STATE COUPLED TEAM STATUS REPORT

Duncan Foley and Carl A. Ruscetta

May, 1981

EARTH SCIENCE LABORATORY
University of Utah Research Institute
Salt Lake City, Utah

Work Performed Under DOE Contract No. DE-AC07-80ID12079

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This progress report summarizes the status of DOE/DGE State Coupled Program resource assessment team efforts in the 16 states for which the Earth Science Laboratory Division/University of Utah Research Institute provides technical support to DOE. These 16 states encompass 18 individual resource assessment programs. Table 1 is a list of the state responsibilities of ESL, Los Alamos Scientific Laboratory and Gruy Federal, Arlington, VA. Appendix 1 is a list of state team publications.

The roles of ESL in the State Coupled Program are to provide technical support services to state teams, host an annual meeting, and coordinate with other DOE programs. Technical support services are detailed monthly as part of the ESL monthly reports. During this year two meetings of state resource assessment teams are being convened, the first was held in Seattle in January. The second will be held in Glenwood Springs, Colorado, in May. ESL will publish a proceedings volume from the Colorado meeting. Coordination with other DOE programs is an ongoing effort. During this fiscal year, the primary coordination effort is with the U.S. Geological Survey, as they update their assessment of geothermal resources in the U.S. to include those with temperatures less than 100°C. This assessment effort will be described in the status report at the end of the fiscal year.

This status report summarizes the efforts of the state teams and includes a brief discussion of the exploration methods used by the teams. ESL tasks are reported in monthly progress reports to DOE/ID.

Table 2 is a list of the most recent program review held for each team. ESL has distributed trip reports to the State Coupled Program core group for

TABLE 1

State Coupled Program DOE Technical Coordinators

STATE	ESL	GRUY	LASL	COMMENTS
Alabama		X		No longer active
Alaska	X			Two programs
Arizona			X	
California	X			
Colorado	X			
Delaware		X		
Hawaii	X			
Idaho	X			
Kansas	X			
Massachusetts		X		
Missouri		X		Not yet on line
Mississippi		X		No longer active
Montana	X			
Nebraska	X			
Nevada	X			
New Mexico			X	
New York		X		
North Dakota	X			
Ohio		X		Not yet on line
Oklahoma	X			
Oregon	X			
South Dakota	X			No active program, yet to come on line
Texas	X			Two programs
Utah	X			
Virginia		X		Mapping program only
Washington	X			
Wyoming	X			

TABLE 2

Most Recent Program Reviews

Alaska	Sept. 80, Oct. 80
California	April 81
Colorado	Dec. 80
Hawaii	None scheduled at present
Idaho	Feb. 81; 26 Mar. 81
Kansas	Mar. 81
Montana	Mar. 81
Nebraska	Jan. 81
Nevada	None scheduled at present
North Dakota	Dec. 80
Oklahoma	Planned for May 81
Oregon	Jan. 81
Texas	Jan 81 (both programs)
Utah	Feb. 81
Washington	Planned for May 81
Wyoming	Dec. 80

most of these meetings.

There are several tasks that all the state teams are doing. The foremost of these, in the eyes of the public and the geothermal community, is the publication of maps depicting the low- and moderate-temperature geothermal resources in each state. Table 3 is a summary of the present status of these maps. The State Coupled Program core group recently reviewed the progress of the mapping programs; a report from this meeting has been issued by ESL.

State teams are responsible for the submission of geothermal data to the USGS for inclusion in computer file GEOTHERM. Most of the data presently in this file were initially submitted in response to USGS needs for publication of Circular 790, "Assessment of Geothermal Resources of the United States - 1978." At the time of this status report, the USGS is in the process of updating Circular 790 to include an assessment of resources with temperatures below 100°C. State resource assessment teams are participating in this project by updating their contribution to GEOTHERM. The USGS is also seeking input from states on ways they would like to be able to use GEOTHERM, and ways to simplify the submission of data. ESL is participating in the update of Circular 790 by providing coordination support between the states and the USGS, and by coauthoring several of the chapters in the new Circular. A complete report on GEOTHERM and the update of Circular 790 will be contained in the end-of-the-year status report.

Resource assessment teams are charged with cooperating with other DOE contractors, in particular participants in the commercialization program, the PON program, and, where appropriate, the User Coupled Confirmation Drilling Program. In general, response by the resource assessment teams has been excellent to requests from these other organizations.

