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November 30, 1983

Dr. John A. Mock
Director of Geothermal and
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U.S. Department of Energy
Washington, D.C. 20585

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RESEARCH AND ECONOMIC ANALYSIS DIVISION
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Dear Dr. Mock:

I herewith submit an unsolicited proposal to the U.S. Department of Energy for a grant of \$125,000 to the State of Hawaii Department of Planning and Economic Development for the purpose of carrying out a program leading to the designation of geothermal resource subzones throughout the State.

Act 296, enacted by the Hawaii State Legislature in 1983, requires the designation of "geothermal resource subzones" within the State; restricts the production, development and distribution of electricity from geothermal resources to the designated subzones; and requires social, economic, environmental and geologic hazard impact analyses to be made. The Department of Planning and Economic Development, in cooperation with the Department of Land and Natural Resources, and with the assistance of the U.S. Department of Energy, hereby proposes to conduct a one-year program to identify and establish geothermal resource subzones in accordance with the above Act. The objectives of the study, scope of work, budget, schedule and related support data are given in the enclosed proposal. Activities carried out under the proposed program will contribute directly to the establishment of a commercially viable geothermal industry in Hawaii carried out by the private sector.

Your favorable action on this proposal would be greatly appreciated. Please feel free to contact me at (808) 548-4150 if you have any questions concerning this proposal.

Sincerely,

Takeshi Yoshihara
Takeshi Yoshihara
Energy Program Administrator

TY/NCF:1s
Enclosure

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DIV. OF WATER &
LAND DEVELOPMENT

An Unsolicited Proposal

For Financial Support from the
U.S. Department of Energy

To the State of Hawaii
Department of Planning and Economic Development

For Designating Geothermal Resource Subzones
in the State of Hawaii

The State of Hawaii is on the threshold of achieving substantial energy self-sufficiency with the discovery of geothermal resources in commercial quantities within the State. Energy production from geothermal resources has been successfully demonstrated on the Island of Hawaii. The HGP-A demonstration power plant, located in the Puna District, Hawaii County, is producing three megawatts of electrical energy which is being delivered to the Hawaii Electric Light Company. This provides sufficient electricity to meet the demands of several nearby communities.

This demonstration plant has attracted two commercial developers--the Puna Geothermal Venture (a consortium of Thermal Power Company, AMFAC, Inc., and Dillingham Corporation) and the GEDCO-Barnwell Industries--which are pursuing active exploration to develop commercial-scale geothermal powered electric power plants. A third company, True/Mid-Pacific Geothermal Venture, has been conducting surveys and locating potential drilling sites on Campbell Estate property near the Volcano National Park, and on the Island of Maui.

Although Hawaii's geothermal resources have yet to be developed on a commercial scale, widespread community opposition has been expressed during exploratory drilling activities and demonstration operations. These concerns prompted the 1983 Hawaii State Legislature to enact legislation to provide for geothermal resource developments by designating "geothermal resource subzones" within the four Land Use Districts of the State and to evaluate the social, economic, environmental, and geologic hazard impacts that might result from exploration, development, and the production of electrical energy from geothermal resources.

Act 296 provides that an assessment of each potential geothermal resource subzone be made using currently available information and including the following factors:

1. The area's potential for the production of geothermal energy;
2. The prospects for the utilization of geothermal energy in the area;

3. The geologic hazards that potential geothermal projects would encounter;
4. Social and environmental impacts;
5. The compatibility of geothermal development and potential related industries with present uses of surrounding land and those uses permitted under the general plan or land use policies of the county in which the area is located;
6. The potential economic benefits to be derived from geothermal development and potential related industries; and
7. The compatibility of geothermal development and potential related industries with the uses permitted under sections 183-41 and 205-2, where the area falls within a conservation district.

Act 296 further requires that after the above assessment on a county-by-county has been completed, a comparison of all areas showing geothermal potential within each county shall be made, and areas for potential designation as geothermal resource subzones selected based upon a preliminary finding that the areas are those sites which best demonstrate an acceptable balance among the factors listed above.

Sources of currently available information include the following agencies:

- * University of Hawaii Institute of Geophysics
- * State Department of Planning and Economic Development
- * State Department of Land and Natural Resources
- * U.S. Geological Survey

The State Department of Planning and Economic Development, working in cooperation with the Department of Land and Natural Resources, proposes a one-year program to identify and establish geothermal resource subzones in the State of Hawaii, based on developments in areas having the least social and environmental impacts. Estimated costs for this one-year program are as follows:

Phase I.	Statewide assessment of potential geothermal resources.....	\$40,000
Phase II.	Social, economic, environmental, and hazard impact analysis for first-cut areas.....	\$60,000
Phase III.	Public participation and information.....	\$20,000

Phase IV.	Designation of geothermal resource subzones.....	\$20,000
Phase V.	Social, economic, environmental, and hazard impact analysis for second-cut areas.....	\$35,000

First-cut subzones are defined as areas in which available information indicates the greatest potential for near-term geothermal development. Second-cut areas include other potential development sites.

Study Objectives and Scope

The objective of the study is to designate geothermal resource subzones in the State of Hawaii for the purpose of concentrating all geothermal related activities in areas having minimum social, economic, environmental and hazard impacts in accordance with Act 296, SLH 1983, enacted by the Hawaii State Legislature and approved by Governor George R. Ariyoshi.

Areas of geothermal potential in the State of Hawaii will be identified, and impact assessments of these areas will be conducted on a county-by-county basis.

