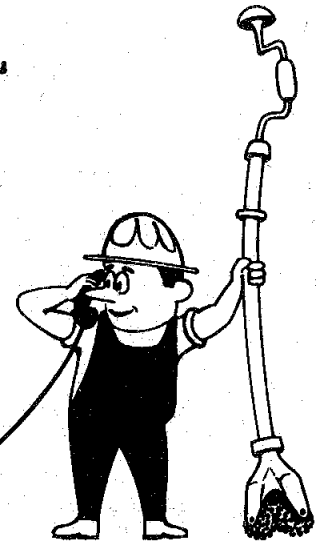


GEOHERMAL



Hot Line



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

Volume 3, Number 3

May 1973

"Man is learning to harness for his enquiring use the very wrath of the earth."

--Reginald Daly

HIGH TEMPERATURE PLASTIC

Research by H. J. Barth of Firestone Synthetic Rubber and Latex Company has demonstrated the properties of a new high temperature plastic. The material, 1,2 polybutadiene, is a pure hydrocarbon (no elements other than hydrogen and carbon in the structure) with outstanding dielectric properties. The 1,2 (vinyl type) configuration allows for rapid curing with peroxide catalysts and imparts a high flexural strength.

Tests of 1,2 polybutadiene show that the heat distortion temperature at 264 lb/in² is greater than 550° F. Thermal gravimetric analysis shows that no weight loss occurs until the temperature reaches 440° C (824° F), and differential thermal analysis indicates a decomposition temperature of 470° C (878° F).

Geothermal applications could include use as a replacement material for rubber seals and gaskets in pressure and temperature measuring instruments and as electrical insulation in logging tools and for separating metal corrosion coupons.

For information and samples contact:

New Products Development Department
Firestone Synthetic Rubber and Latex Company
381 West Wilbeth Road
Akron, Ohio 44301
(216) 379-7759

STANFORD PRESS GEOTHERMAL BOOK

Geothermal Energy edited by Paul Kruger and Carel Otte will be released June 15, 1973 by Stanford University Press. This book is based on the proceedings of the geothermal energy symposium at the American Nuclear Society meeting in June 1972. In 372 pages, the 18 papers discuss geothermal resources and their production and stimulation. The price before June 15 is \$14.00 and thereafter \$17.50. Orders should be sent to:

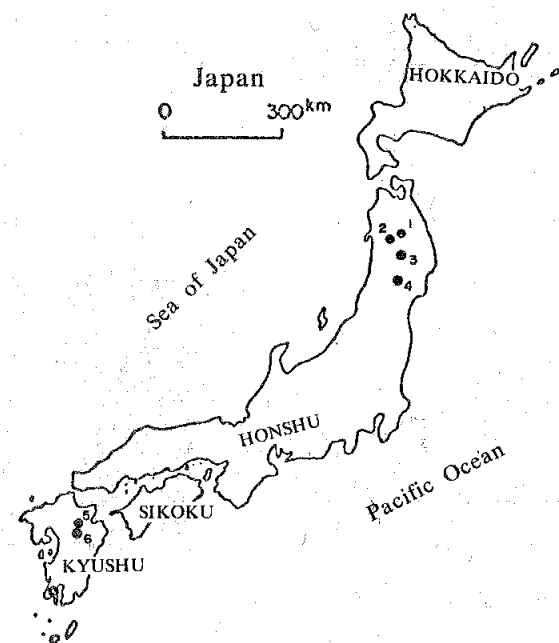
Stanford University Press
Stanford, California 94305

U.S.G.S. AEROMAGNETIC MAPS OF NEVADA

The U. S. Geological Survey has made available on open file, copies of aeromagnetic maps for five areas in Nevada. One map at a scale of 1:250,000 covers the southeastern 1/4 of Lund and the eastern 1/2 of Caliente (1° by 2°) quadrangles. Four maps at a scale of 1:62,500 cover Leach Hot Springs, Cherry Creek, Mount Tobin, Buffalo Springs, McCoy, Fencemaker, Cain Mountain, Mount Moses, The Cedars, and Carico Lake 30' quadrangles in the Winnemucca (1° by 2°) quadrangle.