TABLE 3

Map Status

Alaska	Blue line draft contained in Annual report; coordination begun with NOAA
California	Public map out; technical map beginning preparation, data to NOAA by October (?)
Colorado	Public map out; no technical map planned
Hawaii	Data to NOAA by Jan. 1 for public map
Idaho	Public map out; no technical map planned
Kansas	Data to NOAA after summer field season
Montana	First proof done, being revised, will be printed by Oct. 1, 1981.
Nebraska	Data to NOAA "soon," proof by Oct. 1 that will be updated from summer's work
Nevada	State published map is out; data to NOAA for update by Jan. 1, 1982
North Dakota	2nd proof, will be discussed at Glenwood Springs meeting; printed by Oct. 1
Oklahoma	No map intended at this time
Oregon	State published map is out, data compilation under way for delivery to NOAA "soon"
Texas	Draft of public map has gone to NOAA, not yet had proof made
Utah	Public map out; no technical map planned
Washington	Public map at proof stage; needs resolution of data on map
Wyoming	Data compilation underway; delivery to NOAA in May (?)

State teams also have requirements for the reporting and dissemination of information gathered under the State Coupled Program. Appendix 1 is a partial bibliography of these resources; an update of this list will be compiled at a meeting of teams in May 1981 and will be published as part of the proceedings of that conference.

Alaska

The Alaska program has two contractors. The Geophysical Institute at the University of Alaska has primary concerns with area-specific investigations, and the Alaska Division of Geological and Geophysical Surveys is concerned with an inventory of all thermal sites in the state. The two teams cooperate on several of the site investigations, with geophysical support coming from the Institute and geological and geochemical support from the DGGS.

Two sites are being investigated on the Aleutian Islands of Unalaska and Akutan. Both of these sites are industrial fish processing centers with geothermal manifestations near the towns.

The regional phase of the Willow (lower Susitna Valley) area studies will be undertaken during the summer of 1981. Detailed work will follow in 1982, probably with state funding. Temperatures have been recorded to 77°C at 1800 feet in the area, but the geological controls on the thermal system are poorly known. Although presently sparsely populated, Willow is the selected site for a new state capitol complex and city.

Other sites that the state teams would like to investigate are Clear Creek, a 67°C hot spring, Manley Hot Spring near Fairbanks, and Melozitna. In southeastern Alaska, Tenekee and Goddard are given high priority for an investigation with available funds.

California

The California team has nearly completed their largest task to date, an investigation of the Calistoga area, with the publication of a report outlining their geochemical and geophysical studies. This report will be updated with a publication presently in preparation on the results of the drilling of three thermal gradient holes.

Sites the California team will be investigating this summer include the Sonoma Valley area seeking thermal resources of a quality suitable for space heating, the San Bernardino and Los Angeles areas which have known thermal waters, and the Pasa Robles and Bridgeport areas to complete previous investigations. In addition, the team will report on about 40 thermal sites which will be characterized for water quantity, quality, and for geologic setting.

Colorado

The Colorado team is working on nine tasks during their present contract. Geophysical work includes resistivity surveys, publication of a heat flow map of Colorado which is now being reviewed, and evaluation of geophysical characteristics of thermal sites. Temperature measurements are proceeding on the compilation of a ground-water temperature map, a temperature gradient map based on oil and gas well bottom-hole temperatures, and the direct measurement of temperature profiles. The Colorado team is also investigating the temperatures of waters in mining districts.

The Colorado map continues to be a best seller, with 100 copies distributed in a recent month.

The tasks from the FY 1980 contract are being written up, and a final report is being prepared.

Hawaii

The Hawaii resource team has three main projects for this fiscal year:

1) the completion of ongoing field surveys in four study areas (Lahaina-Kaanapali, Olowalu-Ukumehame, Haleakala northwest rift, and Kawaihae), the synthesis of the data obtained into a coherent geological, hydrological, and geophysical model, and a detailed assessment of the probability of finding a resource in each area;
2) complete, more extensive surveys in North Kona-Hualalai and the Mauna Loa southwest rift;
3) the initiation of field surveys on the lower southwest rift of Haleakala and the southwest rift of Kilauea.

The overall program emphasis is to investigate with geochemical and geophysical methods the unique setting of Hawaiian geothermal resources.

Appendix 2 is a recent summary by the Hawaii team of their progress.

