



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP - 6 2000

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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JANET E. KAWELO

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Ms. Virginia Goldstein, Director
Planning Department
County of Hawaii
25 Aupuni Street, Room 109
Hilo, Hawaii 96720-4252

Dear Ms. Goldstein:

Amendment to Geothermal Resource Permit (GRP 2)
Applicant: Puna Geothermal Venture
TMK: 1-4-1: Por. 2, 3, Por. 19, and 53

Thank you for the opportunity to comment on the permit amendment. We offer the following comments as requested by your letter of August 9, 2000. Underlined text is new, bracketed text is to be deleted, and comments are noted in italics.

Page 2, Paragraph C., Fourth Bullet, First Sentence:

Rules on Leasing and Drilling of Geothermal Resources [Standards] promulgated by the Department of Land and Natural Resources (HAR Title 13, Chapter 183), effective [May 19, 1978, amended] June 22, 1981.

Page 8, Paragraph I., Third Subparagraph, Second Sentence:

[The Geothermal Compliance Specialist from the State of Hawaii Department of Land and Natural Resources (DLNR) is on site daily to monitor compliance with emission standards.] *Air emissions are monitored by the State Department of Health, not the DLNR.*

If there are any questions regarding our comments, please contact Mr. Dean Uchida, Land Administrator, in Honolulu at 587-0446.

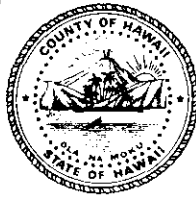
Aloha,

A handwritten signature in black ink, appearing to read "Timothy E. Johns".

TIMOTHY E. JOHNS

bc: Eric Tanaka

Stephen K. Yamashiro
Mayor



Virginia Goldstein
Director

Russell Kokubun
Deputy Director

County of Hawaii


PLANNING DEPARTMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8742

August 9, 2000

MEMORANDUM

<p>TO: DPW – Hilo DWS CIVIL DEFENSE POLICE FIRE TAX OFFICE ✓DLNR – Land Div (Hnl) DLNR – SHPD (Hnl) DLNR – Land Mgmt (Hilo) DOT – Hilo/Hnl</p>	<p>STATE LUC DEPT OF AG NR SOIL CONS (Hilo) LEILANI ESTATES COMM ASSN PUNA COMMUNITY COUNCIL PELE DEFENSE FUND SIERRA CLUB HILO STAFF – MINISTERIAL (See File) HILO STAFF – LR PLANNING (See File) HEALTH</p>
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FROM: Virginia Goldstein
Planning Director 

SUBJECT: Geothermal Resource Permit (GRP 2)
Request: Amendment to Permit
Applicant: Puna Geothermal Venture
TMK: 1-4-1: Por. 2, 3, Por. 19, and 58

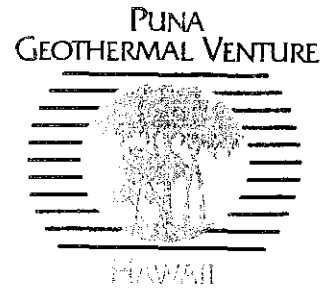
The enclosed application for an amendment to Geothermal Resource Permit (GRP 2) is being forwarded for your review. May we please have your written comments by September 6, 2000. Otherwise, we will assume that you have no comments or objections on the request.

Thank you very much.

Enclosure

PF:jkg
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Post Office Box 30
14-3860 Kapoho Pahoia Rd.
Pahoia, Hawaii 96778
Telephone (808) 965-6233
Facsimile (808) 965-7254



2000 JUL 5 PM 4 22

PLANNING DEPARTMENT
COUNTY OF HAWAII

July 5, 2000

Virginia Goldstein
Planning Director
County of Hawaii
25 Aupuni Street, Room 109
Hilo, HI 96720

RE: Application For Amendment To Geothermal Resource Permit (GRP 87-1)
Applicant: Puna Geothermal Venture
Kapoho, Hawaii: Tax Map Key (3) 1-4-01: por. 2, 3, por. 19, and 58

Dear Ms. Goldstein:

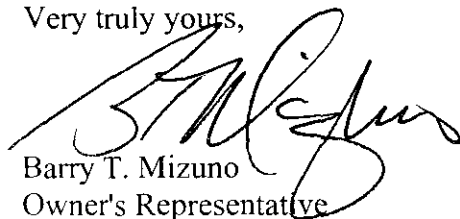
Pursuant to Rule 12-9(a), Planning Commission Rules of the County of Hawaii, enclosed herewith for your review and analysis please find original and twenty-five (25) copies of Puna Geothermal Venture's (PGV) Application For Amendment To GRP 87-1 and the proposed amendments to GRP 87-1 conditions, along with referenced attachments. We also enclose the filing fee of \$1,000 required for this amendment request.

PGV is requesting that GRP 87-1 be amended to allow PGV to generate up to 60MW of electricity on site consistent with applicable regulatory standards and permits utilizing new technology and equipment upgrades. PGV is also requesting the amendment of the conditions of the GRP to incorporate regulatory standards and permit requirements that have been promulgated and issued since the GRP was originally approved in 1989.

Please note that Attachment A contains the language of the original conditions for which amendments are requested, along with the language of the proposed amendments to the conditions of the permit, together with a brief statement of the reasons for the amendments.

Please contact me if you should have any questions concerning this matter. Otherwise, we look forward to receipt of notice of the acceptance at the earliest possible date.

Very truly yours,

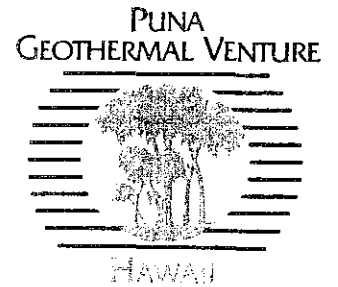


Barry T. Mizuno
Owner's Representative

Enclosures

T:\BTM\GRP\GRP 87-1 Planning App Ltr.doc

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2000 JUL 27 PM 4 30
PLANNING DEPARTMENT
COUNTY OF HAWAII

July 25, 2000

Ms. Virginia Goldstein, Director
Hawaii County Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Dear Ms. Goldstein:

As a matter of clarification, Puna Geothermal Venture's (PGV) application for a modification to the Geothermal Resource Permit (GRP) referred to Kapoho Land Partnership (KLP) as the landowner. Technically, while PGV leases the project site from KLP, ownership of the land was retained by Kapoho Land and Development Company, Limited (KLDC). Mr. Arthur Lyman serves as Senior Vice President of KLDC and is an authorized signer.

We look forward to working with you and your staff in the coming weeks.

