August 30, 1977

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
Kamamalu Building, 250 South King St., Honolulu, Hawaii • Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Mr. William Thompson
Chairman
Department of Land and Natural Resources
State Office Building
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Enclosed is a copy of the Environmental Impact Statement Preparation Notice, for the Geothermal Research Facility Project at Puna, Hawaii. This notice was submitted to the Environmental Quality Commission on August 30, 1977.

Because of your keen interest and involvement with the Puna Geothermal project, we are requesting your comments on the project at this time. Your comments will assist us in the development of the Draft Environmental Impact Statement which is required for the project.

We appreciate your cooperation in this matter.

Sincerely yours,

HIDETO KONO
Director
ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE
GEOTHERMAL RESEARCH FACILITY
UTILIZING THE HGP-A WELL AT PUNA, HAWAII

1. Proposing Agency
Department of Planning and Economic Development, State of Hawaii

2. Agencies and Organizations Consulted
a. Federal:
   (1) Energy Research and Development Administration

b. State:
   (1) University of Hawaii Geothermal Project
   (2) Department of Land and Natural Resources
   (3) Department of Health
   (4) Attorney General's Office
   (5) Environmental Center, University of Hawaii

c. Hawaii County:
   (1) Office of the Mayor
   (2) Department of Planning
   (3) Department of Research and Development

d. Private Parties:
   (1) Hawaiian Electric Company
   (2) Hawaii Electric Light Company
   (3) Kapoho Land and Development Company

3. Project Description
In 1976, a geothermal well was drilled to 6,450 feet on a site located in Puna, about 21 miles southeast of Hilo. The drilling culminated a three-year project, jointly financed by ERDA within the Federal Government, the State of Hawaii, the County of Hawaii, and with additional support from the Hawaiian Electric Company, to ascertain if there was an economically useful geothermal resource along the rift zones radiating from Kilauea Volcano. The test well, HGP (for Hawaii Geothermal Project)-A, has yielded temperatures and pressures from a water-dominated geothermal reservoir capable of generating up to 4 megawatts of electrical power, which makes the resource decidedly of economic interest.
As a continuation of the exploratory drilling project, it is now proposed to install a wellhead generator for the creation of electrical energy along with a research facility designed to investigate problems of reservoir engineering and geothermal power production. The Hawaii Electric Light Co. intends to purchase much of the power produced, some 3 megawatts, for distribution in its grid on the Big Island. The project will also accommodate R&D field experiments in the use of geothermal energy, such as the direct application of the hot water to agricultural and industrial processes. Estimated capital costs of the project range from $3,100,000 to $6,447,000, depending on the generator and other equipment which ERDA agrees to fund.

The well and the proposed geothermal research facility is on 4.1 acres of land, traversed by the 1955 lava flow, owned by the Kapoho Land and Development Company (Tax key 1-4-01:2 (por.)). The site is already fenced to limit access to the well and the equipment at the wellhead. Since the site is immediately off the Pahoa-Pohoiki Road, there is no problem of access. There is a 34.5 Kv overhead transmission line with a power-handling capacity of approximately 2 MWe in the vicinity of the site which the Hawaii Electric Light Co. proposes to extend to the generator.

The project site is being leased from the Kapoho Land and Development Co.

4. Project Organization

The project will be conducted under the direction of the HGP-A Development Group (HGP-A/DG) made up of representatives of the State of Hawaii Department of Planning and Economic Development (the lead agency for the group), the County of Hawaii, the University of Hawaii (the Hawaii Geothermal Project), and the Hawaii Electric Light Co. (HELCO).

Design and installation of the geothermal research facility will be accomplished with the Research Corporation of the University of Hawaii (RCUH) serving as administrative agency. Operation of the generator will probably be by HELCO; RCUH will manage the research and test facility.

5. Public Policy Objectives

A major purpose of the project is to further understanding of geothermal resources on the Island of Hawaii and to encourage their development as a means of reducing Hawaii's present dependence on imported petroleum. A related purpose is to stimulate development of an energy base for a more diversified local economy.

6. Potential Significance of Project

The immediate economic impact of the project is limited; three megawatts will add only a tiny increment to the power supply and productivity of the Big Island. As a research and development facility, however, the project may be of critical importance to geothermal development in Hawaii as it: helps determine the quantity and quality of the geothermal
resource at Puna; works out applications to that resource of existing and new technology; and demonstrates the application of geothermal resources to a variety of economic uses. The results may be significant environmentally, as well as economically, by stimulating the development of an indigenous energy source which is less polluting or less dangerous than the alternatives which may otherwise be adopted, namely continued use of oil, introduction of coal, or construction of nuclear reactors to power Hawaii's electrical energy systems.

7. Environmental Setting

The project is in a relatively unpopulated section of Puna, some four miles from the nearest center of settlement at Pahoa. Puna Sugar Company's nearest land is about three miles to the west; there is a large papaya growing area approximately two miles to the east. A subdivision lies nearer to the east and across the highway to the south, but only one house is within a radius of one-half mile; within one mile of the site there are approximately a dozen scattered houses.

