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CASCADES NEWSLETTER
NO. 1

20 September, 1985

CASCADES GEOTHERMAL PROGRAM
U. S. DEPARTMENT OF ENERGY

The U. S. Department of Energy (DOE), Division of Geothermal and Hydropower Technologies (DGHT), is mandated to perform research in support of industry for identification, evaluation, extraction, and utilization of geothermal energy as an alternative energy source. As part of this effort, DGHT has initiated a new program designed to support industry efforts in the Cascades volcanic region of California, Oregon and Washington.

The majority of the world's known high-temperature geothermal resources are closely associated with active volcanism. A relatively small amount of data are in the public domain from volcanic areas in Japan, the Philippines, Mexico, Central America and from Newberry Caldera (Oregon), Lassen (California), and Meager Creek (British Columbia) in the Cascades. The key aspects of exploration in this environment are knowledge of the locations of heat sources (high-level plutons) and of the locations and nature of fracture systems which would allow meteoric fluids to communicate with the hot rock and ascend within reasonable drilling depths. The western andesitic volcanic province of the U.S., the Cascades, remains one of the areas of high geothermal potential which has seen relatively little systematic exploration by the U.S. geothermal industry. One of the reasons has been the paucity of direct surface geothermal manifestations, which, in turn, has been attributed to high rainfall. Downward percolation of cold water may reduce or eliminate surface thermal phenomena and require deep temperature-gradient measurements as well as deep geophysical exploration to see through the near-surface, cold-water aquifers. This hypothesis can be tested only by drilling below the so-called "rain curtain". Resource assessment and exploration research have been conducted by the U.S. Geological Survey and by the states involved--Washington, Oregon and California--as well as by industry. However, there have been few wells drilled in the Cascades to sufficient depth to evaluate the zone of cold water overflow and the temperature and hydrological conditions beneath it.

DOE's objectives are 1) to gather data to characterize the deep thermal regime of the Cascades volcanic region and 2) to transfer these data to the public in order to stimulate further development of hydrothermal resources. The first step in achieving these objectives was taken when the DOE-Idaho Operations Office issued Solicitation Number DE-SC07-85ID12580 to receive and consider for support proposals to enter into Cooperative Agreements for the drilling of gradient holes and for the release of data generated from the drilling project. To qualify for consideration, the proposals had to meet the following criteria:

1. The proposed site was to be located within the Cascades volcanic region of the United States as delineated by Figure 1;
2. The proposal was to include a cost-share plan in which DOE's share would not exceed 50 percent;
3. The proposed hole was to be a minimum of 3000 feet deep; and,
4. The proposer was to agree to complete the hole and allow DOE access to the hole for data acquisition purposes.

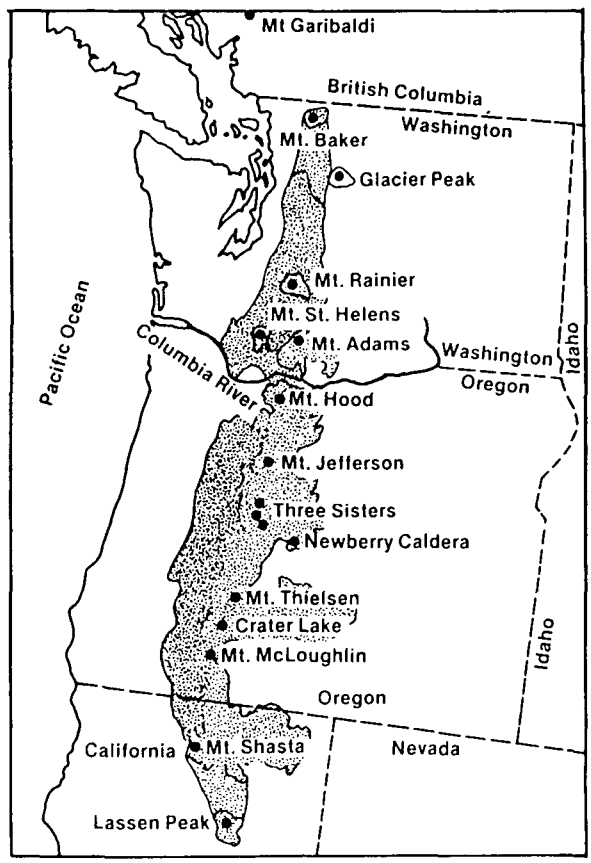

Figure 1. Defined Proposal Area (stippled area)

Three companies submitting proposals were selected to negotiate cooperative agreements. The three firms selected and the proposed drilling projects are: GEO-Newberry Crater, Inc. for drilling two 4000-foot coreholes on the flanks of Newberry volcano; Thermal Power Company for drilling one 5000-foot corehole in the Clackamas area; and, Blue Lake Geothermal Company for drilling one 3000-foot hole (upper 2000 ft rotary, lower 1000 ft core) in the Santiam pass area.

The program will result in the release of such items as rock samples, fluid samples and well logs, as well as data generated from the samples and interpretation of these data.

Mike: Officially, our objective is to develop remote geophysical techniques for seeing through the "rain curtain". The stimulation of resource development must remain a secondary, non-publicized objective. Jim

Splits of rock and fluid samples will be housed at UURI during the active phases of the program, with splits also being retained by the industry participant and the state geological agency as negotiated with DOE. The holes will generally be completed with 2-1/2 in. pipe so that equilibrium temperature gradients can be measured. An access period for entry into the holes up to 1 year after drilling will be allowed for publically funded research. Prior to setting the pipe, the holes will be logged to total depth with a suite of logs that will vary from project to project but will generally include caliper, temperature, resistivity, self potential and gamma ray tools.