Idaho

The Idaho team is in the process of finishing a report on the geologic setting, geochemistry of ground waters, geophysical characteristics, and geothermal potential of the Nampa-Caldwell area of the western Snake River Plain. The team has also been active in support of the DOE funded work in the Boise Capitol Mall project. Their primary task for the upcoming year will be to do the studies necessary to tie these two areas together in an integrated package.

The State of Idaho is subcontracting work in the overthrust belt of Eastern Idaho to the University of Idaho. Six M.S. and Ph.D. theses will be produced as a result of the first year's work in this area. This effort will

continue for a second field season with studies moving north from the first season's efforts.

Kansas

Computerization of the temperature logs and stratigraphic data from oil and gas wells is complete for Kansas. The state team is beginning to analyze and verify these data.

Geophysical studies funded by the State Coupled Program are receiving national prominence and are helping to provide support data to the interpretation of the thermal data. A program of temperature measurements is ongoing with many shallow and a few deep wells selected for field verification.

Geochemical and hydrologic studies will continue during the upcoming field season.

Montana

The state of Montana had been contemplating the development of geothermal resources near Boulder, Montana. The area is the site of favorable geological and geophysical signatures as well as the surface occurrence of hot water. This high-potential direct heat project was threatened by the current owner of Boulder Hot Springs who contended that drilling in the area might disturb the local hydrology and damage his spring. The situation was further complicated due to the proposed test site being located on the basis of confidential company geophysical surveys that were provided by a private source to the Montana RA team. Montana considered the Boulder site as its first choice in an cooperative state/DOE direct-use demonstration project. Due to possible legal problems, however, the proposed project was abandoned and another site

selected in the Camas Valley where the state is willing to cost-share thermal gradient drilling.

The Montana team feels that an area of high development potential is the Deer Lodge Valley where they have recently completed a hydrologic inventory. Geophysical studies will be conducted during the 1981 field season. Anaconda Copper recently shut down a smelter in the area, resulting in high unemployment. It is generally felt within the state that anything to be done to stimulate economic growth in the area would be extremely beneficial.

The Montana team has completed a draft of their report on the Centennial Valley, and the Radersberg and West Yellowstone manuscripts are well along in preparation.

In addition to the Deer Lodge work, further studies in Helena and White Sulphur Springs will be done this year.

Nebraska

Studies by the Nebraska state team are indicating that the western portion of the state is underlain by slightly anomalous temperatures in aquifers at depths of approximately one kilometer. Integration of shallow temperature surveys, deep oil and gas well temperatures and heat flow data have led to the hypothesis that these waters are circulating to depth in the Denver-Julesburg Basin and are driven by thermal heat and hydrologic head to the shallow aquifers in Nebraska.

Nevada

The Nevada RA Team has recently concentrated efforts to three area studies. Detailed studies, including temperature gradient drilling, have been conducted at Golconda, Hawthorne, and Fallon Naval Air Station. Geothermal

studies in the MX siting areas are scheduled to begin soon.

North Dakota

Work in North Dakota has continued to emphasise a statewide overview of geothermal resources. Thermal gradient and heat flow investigations, water chemistry, and stratigraphic studies on the Paleozoic system have been the main objective of the program thus far. 1981 work will focus on potential updip leakage of thermal fluids from the Madison Group into Cretaceous aquifers.

Oklahoma

A major effort of the resource program at the Oklahoma Geological Survey is a study of the thermal regime of Oklahoma. The stratigraphy in Oklahoma is particularily well known by the vast amount of petroleum drilling that has taken place, but the thermal regime is not well documented. In addition to preparing a thermal gradient map, the OGS is looking at two types of field studies. The first is to study thermal equilibration in industry holes of opportunity to help interpret bottom-hole temperature measurements. The second is to measure temperature gradients as wells become available.

Early interpretations of the data indicate that particularily favorable sites for thermal anomalies are found in southeastern Oklahoma.

Oregon

The following report on State Coupled Program activities in Oregon is abstracted from "Geothermal Exploration in Oregon, 1980" by George Priest and Dennis Olmstead (Oregon Geology, Vol. 43, No. 4, p. 43-51).

> The Department is continuing its USDOE-funded low-temperature geothermal-resource assessment program. The second year of this study has culminated in preparation of resource assessment open-file reports on

the areas:

Belknap-Foley,
Willamette Pass,
Craig Mountain-Cove (La Grande),
Western Snake River Plain (Vale),
Northern Harney Basin (Burns),
Southern Harney Basin,
Powell Buttes,
Lakeview,
and Alvord Desert areas.

