by carbonate. Complete brine tolerant systems are realizable for utilization of high temperature-high salinity brines in the Imperial Valley, California and for other areas as well.

### Downhole Pump Tested

A downhole steam-driven geothermal energy pump was tested by Sperry Rand at Chevron Oil Company's test facility near Heber. As part of a joint program funded by ERDA, the pump was tested in Chevron's "J. D. Jackson" 1, Sec. 33, T.16S., R.14E. The pump which operated almost constantly from July 24, 1976, to August 22, 1976, was pulled, inspected, slightly remodeled, and ran back into the hole late in September. Sperry plans to operate it for a few months longer.

The pump, consisting of a boiler and a turbine section, is about 800 feet long. The boiler, utilizing heat from the zone, converts fresh water supplied from the surface into steam. This steam drives the turbine which pumps geothermal fluids from the zone to the surface. At the surface, the fluids are injected into the reservoir through Magma's "Holtz" 2 well, about 1 1/2 miles away from the Chevron well.

Tested to demonstrate reliability and field performance as well as to provide additional reservoir data, the pump worked satisfactorily. It produced geothermal fluids under pressure at rates up to 13,000 bbls. per day. The Sperry people are optimistic that the pump shows commercial promise.

### Costa Rica

UPDATE: Geophysical Exploration (Hotline June, 1976)

Rogers Engineering Co., Inc. of San Francisco and their Costa Rican contractors, the Costa Rican Institute of Electricity (CIRE), have completed their field geophysical exploration work and they are now in the process of compiling the data. The completion of this first stage brings Costa Rica's first geothermal electric power plant closer to a reality. When the data has been compiled, a 2nd phase of exploratory drilling will begin.

### HAWAII

#### Hawaii Geothermal Project

UPDATE - The first well (HGP-A) in the Hawaii Geothermal Project (See Hotline June 1976)

The first major flow test of HGP-A took place on July 22, 1976, at which time the well was permitted to flow for four hours. The pressure readings illustrated a rapid initial build up, followed by a sharp drop in pressure, which gradually leveled off with time. After four hours of sonic flow, well head pressure stood at 68psig, lip pressure at 23psig, and well head temperature at 307°F. Based upon empirical formulas developed in New Zealand by R. James and estimating the enthalpy as 600Btu/lb., the mass flow rate near the end of the test period was approximately 601lbs/sec. - equivalent to around 5 megawatts electricity.

A comparison of the temperature curve, after flashing with that taken before the flash and flow tests shows an overall warming of the hole throughout its depth - except for an apparent cool zone around 6,000 feet - with an increase in maximum down-hole temperatures to 358°C (676°F). A preliminary analysis of water, steam, gas, and air samples indicates that the fluid is at most only slightly brackish and relatively free of dissolved solids.

Both the high down-hole temperature and the evidence of some recharge at depth are sufficiently encouraging to proceed with a more comprehensive well testing program. The next step will be to construct a muffler and separator to measure mass flow rate; to install permanent wellhead bracing; and to flow test the well for about four weeks. Before the latter test is initiated, analysis will be completed on the water, steam, gas, and air samples to assure that any environmental effects are well within acceptable limits.

## OREGON

The State of Oregon, together with North West Natural Gas Co. of Portland, are studying the feasibility of piping thermal waters from beneath the slopes of Mt. Hood to Portland consumers. The State is providing \$10,000 and North West is providing \$50,000 of the exploration costs. An application has also been submitted to ERDA for a \$148,797 grant.

A 45-mile pipeline with a capacity equivalent to 22Mmcf of natural gas per day would be built to transport the hot water. The cost of the pipeline would be about \$1 million per mile while field development costs would be about \$10 million. It is being speculated that the first deliveries would be to industrial steam plants to use as a water supply, and/or heating.

### Summerlake, OR.

Four leasing units within the Summerlake, KGRA were offered for geothermal leasing through sealed bids by the Oregon State Office of the Bureau of Land Management on September 23, 1976. The 2392 acres in tract one went to Southern Union Production Company for \$9,351. Tract two, totaling 2282 acres, went to Chevron of San Francisco for \$4,041. No bids were submitted for tracts 3 and 4.