The first hole under the program is currently underway in the Newberry Crater area by GEO-Newberry Crater, Inc., a subsidiary of Geothermal Resources International, Inc. Surface casing has been set to 470 feet and coring has begun. At this time the hole is drilling at 1830 feet. Core recovery has been about 90%.

More information on this DOE program may be obtained by calling or writing to one of the following:

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GEO-Newberry Crater, Inc.
A Subsidiary of Geothermal Resources International, Inc.

Sept. 7, 1985

Bruce Sibbett
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84108

Dear Bruce:

With respect to your Cascade Newsletter, the first release that you telecopied to me last week and which bears the date of September 1985 is acceptable to us as written. For future editions, we would appreciate your treating our data in the same manner as the Petroleum Information Geothermal Newsletter: that is the location, spud date, projected depth, drilling status, contractor, rig #, and similar information. As for temperature and geological data, we will be episodically be sending you news releases which contain such information and which you may edit as you see fit. We would also appreciate the opportunity to review any release prior to publication.

Very truly yours,

Chandler A. Swanberg, President

CAS/rs

cc: C. Chandler
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DOE NEWS:

FOR IMMEDIATE RELEASE
JUNE 6, 1985

THREE FIRMS SELECTED FOR CASCADES DEEP THERMAL GRADIENT DRILLING COOPERATIVE AGREEMENT

Three West Coast firms were selected this week to enter into negotiations for cooperative agreements to drill four geothermal gradient holes in the Cascade Volcanic Region of Oregon. The announcement was made today by Troy E. Wade II, Manager of the Department of Energy's Idaho Operations Office.

The three firms selected are Blue Lake Geothermal Company, Portland Oregon; GEO Operator Corporation, Menlo Park, California; and Thermal Power Company, Santa Rosa, California.

The Cascades Region is known to contain considerable geothermal potential as shown by recent volcanism and other thermal activities. The drilling program will further define this potential through data collection such as well logs, rock samples, and fluid samples. The results will be transferred to the public for possible further development of hydrothermal resources.

The two-year program, estimated at approximately $1 million, will result in drilling of up to four deep thermal gradient holes.

- DOE -

News media contact: Peter Mygatt, (208) 526-1318

No. 85-6 (G)

MAIL DOE849 DOE4418 AR 'GEO CONTRACTS IN OREGON'

MEMO TO: SAM AOKI

FROM: MIKE WRIGHT

SUBJECT: GEO CONTRACTS IN OREGON

August 10, 1988

Last week while I was in San Francisco, I met with Chan Swanberg to discuss his perceptions of the status of his delivery of data to DOE and his future plans in the Newberry area of Oregon. I asked Chan to send me a complete copy of the material he had previously submitted to you, and I received it yesterday. I have since reviewed this material, along with all of the data and information that GEO has previously sent to us, and I find that they have complied satisfactorily with their agreement with DOE in delivery of data and reports. I have not been involved in the financial transactions between DOE and GEO, and can not comment on their billing or the status of their account.

GEO has proposed to DOE that the agreements for Newberry holes N-1 and N-3 both be concluded as soon as possible. As you know, these agreements included the plugging and abandoning (P&A) of these wells. GEO proposes to assume full responsibility for plugging and abandoning, and this seems to me like a good deal for DOE. We would be wise to agree in writing with GEO that DOE is released from any responsibility in this matter. Although it is unlikely that problems will arise in plugging and abandoning, trouble either with the process itself or future problems that may develop around the well site that may be attributable to a poor P&A job will then become GEO's sole responsibility.

We (DOE and UURI) have been talking for some time now to GEO about obtaining a sample of the waters in N-3 for chemical analysis. (A water sample of N-1 is not of great interest because no aquifer was intercepted.) N-3 found several permeable zones. Temperature logs show that water enters the hole at the 3800-foot level and perhaps in other zones above this depth, and exits the hole at the 1800-foot level, at the water table. This aquifer may or may not be connected with any hydrothermal convection system which may or may not exist in the area. We have felt that a sample of the water would be useful in understanding the Newberry area, especially if there is any future development of geothermal resources there. We have not proceeded with actually getting the sample because GEO has been involved in negotiations with the BLM and Forest Service over exactly how GEO would be required to P&A this well. Since we have believed it likely that GEO would be required to have at least a small drill rig over the hole to P&A, and since the rig

could be used to get the water sample without going to the expense of mobilizing a rig sooner specifically for getting the sample, we have been waiting to learn the outcome of these negotiations. In my discussions with Chan last week, he stated that GEO was independently interested in the water sample, and had plans to obtain one or more samples before or during the P&A operations if it is at all possible. He also said that GEO would be willing to make the data from the sample public. This seems satisfactory to me.

Chan is obviously in somewhat of a rush to conclude the two agreements with DOE. They reported a net loss of $4.4 for 1987. They presently have a heavy drain on their budget in the East Mesa project, where they are drilling holes in an attempt to get power on line in advance of the deadline for their Standard Offer 4 contracts at the end of 1989. In addition, revenues from The Geysers operations is down. Thus, GEO appears to badly need the remainder of the money that DOE is obligated to pay. We would be wise to expedite matters leading to paying them the balance owed because we all have an interest in helping to keep the few remaining geothermal companies as viable as possible in these times of low energy costs. Chan did indicate that GEO would be going ahead with plans to drill a production-sized well on the west side of the Newberry volcano this year. There has been some speculation that they might postpone this well.

In summary, my review indicates that the data and information submitted by GEO, both with the recent submissions and with previous ones discharge GEO's obligations for data delivery. I recommend that DOE accept GEO's offer to assume responsibility for P&A operations for N-1 and N-3 and that DOE proceed to close the agreements with GEO and pay the remaining amounts due.

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