Very truly yours,

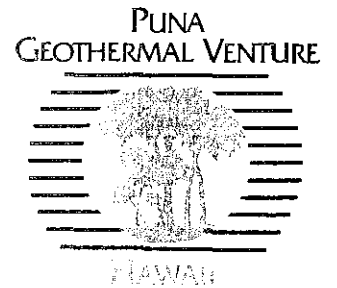

Barry T. Mizuno
Owner's Representative

cc. Arthur Lyman

ref.0725grp

07/25/00

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 Paho, Hawaii 96778
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2000 JUL 27 PM 4 32
 PLANNING DEPARTMENT
 COUNTY OF HAWAII

July 27, 2000

Virginia Goldstein
 Planning Director
 County of Hawaii
 25 Aupuni Street, Room 109
 Hilo, HI 96720

RE: Additional Information Requested For Geothermal Resource Permit Application
 (GRP-2) Kapoho, Hawaii: Tax Map Key (3) 1-4-01: por. 2, 3, por. 19, and 58

Dear Ms. Goldstein:

Pursuant to your letter dated July 24, 2000, and in accordance to Rule 12-9(a), Planning Commission Rules of the County of Hawaii, enclosed please find twenty-five (25) copies of Exhibits requested. In addition, clarifications on other specific issues have been addressed. Exhibits enclosed are as follows:

Exhibit	Description
A.	Hawaii Administrative Rules Title 11, Chapter 46 Community Noise Control Program
B.	Department of Health UIC Permit
B.1	State of Hawaii Administrative Rules UIC Title 11, Chapter 23
C.	Hydrological Monitoring Program
D.	Emergency Response Plan Version 6.3 provided previously therefore not included
E.	Department Of Health Clean Air Branch (NSP) Permit
F.	Current PGV safety procedures- 2 copies on floppy disk
G.	State Noise Permit
H.	Department of Health Noise Standards same as Exhibit A, above
I.	State Ambient Air Pollution Control Standards
J.	Department of Land and Natural Resources Standards

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In response to your other questions, the following responses correspond to questions on your July 24, 2000 letter.

2. The statement "during periods of construction" is intended to include the installation of new equipment, new wells drilled, and new piping installed at the facility. No drilling is anticipated during the period June through December, 2001.
3. Exhibits A, B.1, I, and J provide the standards referred to on page two of our submittal. As a general overview, the State Noise Standard establishes a State-wide uniform control limit on noise emissions based upon land use classifications. The State Underground Injection Control (UIC) Standard has established a uniform, State-wide standard for protecting the underground safe drinking water and preventing hazardous waste from being injected into the aquifer. The State Department of Land and Natural Resources Standards established controls to ensure safety during operations and construction, and the mechanical integrity of all production and injection wells.
4. PGV is one of the largest employers in the Puna District and receives many requests for assistance in community projects. Some of these projects are listed below:
 - o Provided equipment and operators to clear additional area for expansion of the farmers market, and to relocate a church previously located in Kalapana
 - o Provided water tankers to the Hawaii County Fire department to mitigate the fires in the Leilani Estates sub-division.
 - o Provided financial assistance for local sports activities and programs
 - o Provided financial support for organizations such as YMCA, American Cancer Society, Food Bank, and Nanawale Pre-School, etc.
 - o Annual Scholarships for Pahoia High School seniors to attend UH-Hilo and HCC.
5. PGV has provided safety procedures and guidelines in training our emergency responders (Exhibit F). This training provides the necessary skills for dealing with any potential emergencies. PGV has established an internal Incident Command system. There are four incident commanders that have been trained to coordinate mitigation response as required in an emergency. Also, PGV has interfaced with the County Police, Fire, and HAZMAT emergency responders to coordinate training and to familiarize these outside responders with the PGV facility.
6. Phase 1 of the expansion does not include drilling of a new well. It is our intent to add new wells in future phases as the need arises. At this time, no additional drilling pads, other than those previously approved in the GRP, are being requested.

Please contact me if you should have any questions concerning this matter. We look forward to receipt of notice of the acceptance at the earliest possible date.

Very truly yours,



Barry T. Mizuno
Owner's Representative

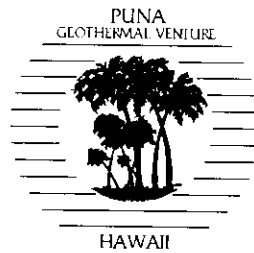
Enclosures: Exhibits

Cc: Mike Kaleikini
Darren Hunt

2000 JUL 5 PM 4 26

PLANNING DEPARTMENT
COUNTY OF HAWAII

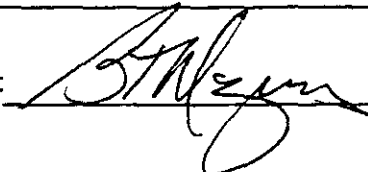
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Application
for Amendment
to GRP 87-1

**GEOHERMAL RESOURCE PERMIT APPLICATION
COUNTY OF HAWAII
PLANNING COMMISSION**

APPLICANT: Puna Geothermal Venture

APPLICANT'S SIGNATURE: 

MAILING ADDRESS: P.O. Box 30, Pahoa, HI 96778

TELEPHONE: (BUSINESS) (808) 965-6233 (HOME) _____

LANDOWNER: Kapoho Land Partnership

LANDOWNER'S SIGNATURE: 

TAX MAP KEY: 1-4-01: por. 2, 3, 19, and 58

NATURE OF DEVELOPMENT: Geothermal Electric Generation

THE APPLICANT SHALL SUBMIT THE FOLLOWING:

- A. Non-refundable filing and processing fee of one thousand dollars.
- B. Original and twenty-five copies of:
 - 1. Application form; and
 - 2. Written and graphic descriptions of the property and the geothermal development activity as outlined under Section 12.3 of the Planning Commission's Rule 12.

0373q 2/26/87

**PUNA GEOTHERMAL VENTURE
APPLICATION FOR AMENDMENT TO
GEOTHERMAL RESOURCE PERMIT NO. 87-1**

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ATTACHMENTS:

- (A) Proposed Amendments to GRP 87-1 Conditions
- (B) Power Plant/Wellfield/Location Layout
- (C) Parcel Map Describing PGV's Power Plant and Delivery System Easements
- (D) Power Plant/Wellfield Process Flow Diagram
- (E) Drawing of Typical Production Well
- (F) Drawing of Typical Injection Well
- (G) Electrical Distribution System
- (H) Topographic Map of Area
- (I) Average Daily Maximum H₂S 1999
- (J) Average Daily Maximum Noise Levels 1999
- (K) PGV Project Expansion - Phase I
- (L) Photo of Drilling Rig

**PUNA GEOTHERMAL VENTURE
APPLICATION FOR AMENDMENT TO
GEOTHERMAL RESOURCE PERMIT NO. 87-1**

Introduction

Description of Proposed Amendments

Pursuant to Rule 12-9(a) of the Planning Commission Rules, Puna Geothermal Venture (PGV) requests the County of Hawaii Planning Commission's approval of certain amendments to the existing Geothermal Resource Permit (GRP) issued October 3, 1989.