### Development in the Klamath Area

Thermal Power Company has begun a geothermal deep well exploration program 17 miles south of Klamath Falls in the Klamath Hills area. In an application to the State of Oregon, Thermal Power listed a potential drilling depth of 8,000 feet.

A new potential area for residential space heating has been discovered in the south suburbs of Klamath Falls with the completion of a 1530 ft. well coming in at 163°F (73°C) and 500 gpm. The hot water well will be used at the site to heat 40 apartments.

## UTAH

Test wells, in one 3-county field of Southwest Utah, have tapped a subterranean reservoir of hot water and steam. It is estimated to be capable of generating up to 2,000 megawatts of electricity. Phillips Petroleum Company has drilled 5 wells east of Milford and on May 23, 1975, tapped a batholith at 2,728 feet. The well erupted with a steam flow greater than 200,000 lb/hr. The combined flow of steam and hot water was greater than 1 million lb/hr. Tests show a pressure of approximately 430 psi; at about 500°F. Of the 5 wells drilled by Phillips, 3 appear productive, one questionable, and the fifth was dry. Utah Power and Light sank 2 test wells, struck steam and will soon begin extensive testing of the promising area.

### University of Utah

The Geophysics department of the University of Utah is currently conducting research on geothermal exploration methods under a \$462,000 federal grant. The University's mechanical engineering department has grants to conduct research in conjunction with the Raft River Geothermal Pilot Plant Project.

## California

### Imperial Valley

The Imperial Valley subsidence detection network survey will begin on or before the first of November. Second-order leveling will be done by crews from Imperial County, Imperial Irrigation District, and Bureau of Reclamation while first-order leveling will be done by the National Geodetic Survey in conjunction with Western Oil and Gas Association. Imperial County will provide a field coordinator for the project.

## Salton Sea

The Geothermal Loop Experimental Test Facility (Hotline June, 1976) was dedicated and put into operation June 4, 1976. Dedication ceremonies were attended by several hundred people, including local, county, state, federal, and industry dignitaries. The research venture, a project of the San Diego Gas and Electric Company and the Federal Energy Research and Development Administration will utilize production and injection wells drilled by Magma Power Company. A 10-megawatt pilot facility will test the application of a binary cycle system for the production of electricity by using the high-temperature, high-salinity brine present in the Salton Sea Geothermal field.

The produced brine is flashed into steam in four progressively lower pressure stages. The steam is scrubbed before flowing into heat exchangers where it heats isobutane in a closed cycle system. The heated isobutane expands to a gas driving turbine generator and then is cooled and converted back to a liquid. However, in the facility, the turbine is simulated by a throttling valve, and no electricity is generated.

The cooled geothermal steam condensate is recombined with the brine and is injected into the reservoir through an injection well about three-fourths of a mile from the facility. Also, the effects of injection of cooled brine into the reservoir are being assessed. Additional data are being used at this facility near Niland to solve problems concerning erosion and scaling that occurs because of the high salinity of the brine. If the facility proves that it is feasible to use the geothermal brines from the Salton Sea field to generate electric energy, the plant may be converted to a 50-megawatt demonstration plant.

## Lake County

State Controller Kenneth Cory announced that the City of Santa Clara was the apparent high bidder in the first competitive lease sale ever held by the State Lands Commission for development of State-owned geothermal resources. The Santa Clara bid was one of two submitted on a 130-acre parcel known as the "Davies Estate" in southeastern Lake County between Clear Lake and Calistoga, on subsurface mineral interest only. The highest bid offered the State 28% of the net profits resulting from development of the known geothermal resources, in addition to a royalty of 10% of income and \$1.00 per acre annual rental. A bid was also submitted by AMINOLL, USA Inc., offering 12% of the net profits.

Pacific Gas and Electric has applied to the Lake County Planning Commission for a permit to construct, install, operate, maintain, and use of The Geysers geothermal steam plant Unit #13. A public hearing will be held at 10:30 a.m., October 21, 1976.

## Sonoma County

### THE GEYSERS

The State Lands Commission will hold the second competitive lease sale for geothermal resources on state lands November 3, 1976, in Long Beach. Bids will be opened for a 434 acre parcel in The Geysers area in which the minerals are reserved to the state. The first such sale was September 1st.