These maps are available for inspection at the following offices:

Library, Mackay School of Mines, University of Nevada, Reno, Nevada 89507
504 Custom House, San Francisco, California 94111
345 Middlefield Road, Menlo Park, California 94025
7638 Federal Building, Los Angeles, California 90012
8102 Federal Office Building, Salt Lake City, Utah 84111
1012 Federal Building, Denver, Colorado 80202



Geothermal Fields in Japan: 1) Matsukawa, 2) Hachimantai-Onuma, 3) Onikobe, 4) Katsukonda, 5) Otake, 6) Hatchobaru.

JAPANESE GEOTHERMAL FIELDS

In a report released May 5, scientists of the Japanese Natural Resources Committee estimate that it is possible to develop between 30,000 and 50,000 megawatts of geothermal energy in Japan.

Japan has two producing geothermal fields and four fields in various stages of development. At the Matsukawa geothermal field, Japan Metals and Chemicals Company has been operating a 20 mw geothermal power plant since 1966. At the Otake field on the southern island of Kyushu, the privately owned Kyushu Electric Power Company has operated a 13 mw geothermal plant since 1967. Both plants were partly financed by government subsidy.

The Mitsubishi Metal Mining Company is installing a 10 mw generating plant at the Hachimantai-Onuma geothermal field near Matsukawa. This geothermal plant, which will be in operation by December 1973, will supply power for a nearby factory owned by Mitsubishi.

Dengen Kaihatsu (power company) has drilled 10 wells in the dry steam, Onikobe field and is constructing a 25 mw generating plant. The average depth of wells in this field is less than 300 meters.

Japan Metals and Chemicals Company has delineated a geothermal field at Katsukonda, which lies between Onikobe and Matsukawa. Tohoku Electric Power Company, the local utility, plans to build a 50 mw geothermal plant and to purchase the steam from the operator.

Kyushu Electric Power Company is developing a 50 mw plant to be operational in 1975 at the Hatchobaru field near Otake.

UNESCO GEOTHERMAL BOOK

The United Nations Educational, Scientific and

Cultural Organization has just released a book entitled *Geothermal Energy* edited by H. Christopher H. Armstead. This is a basic review of geothermal research and development, and it contains the following sections and contributors in its 165 pages:

- I. General
H. C. H. Armstead, E. Bullard
- II. Exploration
J. R. McNitt, C. J. Banwell, G. E. Sigvaldason, G. Facca
- III. The winning of geothermal fluids
K. Matsuo, N. D. Dench, J. H. Smith
- IV. The utilization of geothermal fluids
B. Wood, S. S. Einarsson, B. Lindal
- V. Miscellaneous
T. Marshall, W. R. Braithwaite, H. C. H. Armstead, R. S. Bolton

This book is available for \$14 from:

UNESCO Publications Center
P. O. Box 433
New York, New York 10016

BUREAU OF RECLAMATION MESA WELL REPORT

The U. S. Bureau of Reclamation has released *Test Well Mesa 6-1, Special Report, February 1973*. The Mesa 6-1 well in Sec. 6, T. 16 S., R. 17 E., S.B.B.&M. was drilled for the purpose of testing geothermal desalination equipment and designs. This report describes the drilling, logging, and production testing of the Mesa well. Drilling and testing methods are discussed, and the program costs are enumerated.

Copies of this report are available from:

Edward Lundberg
Regional Director
Bureau of Reclamation
P. O. Box 427
Boulder City, Nevada 89005

IDAHO THERMAL WATER REPORT

The Idaho Department of Water Administration and the U. S. Geological Survey have released: *Geothermal Investigations in Idaho, Part I, Geochemistry and Geologic Settings of Selected Thermal Waters*, by H. W. Young and J. C. Mitchell.