In light of the increased demand for energy production since the issuance of the GRP, PGV seeks an increase in the maximum level of electricity which may be generated by PGV's geothermal operation.

When the GRP was issued in 1989, the Island of Hawaii consumed a peak of 130 MW of electrical energy. Consumption since then has steadily increased to a 170 MW peak in 1999. With the anticipated growth of the Island, it is expected that the peak requirement will increase 3-4 MW each year. PGV proposes to help meet this growing energy need and can do so within the next two to five years with its existing production wells. In addition, the ability to add to the generating capability of the plant could be done in a cost effective manner without increasing any risk to public health or welfare.

In the past twelve years, there have been advancements in the technology and methodology of generating electricity from geothermal steam. PGV seeks the ability to use more efficient and effective equipment in its operation and has provided herein certain amendments in the description of the categories of equipment that can be used.

Since the GRP was originally issued, much has also transpired in the context of the regulation of geothermal energy production. Permits and regulatory oversight by other agencies with expertise in the area now overlap some of the existing conditions of the GRP. Specific standards relating to matters such as noise and air emissions have since been promulgated by other agencies. Amendments are proposed to GRP conditions to acknowledge the jurisdiction of other agencies and to diminish inconsistency and overlapping with the standards and requirements of other agencies.

The passage of time also requires a review of the original structuring and administration of the Geothermal Asset Fund that was established pursuant to the terms of the GRP and to which PGV has made annual contributions of \$50,000. The fund is now in excess of \$1 Million and continues to earn interest. The total amount of claims against the Geothermal Asset Fund which have been approved since the inception of the Fund do not exceed \$1,800.

In light of the above, PGV respectfully requests that the Planning Commission approve GRP amendments in the following areas:

- A. Provide PGV with the ability to generate up to 60 MW of electricity on site consistent with permits and standards approved by the Department of Health and Department of Land and Natural Resources.
- B. Provide PGV with the flexibility and ability to utilize new technology and methodology to modify/upgrade existing equipment and/or install additional generation equipment to meet the power generation demands utilizing natural geothermal steam.
- C. Update/amend the GRP to reflect current oversight/regulatory responsibility over PGV activities by other agencies. Such oversight responsibilities had not previously been delineated or included in the GRP. Currently, the State of Hawaii has promulgated Hawaii Administrative Rules (HAR) addressing the following:
 - Noise Standards promulgated September 23, 1996 by the Department of Health (HAR Title 11, Chapter 46, Community Noise Control). These standards set specific daytime and nighttime limits on permissible sound levels at the property line, based on applicable zoning designations.
 - State Ambient Air Pollution Control Standards promulgated November 26, 1993 by the Department of Health (HAR Title 11, Chapter 60.1). These standards establish permit requirements for activities which may involve the emission of air pollutants and establish guidelines, reporting requirements and procedures for such activities. The permissible ambient levels of hydrogen sulfide (H₂S) are also established through these rules and the Noncovered Source Permit (NSP) issued to PGV.
 - Underground Injection Control Standards promulgated by the Department of Health July 6, 1984, amended November 12, 1992, relating to geothermal injection wells (HAR Title 11, Chapter 23). These standards provide regulatory authority by the Department of Health over the construction and operation of PGV's injection wells in order to protect the integrity of groundwater resources.
 - Leasing and Drilling of Geothermal Resources Standards promulgated by the Department of Land and Natural Resources May 19, 1978, amended June 22, 1981. These standards govern the leasing and drilling of geothermal wells by PGV and the proper use of blowout prevention equipment.

A. Description of the Property and Geographic Description of the Facility

The Puna Geothermal Venture project is located approximately 21 miles southeast of the City of Hilo in the Puna District of the Island of Hawaii, TMK: 1-4-01: por. 2, 3, por. 19 and 58. The project occupies approximately 25 acres of surface area within approximately 500 acres in the Kapoho section of the Kilauea Lower East Rift Geothermal Resource Subzone.

B. Description of Current Operations and Proposed Uses

PGV is currently operating an electrical generating power plant facility which produces an average net generation of 30 MW. The facility consists of three production wells and three injection wells. The newest of the three production wells was drilled and flow tested in November, 1999. Subsequently, it was found that the new production well KS-11, by itself, has the capability of producing approximately 30 MW nominally. The current GRP, however, has a limitation of 30 MW average net output, utilizing the 10 Ormat Energy Converter (OEC) electrical generating units.

PGV proposes to add additional generating equipment and/or upgrade existing units to generate additional electricity. This would involve the removal of several of our existing skid mounted generating units and replace them with newer, more efficient units, and/or the addition of one additional in-line turbine generator down stream of the separation system which would generate additional power, while serving as a step-down valve to reduce the main steam pressure to the existing generating units.

These upgrades and additions are not expected to use additional space or affect the safe operation of the facility. As such, there would be no additional impacts to the community or adverse impacts to the environment. If such equipment changes and additional megawatts are granted, PGV would also be required to comply with all applicable State and Federal permitting requirements.

C. Current Site Plan of the Facility

In the attachment section are maps and drawings describing the facility's uses, locations of structures, drilling sites, wells, access roadways, water sources, wastewater collection and disposal systems, geothermal steam and brine collection disposal systems, power plant, and electrical distribution systems.

Attachments are as follows:

- Power Plant/Wellfield/Location Layout (Attachment B)
- Parcel Map Describing PGV's Power Plant and Delivery System Easements (Attachment C)
- Power Plant/Wellfield Process Flow Diagram (Attachment D)
- Drawing of Typical Production Well (Attachment E)
- Drawing of Typical Injection Well (Attachment F)
- Electrical Distribution System (Attachment G)

Consistent with the standards listed above, the respective agencies have issued the permits listed in the Chronology listed below, which permits provide additional site specific standards and conditions for the operation of the wells and generation plant.

- D. Provide that PGV contribute up to \$50,000 per annum in order to maintain the Geothermal Asset Fund at \$1 Million, in the event that the balance of the Geothermal Asset Fund drops below \$1 Million.

Amended Project Description

PGV proposes that the GRP be amended to allow PGV to develop and operate a 60 MW geothermal power project consisting of multiple power generating units, up to 30 geothermal wells drilled within the subject property, brine and steam pipelines, pollution control equipment, steam separators, production and injection wells, associated wellfield equipment, holding ponds, switch yards, office buildings, warehouses, workshops, control buildings, access roads, and auxiliary facilities such as an air compressors, fire protection equipment, etc., all in a manner consistent with applicable standards and permits.