P.G.&E. and Union Oil Co. of California were co-host for a one day field trip to The Geysers. Fifteen members of the L.O.C.C.'s executive staff were bussed from the Fairmont Hotel in San Francisco to The Geysers on Monday, September 13th. Dick Hourigan of P.G.&E. and Harry Bain of Union Oil Company planned the field trip with Harry Bain traveling with the group and conducting the tour.

## Legislation

### California

#### Senate Bill 1581

Senate Bill 1581 (Nejedly), which revises and clarifies the laws governing inspection and disclosure of well records became effective on September 20, 1976. The Division of Oil and Gas adopted emergency regulations on September 23, 1976, to bring Title 14 of the California Administrative Code into compliance with the provisions of the bill.

The new statute contains an important geothermal provision that should be brought to your attention. An owner or operator must now request confidential status for geothermal wells that never produced commercially. If confidential status is not requested, the records shall be deemed public records.

The new law reads, in part, as follows:

"Such records shall be public records when filed with the division, unless the owner or operator requests, in writing, the division to retain the well records confidential. The confidential period shall not exceed five years from the date of production or injection for other than testing purposes or abandonment, whichever occurs first. Well records retained confidential by the division shall be open to inspection to those persons authorized in writing by the owner or operator. For the purpose of this section, 'date of production for other than testing purposes' means the date on which, in the judgment of the supervisor, sustainable production commenced into a power generating plant, greenhouse, space heating unit, chemical or mineral extraction plant, or other facility dependent wholly or in part upon geothermal resources for its operation. Confidential status shall not apply to state officers charged with regulating well operations, the director, or as provided in subdivision (b)."

"(b) Production reports filed pursuant to Section 3745 shall be open to inspection to the State Board of Equalization or its duly appointed representative when making a survey pursuant to Section 1815 of the Revenue and Taxation Code or when valuing state-assessed property pursuant to Section 751 of the Revenue and Taxation Code, and to the assessor of the county in which a well referred to in Section 3745 is located."

If you wish to submit a request for confidential status for the records of any of your wells in the above-listed categories that are now on file with the Division of Oil and Gas, please do so.

A public hearing concerning the emergency regulations will be held on November 30, 1976, at 1416 Ninth Street, Sacramento, Ca. 95814 in Room 1506-12 at 10:00 a.m. A copy of the regulations may be obtained by writing California Division of Oil and Gas, 1416 Ninth Street, Room 1316-35, Sacramento, Ca. 95814.

#### Senate Bill 1827

Senate Bill 1827 will become effective January 1, 1977. The new law will increase oil, gas, and geothermal indemnity bonds. For coverage of a single geothermal well, the amount of an individual indemnity bond will be raised from \$5,000 to \$25,000. For blanket bonds, the amount of coverage will be raised from \$25,000 to \$250,000. Accordingly, on January 1, 1977, before any operations (Notices to drill, rework, supplementary, or abandonment) for a well can be approved, an updated indemnity bond for the appropriate amount, must be filed with the Division of Oil & Gas. The new bond forms are now being revised and will be available in December. (Cont.)

SB1827 requires any person acquiring the ownership or operation of a geothermal well to file an individual indemnity bond or a blanket indemnity bond with the State Oil and Gas Supervisor within 30 days after such acquisition. Previously, such a bond had to be filed within 5 days of well acquisition.

#### Senate Bill 1828

SB1828 will become effective January 1, 1977. This bill requires the owner or operator of any oil, gas, or geothermal well to give notice to the State Oil and Gas Supervisor of any sale or transfer relating to such wells within 30 days. The previous law required operators to submit notice within five days. Production reports for geothermal wells are now required to be filed on or before the 30th day of the month for each prior month. The previous law provided for 10 days.

#### Federal

##### Production Revenue Act (H.R. 6860)

Included among the provisions of the Production Revenue Act (H.R. 6860) is a 22% reduction of the gross income (not to exceed 59% of net income) from properties for production of geothermal steam, and the current expensing of intangible drilling costs for geothermal steam wells and associated resources. This bill did not receive Senate attention before adjournment.