All of these reports contain compilations of chemical analyses of spring and well waters, reservoir-temperature calculations, temperature-gradient measurements, calculated heat flow, and all available geologic and geophysical maps of each area. New, previously unpublished data in nearly every category have been either generated by the department or borrowed from industrial sources. All of these studies are, as yet, preliminary and will be complemented by final reports of the most promising areas.

Considerable drilling was also completed under the low-temperature assessment program. In 1980, 13 holes were drilled for temperature-gradient measurements to depths of less than 600 ft. These prospect wells were drilled near Oakridge, Burns, and Powell Buttes. The Oakridge city well was deepened from 420 to 1,130 ft, and one well (PB-1) has just been completed to a depth of 1,512 ft into a thermal anomaly at Powell Buttes. This thermal anomaly, discovered by the Department in 1978, is marked by temperature gradients as high as 164°C/km (527°F/mi). A bottom-hole temperature of 57°C (134°F) in the 1,512-ft hole indicates that high gradients extend at least to that depth. This hole will be deepened if funds can be found.

The Department plans to do limited shallow (500-ft) drilling of temperature-gradient wells in the Parkdale area northeast of Mount Hood and in the Corbett-Camp Collins area near Portland in 1981 if funds are available.

Texas

Two state agencies are funded for work in Texas: the Texas Bureau of Economic Geology and the Texas Energy and Natural Resources Advisory Council/ University of Texas El Paso. The primary responsibility of the BEG group is to assess the geothermal resources along the Balcones Fault Zone in central Texas. The TENRAC/UTEP group is concerned with the assessment of geothermal resources in west Texas.

Geothermal studies being performed by the Bureau of Economic Geology at Austin, Texas have involved general statewide surveys (excluding Trans-Pecos) and detailed studies along the Balcones-Luling-Mexia-Talco Fault Zones in central Texas. Statewide surveys have included a water temperature study and a thermal gradient study in addition to a study of lineaments using landsat imagery. Similar evaluations of a more detailed nature as applied to central Texas are nearing completion, in addition to hydrologic and stratigraphic assessment of Cretaceous aquifers in that region.

TENRAC-UTEP investigators are looking in detail at two areas of west Texas, the Hueco Tanks area and the Presidio Bolson. Hueco Tanks is near El Paso and is the southern end of the Tularosa Basin in New Mexico. High thermal gradients have been measured in the Hueco area. The Army and several industrial sites in El Paso have the potential to use any thermal fluids that might be found.

The Presidio Bolson is located south of El Paso in a sparsely populated area. It is, however, across the border from hot thermal springs in Mexico.

Utah

The Utah resource assessment program for the past year has primarily focused on the Jordan Valley (Salt Lake City) area. The results of an ambitious well and spring sampling program are now being interpreted, and a final report is in preparation. The team has identified several previously unknown areas in the Jordan Valley that have apparent thermal anomalies.

Work in the upcoming year will emphasize the areas to the north and south of the Jordan Valley where the majority of the rest of the population of Utah resides.

Washington

The Washington program is currently working in the Yakima Valley and in the Cascade Mountains of western Washington. A subcontract has been let to Washington State University for geologic mapping and hydrologic studies to be carried out as a thesis study in the Yakima Valley. The spring sampling program has been delayed by the eruption of Mount St. Helens, but it should be on schedule by the summer. Drilling for regional heat flow studies will resume soon.

Gravity surveys of the southern Cascades are continuing and will be completed in the upcoming field season.

Work this year will also concentrate on integrating the existing data packages around thermal sites in Washington to prepare a final report on the work completed under the State Coupled Program. One part of this work will be to continue to investigate the lateral thermal features around Mount St. Helens.

Wyoming

The Wyoming team has had field crews operating in the uranium mining districts of the Red Desert and southern Powder Basin. These crews have capitalized on mineral exploration holes to gather data for heat flow and thermal gradient studies. Work has continued on area-specific studies at Cody, Thermopolis, and the Big Horn Basin. Reports on this work are in preparation.

During the upcoming field season, work on thermal gradients will continue in those parts of the state that have not yet been measured. Updated geochemical analyses will be gathered during the year as well.