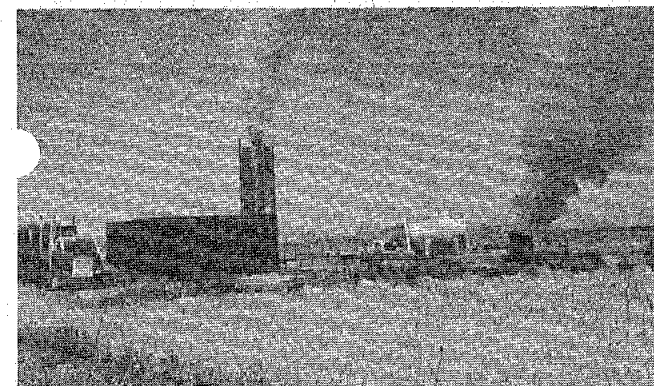
124 hot springs and wells were sampled for this report, and various chemical geothermometers were applied to estimate the reservoir temperatures. At 42 sites the calculated temperatures exceeded 140° C for the reservoir.

Copies of this report are available for 50 cents each from:

Idaho Department of Water Administration
Statehouse - Annex 2
Boise, Idaho 83707

or

U. S. Geological Survey
Water Resources Division
550 West Fort Street
Boise, Idaho 83702



Truck mounted heat exchange unit being tested by San Diego Gas and Electric Co. at "Magmamax" 1 well in the Salton Sea field.

HEAT EXCHANGER TEST RUN

For three weeks during March and April, San Diego Gas and Electric Company tested a truck-mounted, experimental, heat exchanger in the Imperial Valley. Geothermal brine produced from the Magma Energy well "Magmamax" 1 was used to evaluate the unit. This short test showed a high rate of silica deposition in the equipment. After evaluation of the test results and modifications in equipment design, the heat exchanger will be run for a longer period beginning in June. Information gained from this portable unit will be applied to the construction of a stationary 50 megawatt plant.

BUREAU OF RECLAMATION DESALTING PLANT

The U. S. Bureau of Reclamation is nearing completion of a multistage flash desalting unit at the site of the "Mesa" 6-1 well in the Imperial Valley. This unit and a vertical tube evaporator unit were designed for geothermal use by the U. S. Office of Saline Water. When federal budget cuts eliminated O.S.W., the Bureau of Reclamation diverted some of its funds to complete the project.

In the multistage flash unit, the geothermal brine flows through a series of columns where steam is flashed at successively lower temperature and pressure. The last stage will flash steam at 140° F and 2.9 lb/in², well below atmospheric pressure.

The vertical tube evaporator contains a series of heat exchange columns where geothermal brine under pressure will be used to flash steam from a separate saline water. The geothermal brine will remain as a liquid within this system.

The small holding pond used for previous tests will not be large enough for sustained flow, so plans are underway to drill a disposal well.

COMING MEETINGS

Rocky Mountain Mineral Law Institute

The annual meeting of the Rocky Mountain Mineral Law Institute will be held July 19-21, 1973 at Snowmass, Colorado. For further information contact:

Rocky Mountain Mineral Law Foundation
Fleming Law Building
University of Colorado
Boulder, Colorado 80302

Heat Flow Symposium

A symposium on the Origin of Heat Flow Anomalies will be held as part of the International Association of Seismology and Physics of the Earth's Interior meeting in Lima, Peru on August 20-31, 1973. The symposium will consider positive and negative heat flow anomalies and interpretation of their origin.

For submission of abstracts or for further information contact:

Jean-Claude DeBremaecker
Department of Geology
Rice University
Houston, Texas 77001

(Geothermics)

Geothermal Resources Council Annual Meeting

The G.R.C. conference and annual meeting scheduled for San Francisco in September 1973, has been cancelled because of a myriad of problems. Arrangements have been made to hold the G.R.C. annual business meeting, including election of officers, in conjunction with the American Geophysical Union convention at the Jack Tar Hotel in San Francisco during December 10-14, 1973.

The A.G.U. convention will include two sections on geothermal resources. A finalized program of these sections will appear in the "Hot Line" around October.