Study Approach

Based upon the provisions of Act 296, SLH 1983, the following five-phase study approach has been developed for designating geothermal resource subzones.

Phase I. Statewide Geothermal Resource Assessment

This phase will focus upon geotechnical information, its interpretation and analysis of potential geothermal resources on all of the major islands. Due to the time constraints of completing the work by December 1984, available studies will be heavily used with minimal new studies and data gathering. First-cut subzones based only on the availability of geothermal resources will be mapped to conclude Phase I work.

Phase II. Social, Economic, Environmental, and Hazard Impact Analysis

Impact analysis of social, economic, environmental, and geologic hazards will be conducted on the first-cut subzones completed in Phase I. Experts in several disciplines will participate in this phase. Overlay mapping of the impacts will be extensively used to identify highly sensitive impact areas. Adjustments to the first-cut subzones will be made to conclude Phase II work.

Phase III. Public Participation and Information

Communities located in close proximity to the identified subzones will be extensively involved in this phase. Informational meetings will be conducted to explain the technical work and the impact analyses. Comments from the public will be solicited and further adjustments to the subzone are expected to be made as a result of the public involvement.

Phase IV. BLNR Designation of Geothermal Resource Subzones

This phase is expected to involve the Board of Land and Natural Resources which has the responsibility for designating areas as geothermal subzones as provided in Act 296. Briefing sessions will be conducted by the staff on both the technical analysis and the impact analysis. Public input will be described and documented.

The BLNR is expected to hold public hearings leading to the formal designation of the geothermal resource subzone.

Phase V. Impact Analysis of Second-cut Subzones

Impact Analysis of social, environmental and hazard impacts will be conducted on the second-cut subzones, particularly in the County of Maui.

Study Management and Budget

Lead Agency and Study Participants

Act 296, SLH 1983, designated the Board of Land and Natural Resources with the responsibility for designating geothermal resource subzones. The Chairperson has assigned the subzone task to the Division of Water and Land Development (DOWALD) and has designated the Division's Manager-Chief Engineer as the principal contact person.

For the purpose of this proposal the Department of Planning and Economic Development (DPED) will act as lead agency. DOWALD will be responsible for day to day management.

Role of Other Agencies

1. Hawaii Institute of Geophysics (HIG), University of Hawaii:

The HIG has technical expertise on its staff and has completed preliminary assessments of geothermal resource in the State of Hawaii. This available information and expertise will be utilized by DLNR for the assessment phase. Under HIG, the resource and production data for the existing HGP-A geothermal well will be made available for the assessment work.

2. Department of Planning and Economic Development (DPED):

The Energy Division of DPED has made available \$50,000 for use by DLNR in the subzoning work. DPED also has a resource library related to geothermal development which will be made available to the program.

3. Department of Health (DOH):

The Health Department is expected to establish odor and noise standards and to promulgate these requirements into Administrative Rules for implementation. Impact analysis relating to the health of people will be based upon available standards or guidelines.

4. State Land Use Commission (LUC):

Land use activities on agricultural district lands of at least 15 acres or more in size require State Land Use Commission approval. The LUC will be involved in the administration of subzones designated on these lands.

5. County Planning Departments:

Agricultural, urban, and rural district lands are administered by the four County Planning Departments. As such, geothermal development activities within designated subzones would require County zoning approvals prior to implementation.

6. Puna Geothermal Resource Developers:

Currently, two private developers are actively engaged in the exploration of geothermal resource in the Puna area. The Puna Joint Venture (Thermal Power Company, Amfac, Dillingham) and Barnwell Corporation have developed information and may be willing to share their information and expertise with the State in subzoning assessment activities. The same is expected from True/Mid-Pacific Geothermal Venture, which has been conducting surveys and locating potential drilling sites in nearby areas and on the Island of Maui.

Budget Details

In enacting Act 296, SLH 1983, the Legislature did not provide funds specifically identified for implementation of this program. The State Administration has nonetheless selected Act 296 as a high priority program for implementation for Fiscal Year 1983 in order to facilitate the orderly development of geothermal energy. State funds in the amount of \$50,000 have been reprogrammed in order to initiate the work required.

Fiscal Year 1983-84 (July 1, 1983 - June 30, 1984)

\$50,000 has been made available by DPED to partially support planned FY 1983-84 activities. The breakdown of other expenditures required during this fiscal year are estimated as follows:

Hire full-time Geologist I @ \$1,800.00 (SR-24) (9 months)...	\$16,200
Hire full-time Geologist I, (6 months).....	\$10,800
Fringe Benefits (25%).....	\$ 6,750
Other miscellaneous expenses (travel, supplies, etc.).....	\$ 3,000
Information gathering, including mapping.....	\$ 5,000
Promulgation of Administrative Rules.....	\$ 4,500

Assessment of Geothermal Areas, \$2,000/month x 6.....	\$12,000
Impact Analysis, \$3,000 x 4.....	\$12,000
Public Participation and review.....	\$10,000
Equipment.....	<u>\$ 250</u>
Total FY 1983-84.....	<u>\$80,500</u>

Fiscal Year 1984-85 (July 1, 1984 - June 30, 1985)

Principal activities for FY 1984-85 involve the designation of subzones by the BLNR and public information and review. Completion of the project is scheduled for December 1984, involving the following costs:

Personnel Services.....	\$27,000
Designation of Subzones.....	\$10,000
Other Current Expenses.....	\$ 2,500
Public Information and Review.....	<u>\$ 5,000</u>
Total FY 1984-85.....	<u>\$44,500</u>
TOTAL DOE Funds.....	<u>\$125,000</u>