EXPLORATION METHODS OF STATE TEAMS

It is beyond the ability of most direct-use geothermal resource developers to finance broad regional geoscience exploration programs. Trends in the industry to date emphasize either the selection of a site with a spring, and concommitant drilling adjacent to the orifice, or the selection of a site that is devoid of thermal manifestations, and the attendant necessity to develop target models that may not be supported by the regional geologic environment. One goal of the State Coupled Program is to provide private sector consultants with regional or statewide geoscience data which the consultants can then use in their investigations of site-specific target areas.

ESL sent a questionnaire to State Coupled Program participants, 22 of whom responded, asking them to identify which exploration techniques they had used and if they had found them successful or not. Sections on the questionnaire concerned geology, geochemistry, and geophysics; hydrology was not addressed. The questionnaire did not address the sequence in which teams sought and applied the data.

Figure 1 is a summary of the number of states using particular techniques. The most broadly used exploration method is the direct measurement of water temperatures in wells or springs. An overall bias of the program toward inexpensive techniques that identify shallow systems is evident from this table. Water geochemistry, thermal data from other resource exploration holes, and indirect geophysical and imagery techniques have also been employed. The bias away from deep, expensive exploration techniques seems to be a product of restricted funding under the program, the skills of individual state team members, the need for expensive equipment to accomplish some kinds

of surveys, and, at least in the western states, the abundance of sites with surface features that had not been investigated.

Questionnaire respondents were also asked to comment on the level of success they had encountered with specific techniques. One frustration that was expressed was the inability of teams to confirm by drilling the results of their identification of favorable areas. Some teams, therefore, did not wish to say that particular techniques had been successful. Several states mentioned that although they use geochemical thermometry calculations, temperatures estimated by these methods are often unreliable. This problem is being addressed through other DOE programs. It is generally felt by state teams that integration of exploration packages is required; technique interpretations cannot stand alone. Some reconnaissance phase exploration methods are broadly applicable to many areas, others must be tailored to more local geological conditions and target models.

Overall, the exploration methods employed by the state teams are developing a data base on the surface and near-surface thermal regime in the states. Hydrologic evaluations have been done by only a few teams. The deep thermal regime in states is still primarily the realm of heat flow specialists, whose work has been integrated with State Coupled Program efforts only in some areas.

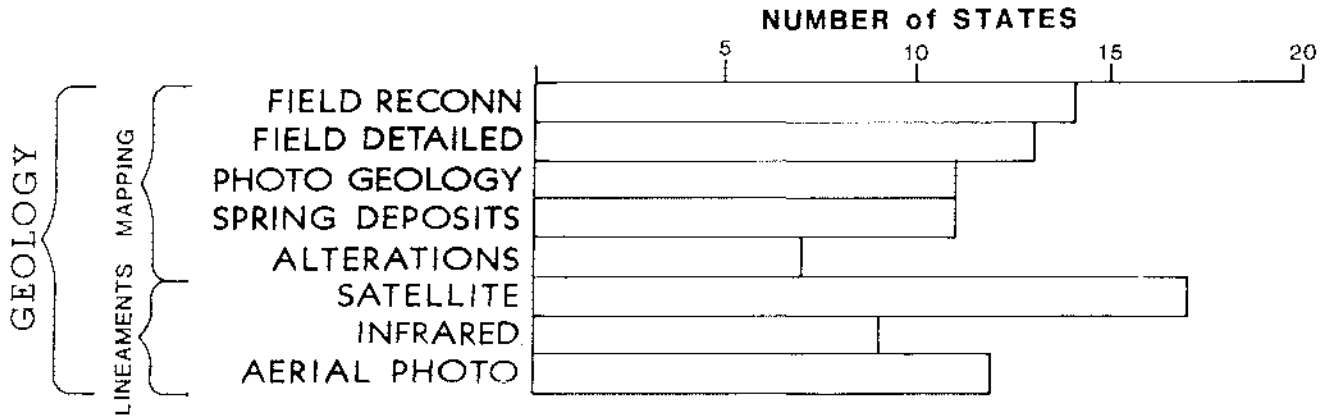

Figure 1. Exploration techniques employed State Coupled Resource Assessment Program.