The project will occupy approximately 25 net acres of surface area located within the Kapoho Section of the Kilauea Lower East Rift Geothermal Resource Subzone. Each drilling site will be engineered to support the drilling equipment and to keep drilling effluent contained on site and separate from any natural drainage. Each wellpad will have drilling mud pits, sumps with gently sloped walls used to temporarily store drilling wastes which typically consist of rock cuttings, waste drilling mud, cement particles, lost-circulation material and other drilling mud additives, and other waste drilling liquids. The high porosity of the volcanic soils and rock in the site area results in rapid downward percolation of rainwater. Berms will be provided to contain possible spills in areas where chemicals are handled. Catch basins, culverts, ditches, and berms will be provided for drainage control.

In accordance with the requirements of the Department of Health NSP, geothermal emissions will be vented through an approved abatement device during well/pipeline cleanouts. Noise will be generated during well drilling, construction, and operational phases of the project. However, the sites have been located in agricultural areas away from urban population concentrations. The sites will also be located to take advantage of existing topography and vegetation to muffle or block noise from the drilling operations.

Specific Amendments of Conditions

The specific amendments to the GRP conditions proposed by PGV and the rationale for each amendment are attached hereto as Attachment A.

D. Elevation Drawings

Attachment H is a map of the topography and elevations of the PGV facility and surrounding easements.

E. Description of Existing Wells and Drilling Rig

Chronology of Existing Wells:

- February 1992 - KS-1A completed and converted into an injection well.
- September 1992 - KS-3 completed as an injection well.
- November 1992 - KS-4 completed as an injection well.
- February 1993 - KS-9 production well completed.
- April 1993 - KS-10 production well completed.
- November 1999 - KS-11 production well completed.

Attached are typical diagrams of production and injection wells (Attachments E and F). Also attached is a photo of the refurbished PGV drilling rig 'Imina Ikaika (Attachment L).

- In July 1999 - PGV purchased True Geothermal's drilling rig and prepared it for the drilling of KS-11 production well. PGV opted to purchase the rig instead of leasing, in line with the long-term commitment to Hawaii and other safety considerations.

F. Area of Surface Disturbance

The Facility Location and Plant Layout drawing also refers to the areas of surface disturbance at PGV. No additional surface area disturbance beyond these depicted areas is anticipated as a result of the proposed amendments.

G. Methods of Disposal of Well Effluents and Other Wastes

PGV currently utilizes three geothermal injection wells, KS-1A, KS-3, and KS-4, with a pending application for an additional well. All steam, brine, and condensate generated from production wells are injected into these three injection wells at a depth of between 3,900 and 7,300 feet. PGV operates all three injection wells under permit and oversight by the State of Hawaii Department of Health's Safe Drinking Water Branch. PGV holds State of Hawaii Underground Injection Permit UH-1529 authorizing the operation of the injection wells.

Drilling muds and other wastes not reinjected are disposed of pursuant to State of Hawaii Department of Solid Waste regulations.

Sewage disposal at PGV is by way of cesspool and is in accordance with the State of Hawaii Department of Health rules.

H. Geologist's Report

The PGV site is an elongated, roughly diamond shaped parcel, approximately 500 acres in size, located on Kilauea volcano's Lower East Rift Zone (LERZ), three miles southeast of the town of Pahoa, and 21 miles south-southeast of the city of Hilo, on the eastern side of the Island of Hawaii. The site is bordered on the north-northwest by State Highway 132 (Pahoa-Kapoho Road) and on the south-southwest by Pahoa-Pohoiki Road. The borders of the site are located at an elevation of approximately 540 to 600 feet above mean sea level (famsl).

The dominant geological feature at the PGV site is Pu'u Honuaua, a large cinder cone which rises approximately 240 feet above its environs. Vents from Kilauea's 1955 eruption are located near the eastern and western borders of the site, and a prehistoric vent, Pu'u Pilau, is located near the southern border. Numerous fissures strike east-west, parallel to the LERZ, through the site. The 30 MW PGV geothermal electrical generating plant is located on the south side of Pu'u Honuaua in a small saddle between the main vent and an auxiliary vent to the west.

The LERZ is a conduit for the subsurface lateral migration of magma flowing east-northeast from the caldera at the summit. It is this magma which provides the heat source for the high temperature geothermal reservoir that PGV utilizes for energy production.. The geothermal reservoir, a system of vertical to near vertical fractures, contains the geothermal resource of high temperature steam at a depth of between 5,000 and 6,500 feet below the surface.

Geologic hazards in the area include renewed volcanic flows and tectonic activity. However, the existing power plant and proposed modifications sit an elevation of 670 feet and approximately 40 feet above the southern base of Pu'u Honuaua, which places it at a relatively low risk of inundation from uplift lava flows. All geothermal wellheads are placed in cellars that can be filled with cinder to reduce the risk of structural failure. The facilities have and will be designed to withstand expected ground movements accompanying tectonic activity.

Hydrology

The youthful age of Kilauea volcano has directly affected its hydrology. Deep soils and valleys have not had time to develop, and extremely porous lavas remain at or very near its surface. Consequently, there is no runoff from the high precipitation that falls on the volcano, and Kilauea supports no perennial streams. Groundwater flow generally follows surface topography, flowing down gradient to eventually exit as coastal springs and diffuse seeps.

There is no surface water in the project area. Groundwater is influenced by infiltration from the geothermal resource. Non-potable water exists beneath the surface at the site. Nevertheless, contamination of any groundwater resources is avoided by reinjection of condensate below the groundwater table back to its source. The disposal of drilling fluids and muds is accomplished by use of reinjection wells.

I. Air Quality and Noise Monitoring

Air and Noise Emission Standards and Controls

Air emissions are controlled through a total reinjection concept at the facility. All steam, brine, and condensate from the three production wells are reinjected back into the three injection wells. Air emissions are monitored by the use of hydrogen sulfide (H₂S) and particulate matter devices. Hydrogen sulfide is a regulated air contaminant, and the State ambient air standard for hydrogen sulfide is 25 ppb measured at property boundary on an hourly average during an upset. In terms of health concerns, Hawaii and Federal OSHA safety standards allows 10,000 ppb, 8 hours a day, 40 hours a week of exposure without the use of personal protective equipment, which means no adverse health hazards are expected at those levels. In the event H₂S concentrations exceed the ambient air standard of 25 ppb on an hourly average basis, which is regulated by the State of Hawaii, PGV has written safety procedures to mitigate any adverse health effects to the community.

In terms of particulate matter, two PM-10 monitors are installed only at Monitoring Station B, which is used only during the drilling phase of the project.

Air emissions are strictly regulated by the State of Hawaii Department of Health Clean Air Branch. PGV currently is permitted as a noncovered source facility. The Geothermal Compliance Specialist from the State of Hawaii Department of Land and Natural Resources (DLNR) is on site daily to monitor compliance with emission standards.

Noise emissions are controlled by use of noise abatement materials and sound engineering controls. The engineering controls that PGV has employed at the facility are:

- Lead/aluminum/fiberglass insulation of process piping.
- Sound walls with acoustically effective material in the power plant.
- OEC generators with acoustically effective silencer materials.
- Planting of indigenous vegetation for sound deterrents.