#### Federal Government

##### UPDATE - ERDA Loan Program

The Geothermal Loan Guaranty Program Regulations were signed on May 25, 1976, and became effective on June 25, 1976. Of major interest is that the manager of ERDA's San Francisco operations office (SAN) has the sole responsibility for processing all geothermal loan guaranty applications for the entire United States.

The proper filled-out application form submitted to ERDA will not meet SAN's requirements. Additional data and documentation needed are outlined in Section 790.21 of the Regulations; however, more specific information will be contained in guidelines now being developed by SAN. SAN must perform environmental, financial, legal, management/marketing, and technical/geophysical assessments for each application. Therefore, the average projected review time is currently estimated to be about eighty working days. For further information, contact San Francisco Operations Office (SAN) of ERDA, Attention: Mark N. Silverman, 1333 Broadway, Oakland, Ca. 94612, phone (415) 273-7881.

#### Federal Lease Sales

##### Known Geothermal Resources Areas, NV

The March 4 Federal Register establishes Soldier Meadow, Humboldt County, Nevada, as a Known Geothermal Resources Area (KGRA) and it contains about 5966 acres.

The Bureau of Land Management has prepared a tentative schedule for sale of geothermal leases on Public lands known to have a high geothermal potential during the remainder of fiscal 1976 and fiscal 1977 and 1978. Each sale will range from 10,000 to 30,000 acres. Seven sites were sold in June for a total of \$92,544. Land Law Examiner Stan Bronczk said only seven bids were received on six separate parcels in the Brady-Hazen resource area and one in the Beowawe resource area. Southern Union Production Corporation, Dallas, Texas, purchased three leases totaling 5,093 acres for \$41,837; W.O. and Guth M. Darley purchased three units totaling 7,099 acres at a total of \$42,798, and Union Oil Company of California and Magma Energy, Inc. purchased 1505 acres for \$7.9. There were no takers for the remaining twenty parcels.



### Geothermal Lease Sales Scheduled

A tentative schedule of competitive and noncompetitive resource lease sales on federal lands is being announced in the Federal Register, according to Ed Hastey, California State Director of the Interior Department's Bureau of Land Management. The nationwide schedule lists planned sales for the remainder of this fiscal year and the next two fiscal years.

"The purpose of the announcement," Hastey said, "is to advise industry and the interested public of the areas now under evaluation and scheduled for environmental and other preleasing evaluations. We encourage comments from all interested persons. This feedback will help BLM concentrate its preleasing program on areas which have the best geothermal potential and which would experience the least environmental impact."

Written comments should be sent to: State Director, Bureau of Land Management, Room E-2841, Federal Building, 2800 Cottage Way, Sacramento, Ca. 95825

### Competitive Lease Sale Action Schedule as of 10/13/76

The lease sale dates are those provided by the State Directors of BLM. Lease sale dates are tentative until public notice is issued 30 days prior to sale.

<u>Location of KGRA</u>	<u>Latest Sale Date Scheduled</u>	<u>Original Sale Date</u>
Leach Hot Springs NV	10/19/76	10/14/76
Colado, NV	10/19/76	
San Ysidro-Lighting Dock, NM	10/27/76	10/21/75
Raft River, ID	11/17/76	11/17/76
Kilboure Hole, NM	12/02/76	
Geysers Calistoga, CA	12/02/76	
Vale Hot Springs, OR	12/09/76	
Crump Geysers, OR	12/09/76	
Aluord, OR	12/09/76	
Klamath Falls, OR	12/09/76	
Kyle Hot Spring, Darrough, NV	12/14/76	
Wendel-Amadee, Whitter Springs, CA	01/20/77	
Randsburg, CA	02/15/77	
Mono-Long Valley, CA	03/15/77	
Baca Location One, NM	03/30/76	
Pinto Hot Springs, NV	04/19/77	
Radium Springs, NM	05/25/77	
Indian Valley, CA	09/??/77	
Lower Frisco, Gila Springs, NM	05/24/78	
Knoxville and Glamis-Dunes, CA	08/??/78	
Deckwourth Peak, CA	09/??/78	
Coso, Lassen, Saline Valley, CA	??/??/78	

### GRC's Rocky Mountain Section

The Geothermal Resources Council (GRC) announces the formation of a Rocky Mountain Section. The GRC, the only organization representing the geothermal community, is headquartered in Davis, California and presently has about 450 members.