The site is covered with aa lava from a recent (1955) flow and with the vegetation common to such areas: lichen, ferns, ohia lehua saplings, some wild orchids, nutgrass and other grasses, and a few coconut palms. Tree ferns and a variety of other ground covers, none of them rare or of much economic value, are found further off, within a mile radius. The Lava Tree State Park, about three-fourths of a mile towards Pahoa to the west, is of special interest both scientifically and as a visitor site.

No rare or endangered species of plants, animals, or birds were found in biological studies. A survey for archeological sites near the project also yielded negative findings. There are no potable water sources within several miles of the project site; the nearest wells have been and will continue to be monitored to ascertain if the geothermal well has any effects on the ground water supplies of Puna; no effects have been found.

As is true of much of the Puna District, the area near HGP-A receives relatively high amounts of SO\textsubscript{2} and H\textsubscript{2}S from the fumeroles in and around the Hawaii Volcanoes National Park when the winds blow from the Park area, some 25 miles to the west. As in other geothermal areas elsewhere in the world, the air, water and soil in Puna contain above-average quantities of mercury, but these are not significantly added to by the operation of the well.

8. Summary of Major Potential Impacts of the Project

a. Without proper safeguards, the environment could be polluted by unmuffled noise from the wellhead-generator and by the smell of H\textsubscript{2}S vented into the atmosphere from the well operation. (Actual toxicity is not a factor.)
b. Without adequate security measures, the project could be an attractive nuisance, dangerous to persons blundering into the production-experimental facility.

c. Visually, the chief impact of the installation will be a cooling tower, needed to condense the vapor emitted by the generator.

9. Impacts Which Do Not Offer Significant Problems

a. Installation of the wellhead generator and equipment for testing other applications of the geothermal fluid will not take long, nor require new roads or other incursions on the adjacent land.

b. Removal of effluent hot water is not a problem because (i) the rate of discharge is relatively small -- some 60 gallons per minute -- and (ii) the cinder cover and lava underneath are highly porous. Hence, the effluent will be directed to settling basins within the fenced-off project area, where it will percolate through the lava to the reservoir below. Since the geothermal fluid is high in silica, the basins will be back-hoed as they are coated over, to restore porosity.

c. Since only a few supervisory and custodial employees will be stationed at the project and the numbers of scientists/technicians using the research facility will not be great at any time, problems of housing and associated infrastructure needs will not arise, except for installing a cesspool for waste disposal. The site may become a stop for tour buses, but it is not planned to admit casual visitors into the project area, which is protected by a high chain fence. There is room for off-road parking.

d. Since the intake of the geothermal well is far below the level of ground water and since the effluent will nowhere approach any water well, the operation of the geothermal well does not impact on the ground water supply. Water from the rain catchment systems of houses sampled within five miles of the site yielded no detectable amounts of metals, H₂S or other undesirable elements emanating from the well.

10. Measures to Mitigate Potential Adverse Impacts of the Project

a. Noise should not be a problem when the generator is in operation, since the steam from the well will be piped to the turbines and the entire generator unit is enclosed in a structure. On those occasions when the flow is diverted while maintenance operations are carried on, a set of mufflers will hold down the decibels to levels no greater than those now experienced prior to installation of the generator. Fans in the cooling tower will be balanced to reduce noise.
b. Scrubbing equipment will be installed to reduce the level of \( \text{H}_2\text{S} \) in emissions from the generator well below the health hazard range to a level where it is not a nuisance.

c. Wood fencing and landscaping will somewhat reduce the visual impact of the installation on the grey-green landscape of the lava fields.

11. Alternative Sites

The site for the HGP-A well was selected by geophysicists as the most promising of the land available for drilling to reach a geothermal reservoir. Given the placement of the well, the research and demonstration facility must be immediately adjacent, for it would be costly, technically inefficient, and environmentally disruptive to pipe the hot water from the well any great distance.

12. Determination of Need for E.I.S.

Because this project is being conducted by State agencies, and because it is intended to stimulate a new energy development of potentially great effect, it is determined that an Environmental Impact Statement should be prepared, even though the direct effects of the project on the environment are deemed to be minor. This statement, therefore, is being submitted as a Preparation Notice for the E.I.S.
Dear Property Owner: TMK: 1-4-01/4, 1-3-44/5

Special Permit Application
Kapoho, Puna, Hawaii
Tax Map Key 1-4-01:portion of 2

You are hereby notified that a request for a special permit to allow the establishment of a geothermal research facility and to conduct flow tests on approximately 4 acres of land situated within the State Land Use Agricultural District has been submitted by the petitioner, State of Hawaii Department of Planning and Economic Development.

The property involved is located about one mile makai of Lava Tree State Park on the east side of Pohoiki Road, Kapoho, Puna, Hawaii.

A public hearing on the subject among others will be held beginning at 7:00 p.m. on Thursday, February 23, 1978, in the Councilroom, County Building, South Hilo, Hawaii.

You are invited to comment on the application at the hearing or submit written comments prior to the hearing date.

Sincerely,

Sidney M. Fuke
Director
SPECIAL PERMIT REQUEST

TO INSTALL A GEOTHERMAL RESEARCH FACILITY AND TO CONDUCT FLOW TESTS

KAPoho, Puna, Hawaii

TAX MAP KEY: 1-4-01: PORTION OF 2

APPLICANT: DEPARTMENT OF PLANNING & ECONOMIC DEVELOPMENT

STATE OF HAWAII

JAN. 19, 1978