PGV currently is operating with a noise permit issued by the State of Hawaii. The Department of Noise and Radiation Branch regulates noise at the facility. PGV is classified as a Class C facility, which means the facility can operate at a maximum noise level of 70 dBA, measured 24 hours a day at the property boundary. Noise is monitored by use of noise microphone devices installed at PGV's property boundaries at Monitoring Stations A and B. An alarm system is installed in PGV's Control Room for early detection to allow prompt action if required. The noise alarm setpoint for early warning detection is set at 65 dBA.

Meteorological Ambient Air Quality and Noise levels are measured at the PGV boundaries of the power plant in three locations. These locations will measure any potential air

quality and noise effects on the surrounding community. In addition, the monitoring stations are regulated by the State of Hawaii Clean Air Branch and Noise and Radiation Branch.

Equipment Descriptions

The monitoring sites are equipped with instrumentation systems for monitoring ambient levels of H₂S and for collecting meteorological information. The following are the types of equipment installed:

- Hydrogen Sulfide Analyzers
- PM-10 Samplers
- Precipitation
- Relative Humidity
- Air Temperature
- Wind Direction
- Wind Speed
- Wind Turbulence
- Noise Devices (Stations A and B only)

Southeast Fenceline Monitoring Site (A)

The Southeast Fenceline was selected as the location for Monitoring Site A because it is near a cluster of homes that are topographically down gradient from the PGV facilities. In addition, daytime winds from the northwest are occasionally observed in the project area, and Monitoring Site A is used to observe the impacts of H₂S emissions/noise under these meteorological patterns.

Previous measurements of H₂S, and noise with a average daily maximum, have been attached for the year 1999 (Attachments I and J). These averages were measured under a variety of meteorological conditions, including varying wind directions, speeds and atmospheric conditions. These samples are representative of the ambient air quality conditions at the sites throughout the year.

Southwest Fenceline Monitoring Site (B)

The Southwest Fenceline was selected as the location for Monitoring Site B because it is located within the predicted maximum H₂S impact. Wellpad E is closest to the project boundary and is expected to have greater off-site impact than similar activities at the other wellpads. Monitoring Site B is also in the prevailing downwind direction of the northeast trade winds, which is the most frequently occurring wind direction in the project activity areas. H₂S emissions from the facility, during normal operations, are usually fugitive in nature and released at or near ground level. Monitoring Site B was strategically located to observe this condition and

measure maximum H₂S concentrations/noise under the most frequently occurring meteorological conditions.

West Fenceline Monitoring Site (C)

Monitoring Site C was installed at the west fenceline location in response to a request by the State of Hawaii Department of Health. This location was selected due to the proximity of residential areas. Although the site is not in the prevailing downwind direction from the PGV facilities, easterly winds carrying fugitive emissions to this area are not uncommon.

A noise monitoring station at this site is not required by any agency.

The measurements provided at the three monitoring stations are all within the parameters of health, workplace and other standards relating to short or long term exposure to H₂S or noise levels.

J. Description of Measures to Protect the Environment

The following describes the measure taken for protecting the environment, including, but not limited to the prevention and control of:

- Fires;
- Soil erosion;
- Surface and groundwater contamination;
- Damage to fish and wildlife or natural resources;
- Air and noise emissions;
- Hazards to public health and safety;
- Socio-economic impact(s); and
- Impacts on public infrastructures and services.

Fire

The PGV facility and the surrounding area have been generally cleared of vegetation to prevent any fires which might originate at the site from spreading . The facility has been designed and PGV operations and maintenance personnel have been trained to handle incipient firefighting events, which will place a minimum impact to emergency response agencies. Firefighting systems at PGV include the following:

- 6 fire hydrants with 750 GPM fixed fire nozzles attached
- 4 fire hydrants with 350 GPM AFFF fixed fire nozzles attached, which includes 55 gallons of 3% hydrocarbon fire fighting foam
- 4 fire boxes containing 200 feet of 1½" fire hose with nozzle
- 1 electrical fire pump
- 1 diesel driven fire pump
- 12 UV/IR flame detectors
- 13 combustible gas detection sensors
- 1 automated activated deluge valve on N-Pentane storage tanks
- Underground piping and isolation valving
- Halon 1311 fire suppressant for the control room and power shelters
- Fire extinguishers (approximately 60) throughout the facility
- Automated fire supervisory panels in the control room and power shelters

Soil Erosion

PGV has incorporated a landscaping program to minimize soil erosion around the perimeter based on the approval of the County of Hawaii. A rock lined drainage system has been developed to divert rain water from eroding the roadways. No future drainage plan will be required.

Surface and Groundwater Contamination

There are no surface streams or ponds in the vicinity of the facility. Groundwater is protected by cementing production and injection well casing into the ground to depths below sea level and well below the potable water table. All three injection wells are required to have an inner casing installed in the event of a potential liner leak. Nitrogen pressure is used to pressurize both casings and is monitored to detect any mechanical loss of integrity. Incipient oil, fuel and other materials spills may occur, however, PGV immediately cleans up spills in accordance with its Emergency Response Plan.

Damage to Fish and Wildlife or Nature Resources

The land requirements of the PGV project are relatively small (approximately 25 acres for the facility). It is not anticipated that additional acres will be utilized for the electrical expansion

of the facility. The project is several miles from the ocean, and no impact to the fish should occur. The wellpads and power plant locations are situated around non-native weedy species and papaya fields. Much of the surrounding area is covered by the 1955 lava flow.

Hazards to Public Health and Safety

Public health and safety are protected by controlling air, water, and noise impacts. PGV has developed strict operating, environmental, and safety procedures to ensure the facility is operating safely and in compliance at all times. PGV has an Environmental/Safety Manager on-site to monitor the facility and to ensure safety and environmental compliance is maintained. PGV has developed strict written notification procedure guidelines to ensure the safety of the nearby residents. At 5 ppb, measured at property boundary, the HCPD, CDA and DOH are notified of any hydrogen sulfide emission. The Emergency Response Plan, a copy of which is filed with the County of Hawaii HAZMAT team, will evacuate residents at 10% of Hawaii/Federal OSHA guidelines (1,000 ppb). The Federal Environmental Protection Agency regulates hydrogen sulfide at levels of 30,000 ppb for evacuation.

Socio-Economic Impacts

PGV's development of the facility has already resulted in a number of positive socio-economic impacts on the Island of Hawaii, including the following:

- PGV commenced commercial operations April 1993, which eliminated the rolling black-outs on the Big Island. PGV supplied 20% of the electricity to the Big Island community in 1999 .
- Since startup, PGV has decreased dependence upon imported petroleum products and displaced 115 million gallons of oil from entering Hilo Harbor.
- Provided additional employment opportunities for skilled labor.
- Provided a dependable and efficient alternative source of energy which is indigenous to the Island of Hawaii.
- PGV has paid royalties to the State of Hawaii in excess of \$3 million, which is distributed to the County of Hawaii and the Office of Hawaiian Affairs (OHA).
- PGV contributes to and participates in local community activities.
- PGV contributes to the local high school's summer hire program.
- PGV has contributed \$30,000 to the Reading is Fundamental program at Keonepoko School.