WELL OPERATIONS

STATE OF ARIZONA

Geothermal Kinetics

Geothermal Kinetics has spudded "Power Ranches Inc." 2 about three-fourths of a mile west of "Power Ranches Inc." 1 in the same section. The new well is 1,980 feet S and 660 feet W from the NE corner of Sec. 1, T. 2 S., R. 6 E., G.&S.R.B.&M. These wells are the first and second geothermal wells to be drilled in Arizona. As of May 17, 1973, the well was being drilled below 1,219 feet on the way to a scheduled total depth of 6,600 feet.

Geothermal Kinetics Systems Corp.

Geothermal Kinetics has completed the first geothermal well in Arizona. The well, "Power Ranches Inc." 1, is located in Sec. 1, T. 2 S., R. 6 E., G.&S.R.B.&M., two miles SE of Higley. The total depth is 9,207 feet, and casing was set at 9,065 feet. The well bottomed in hydrothermally altered volcanics after passing through zones of volcanic ash with up to 30 percent porosity. A bottom hole temperature of 325° F was recorded after the completion of drilling. Geothermal Kinetics is controlled by United Siscoe Mines in Toronto. For more information see "Hot Line" v. 3, n. 1, February 1973.

LAKE COUNTY, CALIFORNIA

Pacific Energy Corporation

Pacific Energy Corporation entered the "Kettenhofen"

1 well (150 feet S and 125 feet E from the center of Sec. 28, T. 13 N., R. 8 W., M.D.B.&M.) in Lake County on April 23, 1973. The company plans to deepen the well to 10,000 feet. Pacific Energy is the third operator to enter the well. It was originally drilled by Eureka-Magma Explorers in 1971 and deepened by Getty Oil Company in 1972. Getty abandoned the well at 7,822 feet in Franciscan graywacke. For more information see "Hot Line" v. 3, nos. 1 and 2.

IMPERIAL COUNTY, CALIFORNIA

Magma Energy, Inc.

Magma Energy drilled three wildcat wells in the Imperial Valley during March and April 1973.

"Sharp" 2 was spudded March 3 and drilled to a total depth of 6,493 feet. The well is 145 feet S and 180 feet W from the E 1/4 corner of Sec. 34, T. 16 S., R. 16 E., S.B.B.&M.

"Bonanza" 1 was spudded March 22 and drilled to 5,024 feet. Its location is 2,600 feet N and 675 feet E from the SW corner of Sec. 22, T. 15 S., R. 14 E., S.B.B.&M.

"Fed-Rite" 1, spudded April 14, was drilled to 5,380 feet and is 155 feet S and 155 feet W from the E 1/4 corner of Sec. 8, T. 17 S., R. 13 E., S.B.B.&M.

Bureau of Reclamation

The Bureau of Reclamation has issued specifications for its second geothermal well "Mesa" 6-2 located 2,800 feet E and 3,600 S from the NW corner of Sec. 6, T. 16 S., R. 17 E., S.B.B.&M. Bids for the drilling of this 6,000-foot deep well will be opened June 7, 1973. The well may be used for injection of waste brine from the desalination test plant or as a production well.

Salton Sea Geothermal Field

Phillips Petroleum Company

Phillips is reworking the "Sinclair" 3 and 4 wells in the Salton Sea field in preparation for production testing. Under an agreement with Geothermal Energy and

Minerals Corporation who owns the wells, Phillips has entered the wells, cleaned them out, and run casing inspection logs.

"Sinclair" 4 (400 feet N and 250 feet E from the S 1/4 corner of Sec. 4, T. 12 S., R. 13 E., S.B.B.&M.) had 9 5/8-inch casing to 5,300 feet. A new 7-inch protective casing was cemented above the perforations, and new well head equipment was installed. This well has often been produced for short periods since its completion in 1964. Geothermal brine was accumulated in surface ponds for the production of calcium chloride concentrates.

"Sinclair" 3 (330 feet S and 330 feet E from the NW corner of Sec. 10, T. 12 S., R. 13 E., S.B.B.&M.) had 6 5/8-inch casing to 6,920 feet. A new 5 1/2-inch protective casing was cemented above the perforations, and new well head equipment was installed. This well has not been produced since its completion in 1963.

In the proposed testing program, Phillips will produce brine from "Sinclair" 4 and inject waste brine into "Sinclair" 3.

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Geothermal Hot Line

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