A) Geological Techniques

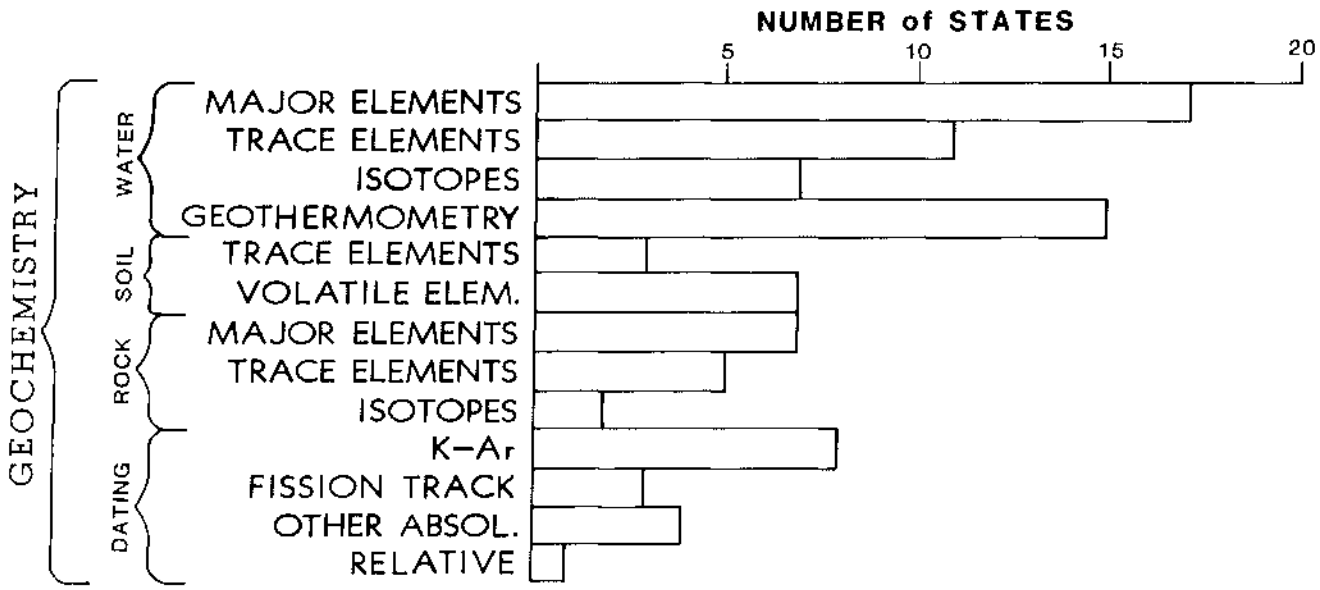

Figure 1 (cont.)