Impacts on Public Infrastructure and Services

There should be minor impacts on public infrastructure and services. Currently, the project employs 30 full time positions (14 in operations, 8 in maintenance, and the remainder in administration). No changes are anticipated.

During drilling and construction, the employment peaks to an estimated 100. These additional people utilize existing facilities and do not require additional services that are not already provided by the County of Hawaii.

Traffic will increase during periods of drilling and construction, however, these added vehicle trips should not add significantly to the existing traffic levels. During wellfield or power plant upgrades, peak traffic impacts will be at the level of 35 vehicle round trips per day. Traffic during normal operations is expected to remain at between 2,000 to 3,600 vehicle round trips per day. These traffic levels amount to less than one percent of existing traffic levels at the Highways 130 and 132. The entrance to the site for most vehicles approaching from the Pahoa direction on Highway 132 (the Pahoa-Kapoho Road), is on the right, thus reducing potential traffic congestion and conflicts.

Since virtually all of the current personnel are residents of the Island and the increased production capabilities will not require additional personnel, there are no anticipated adverse housing impacts for the area. Any additional temporary construction personnel are expected to come primarily from the Island, as done during previous construction phases.

K. Mitigation Measures

PGV has taken measures to mitigate potential adverse effects to residents or the surrounding properties in the areas of health, environmental, and socio-economic activities. The following are mitigation measures that PGV has employed:

Detection Equipment

PGV has installed early detection equipment, i.e., UV/IR detection, combustible gas detection, and hydrogen sulfide detection within the power plant. Through such detection devices, the nature and source of any emission of air contaminants can be immediately determined and measures taken to terminate the activity causing the emission before it poses further risk to the health or safety of personnel or the surrounding area.

Monitoring Equipment

Installation of three meteorological and/or noise stations at PGV's property boundaries. The monitoring equipment, discussed in more detail above, provides PGV and public agencies with the ability to assess the ambient air and noise quality at the boundaries of the project and provides an additional system of notifying PGV of any events that require action to be taken. The monitoring stations also have backup generator power in the event of power failure.

Noise Abatement

Noise abatement methods include piping insulation, the use of sound walls placed at strategic locations, OEC generators with acoustic silencing materials, and the planting of indigenous plants for additional sound barrier effect.

Hydrogen Sulfide Abatement Equipment

PGV has installed hydrogen sulfide abatement equipment consistent with the Best Available Control Technology (BACT) requirements of the GRP.

Alarm Systems

There are computerized alert alarms systems in the control room. When the early detection equipment and monitoring stations register air and noise emissions in excess of allowable limits, the alarm systems are calibrated to notify personnel onsite of these events 24 hours a day. Other alarms are also set for equipment malfunction.

Power Plant Design

Design of the power plant with automatic instrumentation controls also minimizes human error. In addition, extensive training of all the operations and maintenance personnel who control the power plant as per design.

Maintenance Program

PGV has a scheduled program for the inspection, testing and maintenance of all wellhead/power plant equipment. This helps to assure that the risk of equipment failure is prevented.

Compliance With Permit Requirements and Standards

As noted above, PGV has obtained operating permits required by the State of Hawaii, all of which contain strict operating and monitoring standards intended to protect public health and safety.

Participate in Local Community Activities and Meetings

PGV has been involved in community activities which includes attending community association meetings to gain an understanding of and to address community concerns, and providing assistance to general community needs by contributing to local organizations such as Reading is Fundamental, Pahoehoe High School Summer Hire Programs, and others.

Public Information Updates

PGV publishes and distributes quarterly newsletters detailing current events at the facility and which provide pertinent information about the current operation of the facility and the upcoming scheduled events. The newsletter is distributed by mail and/or hand delivered by the Community Liaison. PGV also maintains a Telephone Information Line, which is updated daily with current events of the project.

24-Hour Telephone Response Line

PGV maintains a Telephone Response Line which is available 24 hours a day for community or resident concerns.

Community Liaison

PGV employs a Community Liaison, whose responsibilities are to interface with the community residents on matters relating to plant activities and community concerns.

L. Monitoring Plans

PGV has numerous monitoring plans. Most of the plans are required as a condition of operation in the various permits issued by the State of Hawaii. The plans listed below indicate which State and County Departments regulate these plans:

Monitoring Plans	Responsible Agency
Mechanical Integrity Plan	<ul style="list-style-type: none">• DOH Safe Drinking Water Branch• Department of Land and Natural Resources
Hydrological Monitoring Plan	<ul style="list-style-type: none">• County of Hawaii Planning Department• DOH Safe Drinking Water Branch
Meteorological and Air Quality Monitoring Plan	<ul style="list-style-type: none">• County of Hawaii Planning Department• DOH Clean Air Branch
Noise Monitoring Plan	<ul style="list-style-type: none">• County of Hawaii Planning Department• DOH Noise and Radiation Branch.
Drilling Plan	<ul style="list-style-type: none">• Department of Land and Natural Resources
Power Plant and Wellfield Monitoring Plan	<ul style="list-style-type: none">• State/Federal OSHA• Department of Land and Natural Resources• DOH Safe Drinking Water Branch

M. Emergency Response Plan

PGV has developed an Emergency Response Plan, Version 6.3, written to respond to emergency situations on site. The plan was reviewed and approved by the County of Hawaii. The Planning Department maintains and distributes copies of the plan to various agencies and the public library in Pahoa. PGV has incorporated additional plans in Version 6.3 which include:

- Hazardous Waste Operation Emergency Response (HAZWOPER) 29CFR.1910.120.
- Emergency Action Plan

PGV also has created an internal Hazardous Materials (HAZMAT) team to address emergency situations, emergency response plans relating to the safe operation of the power plant, and a fire prevention plan. All PGV personnel are trained to respond to emergency situations as required. At a minimum, 24 hours of HAZMAT training is provided to such personnel. PGV has four incident commanders on staff, each with a minimum of 40 hours training.

N. PGV Project Expansion - Phase I

Attachment K is the proposed project expansion schedule which PGV will implement upon approval of the GRP amendments by the Planning Commission.

O. Progress Reports

Currently, PGV provides weekly written status reports to the Hawaii County Planning Department during the construction of the project and the drilling or testing of any well. Semi-annual status reports are also provided on February 15 and August 15 of each year. Other data and records are available to the Hawaii County Planning Department for inspection upon request.