The Rocky Mountain Section held an organizational meeting in June installing as officers Dr. L. Trowbridge Grose, Professor of Geology at the Colorado School of Mines, as president; Glen Campbell, Gulf Mineral Resources, as vice president; and Edgar A. Pash, U. S. Fish and Wildlife Service, as secretary/treasurer.

The Section's goals are to promote more frequent association between members of the GRC residing in the Rocky Mountain region and to expand awareness of the GRC and its functions.

Luncheon meetings will be held regularly beginning in September on the last Thursday of each month at the Petroleum Club Building, 16th and Broadway, Denver, Colorado. These meetings will feature speakers addressing topics on the exploration, development, and utilization of geothermal resources.

Interested persons are invited to participate. For further information, contact Darline Dalman at (303) 433-6151 ext. 301 or any of the above officers.

### Interstate Oil Compact Commission

On June 29, 1976, the Energy Resources Committee of the Interstate Oil Compact Commission adopted a resolution to recommend that the Chairman of the commission appoint a special committee to study the legal and technological aspects of development of geothermal energy resources and to make recommendations to the member states with regard to appropriate regulations of such activity.

### Isotope Study of Geothermal Areas Presented as Cal Tech Dissertation

The Ph.D. dissertation of Steven J. Lambert on Stable Isotope Studies of Some Active Hydrothermal Systems is of interest to the geothermal industry. Lambert measured the isotopic ratios of oxygen, carbon, and hydrogen in minerals from The Geysers, Valles Caldera, Heber, and Tiwi Geothermal Fields.

The oxygen isotopic ratios in quartz and calcite at The Geysers show that the present activity began with large quantities of meteoric water at 160° to 180°C circulating through fractures in the rock in response to magma of the Pliocene Clear Lake volcanics. The present steam system developed because the temperature increased to 320°C, and the circulation of fluids became more restrictive.

At the Valles Caldera, New Mexico, large volumes of meteoric water have interacted with previously unaltered porous sediments and pumiceous volcanic tuffs at temperatures from 100° to 280°C.

At Heber in the Imperial Valley, the oxygen isotopic ratios in quartz of the Pleistocene sand strata show that the sands are isolated from one another by low permeability clay layers. The low degree of isotopic alteration indicates that the Heber system is very young.

The Tiwi Field, Philippines, shows the effects of significant hydrothermal alteration. The isotopic changes are more subtle than those observed in other areas because the initial oxygen isotopic composition of the rock is much closer to that of the meteoric water than elsewhere.



## Burmah Oil and Gas

Burmah Oil and Gas has recently been purchased by a subsidiary of R. J. Reynolds, Inc. This action went into effect on July 1, 1976. The new name of the company is Aminoil USA, Inc. All their geothermal operations formerly handled in the Long Beach office are now being handled in the Santa Rosa office.

## CONFERENCES

### 3rd Annual Energy Symposium

The 3rd annual Energy Symposium will be held at the Hyatt Regency Hotel in Los Angeles, April 26, 1977. The symposium is sponsored by the Los Angeles section of the American Nuclear Society in conjunction with organizations affiliated with the Los Angeles Council of Engineers and Scientists. Papers are invited which describe original research or plans and projects of significance concerning energy problems in Southern California. Papers in the following general areas are solicited: technology developments, environmental impact, system design and application, economic considerations and results of recent political, sociological, demographic or planning studies. Original papers and updated results of ongoing programs are requested. Abstracts are due November 15, 1976, and should be sent to: Dr. Wm. F. Hassel, Science Applications, Inc., 101 Continental Bldg. Suite 310, El Segundo, Ca. 90245. For more information contact Roger Moore, general chairman (213) 570-2073

### 3rd Annual UMR-MEC Conference on Energy

The 3rd Annual UMR-MEC Conference on Energy will be held October 25 - 29, 1976. Conference Director: Dr. J. Derald Morgan, Professor of Electrical Engineering, Electrical Engineering Department, University of Missouri-Rolla, Rolla, Missouri 65401 (314) 341-4509

### 3rd Latin American Congress on Thermalism

The III Latin American Congress on Thermalism will be held December 12-21, 1976, in Buenos Aires, Argentina. The topics discussed will include plans for the development of natural resources, scientific investigations, use of resources, exploration, political and institutional aspects. For more information and registration write: Secretaria General, XII Congreso Internacional De Tecnica Hidrotermal, Viamonte 1145-1er. Piso, Buenos Aires, Argentina.