B) Geochemical Techniques

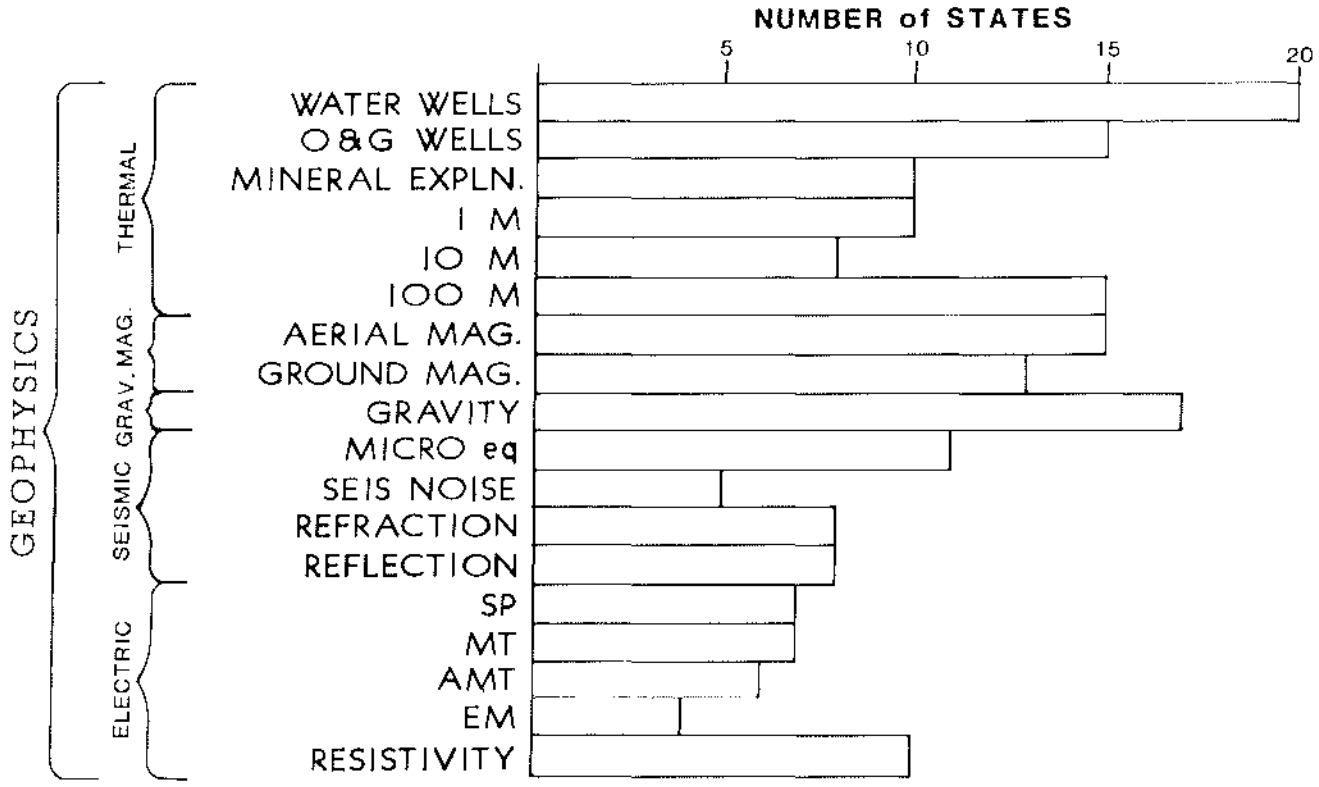

Figure 1 (cont.)

C) Geophysical Techniques

APPENDIX I

PARTIAL BIBLIOGRAPHY - STATE PROGRAM RESOURCE ASSESSMENT TEAMS

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APPENDIX II

CURRENT GEOTHERMAL DEVELOPMENTS AND RECENT LEGISLATION PENDING IN HAWAII STATE LEGISLATURE CONCERNING GEOTHERMAL ENERGY

University of Hawaii at Manoa

Hawaii Institute of Geophysics
2525 Correa Road • Honolulu, Hawaii 96822
Cable Address: UNIHAW

April 3, 1981

Carl Ruscetta
Technical Program Planner
Earth Science Laboratory
University of Utah Research Institute
420 Chipeta Way, Suite 120
Salt Lake City, UT 84108

Dear Carl:

Enclosed is a write-up on HIG's current geothermal developments and a listing of legislative bills that are active in the Hawaii State Legislature relating to geothermal energy,

I'll keep you posted of any progress.

Sincerely yours,

Donald Thomas
Geothermal Resource Assessment Program

DT:jd
encls.

Geothermal Resource Evaluation and Commercialization: Current Developments

The Geothermal Resource Assessment Program at the Hawaii Institute of Geophysics has completed resource evaluation work in two of the twenty potential geothermal sites tentatively identified during an earlier phase of work and is currently conducting exploration in six other areas. Data obtained at one of the two completed areas (Lualualei Valley on Oahu) is considered to strongly indicate the presence of a low- to moderate-temperature resource whereas surveys completed in the second area (Keaau on Hawaii) suggest that the identified anomaly in this area was due to other, non-geothermal, processes and that there is a very low probability that a resource is present.

The results of surveys in the six areas currently under investigation are as follows:

KAWAIHAE: Geochemical and geophysical results to date strongly suggest that a low-temperature resource may be associated with a prehistoric eruptive vent to the east of Kawaihae Bay.

HUALALAI: Geophysical results indicate that warm water may be present near the summit and along the upper west rift. Geochemical data apparently detect the movement of warm subsurface water down the southern flank of Hualalai.

SOUTH POINT: Very preliminary geophysical surveys have detected an apparent anomaly along the central lower flank of Mauna Loa although presence of heat is not at present confirmed.

HALEAKALA NORTHWEST RIFT: Geochemical data have tentatively located a thermal anomaly along the lower northwest rift although geophysical surveys have not as yet confirmed these initial results.

OLOWALU - UKUMEHAME CANYONS: Geochemical and geophysical anomalies strongly indicate a heat source to the northwest of the Ukumehame canyon. Warm ground waters at shallow depth further substantiate the presence of a nearby heat source.