P. Archaeological Survey

At the request of PGV, the Department of Anthropology of the Bernice Pauahi Bishop Museum conducted an archaeological reconnaissance survey in June 1984 of the areas that were planned for surface disturbance for the development of PGV. The purpose of the survey was to determine the presence or absence and general nature of any archaeological resources evident on the surface of the project area. The survey included a systematic walk-through of the proposed site area. The area within a one-mile radius of the immediate survey area was also investigated on a less intensive basis. No archaeological sites were located during the reconnaissance survey. Future construction or expansion will be confined to the areas previously surveyed.

Q. Conclusion

PGV respectfully requests the Planning Commission's approval of the proposed increased geothermal power generating capabilities and amendments to the related conditions. PGV has demonstrated that it can operate the site in a manner which is of tremendous benefit to the

County of Hawaii, and which does not pose unreasonable adverse effects upon residents or surrounding property or unreasonably burden public agencies.

ATTACHMENT A

Proposed Amendments to
GRP 87-1 Conditions

PROPOSED AMENDMENTS TO GRP 87-1 CONDITIONS

Proposed Amendment to Condition No 1:

1. This Geothermal Resource Permit grants approval for those uses and improvements described in the "Geothermal Resource Permit Application Amendment for the Puna Geothermal Venture Project," dated March 1989, except as amended, modified, or conditioned by this Geothermal Resource Permit. Except as otherwise described in this permit, no other uses are authorized by this permit, **The following uses are allowed under this Geothermal Resource Permit: turbines, generators, air coolers fans, air compressors, diesel driven pumps and motors, production wells, injection wells, steam separators and accumulators, electrical transformers, control valves, rock mufflers, H₂S abatement equipment, welding machines, drilling rigs and auxiliary equipments, etc designed and operated for the generation of up to 60 MW of geothermal power** and any related proposed other uses of the geothermal resource or improvements to the land, whether to be conducted by the permittee or a third party under contract to, or other agreement with, the permittee, shall be subject to prior review and approval, consistent with the applicable Rules of Practice and Procedure of the Hawaii County Planning Commission. The Planning Director may, upon written request of the permittee, approve deviations from the project layout and uses permitted under this Geothermal Resource Permit. No action pursuant to any such request for deviation by the permittee shall be taken without the written approval of the Planning Director. Amendments to the Geothermal Resource Permit and its conditions may be granted pursuant to Article 12-9 of the Rules of Practice and Procedure of the County of Hawaii Planning Commission.

Reason:

The intention behind this amendment is to allow PGV the opportunity to eventually provide up to 60 MW of power generation.

2. The permittee, its successors, or assigns shall be responsible for complying with all of the stated conditions of approval of this Geothermal Resource Permit. Should the Planning Director determine that there is noncompliance with the Geothermal Resource Permit or its conditions, the permittee may be subject to enforcement of the Geothermal Resource Permit conditions and penalties pursuant to Sections 12-10 and 12-11 of Rule 12 of the Rules of Practice and Procedure of the County of Hawaii Planning Commission.
3. The permittee shall grant unrestricted access to the subject property(ies) to authorized governmental representatives or to consultants or contractors hired by governmental agencies for inspection, enforcement, or monitoring of activities subject to or authorized by this Geothermal Resource Permit. A designated employee shall be available at all times for purposes of supplying information and responses deemed necessary by the authorized governmental representative in connection with such work.

Proposed Amendment to Condition No. 4:

4. During the periods of construction [of the project,] or during the drilling or testing of any well, the permittee shall submit a weekly status report to the Planning Department which shall include:
 - a. A brief description of the work undertaken during the previous week under the Geothermal Resource Permit;
 - b. A description of the work being proposed during the next week under the Geothermal Resource Permit; and
 - c. Any other information that the Planning Department may reasonably require which addresses the immediate environmental and regulatory concerns of the County of Hawaii or the requirements of the Geothermal Resource Permit.

Reason:

The additional work planned at the site will not necessarily be done during one construction period, but will likely be done over a period of time in different phases. The amendment would more clearly state when the reports are required.

5. The permittee shall submit a written semiannual status report to the Planning Department by February 15 (covering the preceding period of July 1 through December 31) and August 15 (covering the preceding period of January 1 through June 30) of each year. The status report shall include, but not be limited to:
 - a. A brief summary of the work undertaken during the current reporting period under the Geothermal Resource Permit;
 - b. A brief summary of the work being proposed over the next reporting period under the Geothermal Resource Permit;
 - c. The results and analysis of all environmental monitoring activities undertaken as required by this Geothermal Resource Permit;
 - d. A log of any complaints received by the project and the responses thereto; and
 - e. Any other information that the Planning Department may reasonably require which addresses the environmental and regulatory concerns of the County of Hawaii or the requirements of the Geothermal Resource Permit.

Proposed Amendment to Condition No. 6:

6. If any environmental monitoring data collected as required under this Geothermal Resource Permit indicates[, that] **the** project operations are creating, or have the immediate potential of creating, excessive health or environmental effects not otherwise permitted by this Geothermal Resource Permit, the permittee shall [submit such data to the Planning Department within 48 hours of its identification.] **comply with the State of Hawaii Clean Air Branch Noncovered Source Permit (NSP) reporting requirements, and simultaneously provide a copy of such report(s) to the Planning Department.**

Reason:

Under the NSP, PGV is required to provide the Department of Health with immediate notification of ambient H₂S concentrations in excess of stated levels at the monitoring stations or other events which may result in the emission of particulates in excess of DOH standards and provide written reports to the Department within five (5) business days thereof.

As PGV is already required to report such events to the Clean Air Branch under the terms of the NSP, the reports will be made available to the Planning Department for its information.

Proposed Amendment to Condition No. 7:

7. **The permittee shall comply with the Clean Air Branch, Safe Drinking Water Branch, and Department of Noise and Radiation Branch of the Department of Health's recordkeeping requirements.** The permittee shall maintain [a] records, in a permanent form suitable for inspection, **regarding noise, hydrogen sulfide emissions, equipment upsets, and any other sampling or analytical results,** [A]and shall make such record available on request to the Planning Director or his designee. [The record shall include:
 - a. Occurrence and duration of any start-up, shut-down, and operation mode of each geothermal well and/or facility;
 - b. Performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous monitor(s) that have been installed; and
 - c. All measurements reported in units compatible with applicable standards/guidelines.]

Reason:

The reporting requirements of the Department of Health agencies duplicates the information previously required under this condition. Instead of two separate

reports, PGV proposes to make the reports required under its other permits available to the County for inspection.

8. Prior to the commencement of any grubbing or grading activity, the permittee shall:
 - a. Submit a metes and bounds description of all lands to be disturbed including but not limited to all roadways, well pads, steam gathering system corridors, injection system corridors, power plant site, and transmission line corridors to Planning Director;
 - b. Mark the boundaries of these sites to be disturbed in the field; and
 - c. Comply with all requirements of Chapter 10 Erosion and Sedimentation Control, Hawaii County Code (the County grading ordinance).
9. No construction or transportation equipment shall be permitted beyond the prescribed boundaries of the areas to be disturbed.