### Geothermal Environmental Seminar

The Geothermal Environmental Seminar has been scheduled for October 27, 28, and 29, 1976, at the Konocti Harbor Inn, Clear Lake, California. Registration fee for the seminar is \$25.00. A guided field tour to The Geysers and a 30-minute plane trip covering the entire KGRA are two of the several activities scheduled. For more information, contact: Geothermal Seminar, P. O. Box 145, Lakeport, California 95453 (707) 263-2391.

## Publications

Geothermal Deposits: Origin, Evolution, and Present Characteristics - Written by J. H. Tatsch. The Earth's surface reveals that certain elongate belts, characterized by varying degrees of seismic, tectonic, and magmatic activity, have existed in various parts of the Earth during hundreds of millions of years. These belts provide a convenient geometrical, mechanical, thermal, and chemical framework within which to analyze the origin, evolution, and present characteristics of the Earth's geothermal deposits. Hard cover, 6x9 inches, 340 pages. Table of contents, line drawings, index, references. \$84.00. ISBN-0-912890-10-X. LC:75-9303. 1976 (Spring) Tatsch Associates, 120 Thunder Road, Sudbury, MA 01776

Geothermal Energy as a Source of Power -- by S. L. Milora and J. W. Tester: Cambridge, Ma. MIT Press, 1976

Geothermal Guide to Mexicali-Imperial Rift Valley -- Prem K. Saint. Geothermal Energy Association, 318 Cherrywood Street, West Covina, Ca. 91791

Geothermal Project Summaries -- ERDA 76-53, April 1976. This publication covers active research and development projects and contains a list of ERDA geothermal contractors.

High-Temperature Properties of Silicate Liquids: Application to the Equilibration and Ascent of Basic Magma -- By I.S.E. Carmichael, J. Nicholls, F. J. Spera, B. S. Wood, S. A. Nelson, August 1976, prepared for the U. S. Energy Research and Development Administration. Published by Lawrence Berkeley Laboratory, Technical Information Division, University of California, Berkeley, California 94720.

Isotopes of Water -- A bibliography, by W. Kelly Summers and Carolyn Sittle, Published 1976 by Ann Arbor Science Publishers, Inc. P. O. Box 1425, 230 Collingwood, Ann Arbor, MI 48106 289pp.

Planning Maps for Geothermal Energy Programs -- These maps show current study areas and provide information relating to lease applications pending, leases issued, land ownership and known geothermal resource areas (KGRA) in California. Publication 3200 (C-931.2), Bureau of Land Management, Federal Office Bldg., Room #2841, 2800 Cottage Way, Sacramento, California 95825

Proceedings Second Geopressured Geothermal Energy Conference, Texas -- Edited by Myron H. Dorfman and Richard W. Deller, Center for Energy Studies and Energy Research and Development Administration, Available from the Center for Energy Studies, ENS 143, The University of Texas at Austin, Austin, Texas 78712, Attn: Mrs. Phyllis Smith, Price \$15.00 (make checks payable to the University of Texas at Austin) 5 Volumes.

The Recovery and Separation of Mineral Values from Geothermal Brines -- D. H. Christopher, Maxine Stewart, and Janet Rice. Hazen Research, Inc., Golden, CO 12 Jun 75, 44p  
Bullens-OPR-81-75, Pb-2/5 686/1PSN PC \$4.00/MF \$2.25

Report on the Status of Development of Geothermal Energy Resources in California -- by O. Citron et al. : Pasadena, Ca., Jet Propulsion Laboratory. Available from the California Energy Commission, 1111 Howe Avenue, Sacramento, Ca. 95825

Synergy Directory -- The July 1976, Vol. 3 Synergy directory contains over 2500 articles, books, and government reports, as well as alternate energy conferences; research groups; manufacturers and facilities in several fields including geothermal energy. Write: P. O. Box 4790, Grand Central Station, New York, NY 10017.

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