LAHAINA-KAANAPALI: Geochemical surveys near geologically recent post-erosional volcanic centers suggest that a thermal anomaly may be present, however shallow geophysical soundings have not confirmed this interpretation to date.

Upon completion of the surveys in the above areas, resource evaluation work will be initiated in the following tentatively identified potential geothermal areas: Kaneohe-Waimanalo area (Koolau caldera) on Oahu, the Haleakala Southwest rift and the Kilauea Southwest rift area.

Interest in private development of the identified geothermal resources has been very strong during the last year with three companies actively seeking exploratory drilling permits and lease rights to the mineral resource. Two other private organizations have also expressed interest in the possibility of conducting exploratory work although no firm commitments have been made to date.

Barnwell Geothermal (in a joint venture with Geothermal Energy Development, Co.) and Thermal Power Company (in a joint venture with Dillingham Company) have acquired exploratory drilling permits in three separate locations along the Kilauea East Rift; a total of approximately twenty well site permits have been issued by the county of Hawaii. Barnwell Geothermal has completed one well and is presently preparing a site for a second. (Unfortunately no information has been officially released concerning the success of their initial effort.) Thermal Power Co. has obtained the

necessary permits for two wells and has announced that they will begin drilling in March or April of 1981. Mid-Pacific Energy Corporation has announced their intention to begin drilling operations in mid- to late 1981 and are presently preparing permit applications and negotiating for surface rights. Although they have not officially announced their drilling target, it is considered highly probable that they will begin exploratory drilling on the island of Maui.

Representatives from America Factors (Amfac) have also expressed interest in the possibility of using warm water from the Olowalu-Ukumehame canyon area for process heat in a nearby sugar mill, hot water-air conditioning in a resort complex, and possibly for an ethanol plant. They are presently evaluating the economic potential for these applications in light of the economic feasibility analysis recently completed by Puna Sugar Company. This study considered the direct use of high-temperature steam (generated from geothermal fluids at the Puna reservoir) in a sugar processing plant on the island of Hawaii. Although this study indicated that such an application would be profitable, the cost of such a project was estimated at approximately $21 million with a rate of return on the investment of only 15%.

In addition to the above, Occidental Geothermal, Arco, and Shell Oil Co. have all expressed limited interest in Hawaii's geothermal resources. None of these organizations, to date, have sought mineral leases or permit applications and therefore their level of interest is considered to be very tentative.

Two other projects that are presently nearing completion are the HGP-A Wellhead Generator Proof of Feasibility Project and the Dillingham Industrial Park Study. The Wellhead Generator Project has received delivery of most of

the major generation equipment and is expected to begin producing power by mid- to late April 1981. In conjunction with this effort, the county of Hawaii is presently investigating the feasibility of using waste heat from the geothermal brine in a direct-use/cogeneration evaluation and demonstration project. The direct use applications being considered are those most compatible with the existing agricultural and fisheries industries in the Puna district. The Dillingham Industrial Park Study, which is expected to be complete by early March 1981, has conducted an economic evaluation of a number of potential direct-use applications that are compatible with Hawaii's industrial, agricultural and natural resources base. Although the final evaluation is not yet available, preliminary data suggested that the most economically attractive "anchor industry" for a geothermal industrial park was an ethanol plant. Economically viable secondary industries colocated with the "anchor industry" included a cattle feed mill, papaya processing plant and a refrigeration plant. This study has also suggested that very few, if any, of the secondary industries could economically use geothermal energy without colocating with a major anchor industry such as an ethanol plant or an electrical generation facility. This conclusion is dictated largely by the initial expense of drilling a well to the depth (23,000 ft) required for recovering geothermal fluids of sufficient quality to be usable.

Status of Legislation Relating to Geothermal Energy, March 13, 1981

Bill	Purpose	Status
HB 266	To clarify State ownership of geothermal resources under privately owned land without mineral rights reservation.	Passed 2nd reading
HB 806 & SB 556	To clarify any ambiguities relating to the tax rate applicable to producers of electricity generated from alternate energy sources.	Passed 2nd reading in both Houses
HB 1408	To provide funds for demonstration and commercialization of geothermal steam, hot water, minerals in Hawaii County.	Passed 2nd reading
SB 1804	To provide funds to identify and determine the extent of the State's geothermal resources.	Passed 2nd reading