Proposed Amendment to Condition No. 10:

10. Prior to commencing any geothermal well drilling, testing, production, or injection activity approved under this Geothermal Resource Permit, the permittee shall submit [to, and secure the approval of, Planning Director of] a hydrologic monitoring program **to the State Safe Drinking Water Branch. Semi-annual testing shall be performed in accordance with the Hydrological Monitoring Program (HMP) which is described in the Hawaii State Underground Injection Control (UIC) permit. All data and reports submitted to the Safe Drinking Water Branch shall be available for inspection by the Planning Director upon request.** [The program shall, at a minimum, provide for the quarterly monitoring of water levels and appropriate chemical species from existing wells completed within the shallow aquifer in those areas downgradient of the project area, including the Green Lake water supply, as well as from a well located within the project boundary and completed within the shallow aquifer. The monitoring, sampling, and analysis protocols shall be clearly defined in the program submitted to and approved by the Planning Director and shall be reviewed as required. The monitoring and sampling shall be conducted by a qualified contractor, and the samples analyzed by a qualified laboratory, selected by the permittee but subject to the approval of the Planning Director. The selected contractor and laboratory shall operate under contract to, and shall be funded by the permittee. The program shall monitor the shallow groundwater immediately prior to, and during, all periods of well drilling, testing, production, and injection activity approved under this Geothermal Resource Permit. The data obtained shall be submitted to the Planning Director in accordance with the requirements contained in this Geothermal Resource Permit for submittal of all collected environmental monitoring data. The County shall make random checks of the ground water supply no less than every two months.]

Reason:

The State's Safe Drinking Water Branch has approved semi-annual testing of the hydrological program. Instead of having a duplicate program which also requires the County's oversight, PGV would comply with the State's monitoring program and make the data available for County inspection. Furthermore, the Green Lake water supply pumping station was removed from service in 1995. In addition, the monitoring program established that the facility did not adversely affect the Green Lake water supply. The Hydrological Monitoring Program will need to be revised based on the abovementioned.

11. If pollution of the shallow ground water is demonstrated to be occurring from the project construction, operation or maintenance activities as determined by the Planning Director in consultation with the Department of Water Supply and the Department of Land and Natural Resources, the permittee shall immediately take those measures necessary to eliminate the source of the pollution meeting with the approval of the affected agencies. If any geothermal production or injection well demonstrates that the integrity of the well casing is lost such that the shallow groundwaters are being, or may immediately be polluted by the production or injection activity of that well, the permittee shall, as quickly as practical consistent with safety and prudent operating practices, cease the production or injection activity for that well, and the activity not resume for that well until adequate casing integrity is restored to the satisfaction of the Department of Land and Natural Resources.

Note: Condition Number 12 was skipped on the Planning Department's 1989 document. The amended GRP should be renumbered accordingly upon its issuance.

Proposed Amendment to Condition No. 13:

13. [In the event the Department of Water Supply determines that the existing Green Lake County water source becomes contaminated by the permittee's geothermal wellfield system, the permittee shall immediately provide alternative(s) to the water supply, including the hauling of water if necessary as a temporary alternative, which meet the approval of the County's Department of Water Supply and the State Department of Health.]

Reason:

See reasons for amendment to Condition No. 10. Green Lake no longer serves as a water source, and research data confirms that the geothermal wellfield system has not contaminated the Green Lake water quality.

14. Only nonhazardous drilling and additives, as recognized on the "California Department of Health Services Drilling Mud Additives Used in Nonhazardous Drilling Muds and Fluids" list, shall be used during the drilling of the geothermal wells, and which list shall be on file with the County Planning Department.

Proposed Amendment to Condition No. 15:

15. All drilling mud solids and drill cuttings shall be discharged to and contained within [the well pad sump] **a containment area**. A disposal site or sites approved by the State Department of Health, prior to any disposal activity covered by this permit, shall be provided for sump **containment** contents and other waste materials to be disposed of from the drilling activity. All sumps/ponds/**containments** shall **have approval from** the State Department of Health.

Reason:

The methods for discharge and containment of mud solids and drill cuttings, has evolved in newer technologies. Flexibility is needed in the language of the condition in order to allow newer technologies to be utilized.

Proposed Amendment to Condition No. 16:

16. All geothermal brines, steam condensate, and noncondensable gases produced during normal project operations shall be **disposed of in accordance with the State Department of Health Underground Injection Control permit requirements** [injected into the geothermal reservoir].

Reason:

The injection of geothermal brines and other approved fluids is regulated pursuant to current UIC requirements.

Proposed Amendment to Condition No. 17:

17. Prior to commencing any activity approved under this Geothermal Resource Permit on the project site, the permittee shall submit **an air quality and meteorological monitoring program** to, and secure the approval of, **the State Department of Health Clean Air Branch, and shall comply with all NSP requirements and standards. All data and reports provided to the Clean Air Branch pursuant to the NSP shall be made available to the Planning Director for inspection upon request.** [the Planning Director of an air quality and meteorological monitoring program. The program shall include provisions for installation, calibration, maintenance and operation of recording instruments to measure air contaminant concentrations, the specific elements to monitored, the number of stations involved, and frequency of sampling and reporting. The Planning Director shall review and approve the submitted monitoring plan in consultation with and concurrence of the State Department of Health. The monitoring and sampling shall be conducted by a qualified contractor, and the samples analyzed by a qualified laboratory, selected by the permittee but subject to the approval of the Planning Director. The selected contractor and laboratory shall operate under contract to, and shall be funded by the permittee. The program shall monitor the air quality immediately prior to, and during, all periods of well drilling, testing, production, and injection activity approved

under this Geothermal Resource Permit. The data obtained shall be submitted to the Planning Director in accordance with the requirements contained in this Geothermal Resource Permit for submittal of all collected environmental monitoring data.]

Reason:

The same rationale applies here as in Condition No. 10.

Proposed Amendment to Condition No. 18:

18. The permittee shall apply “Best Available Control Technology” (BACT) for air emissions to all aspects of the project to minimize air quality impacts. BACT means the maximum degree of control for air quality concerns taking into account what is known to be practical and economically viable. BACT for each aspect of the project shall be **in accordance with applicable Federal and State regulations**. [determined by the Planning Director in consultation with other appropriate governmental agencies involved in the control or regulation of air quality from geothermal development projects. Such determination shall be made prior to issuance of any construction permit for that aspect of the project. BACT shall be subject to review by the Planning Director every five years, commencing with the date of approval of the Geothermal Resource Permit for the wellfield operations, and with the date of full power plant operation for the power plant].

Reason:

The requirement that PGV comply with applicable air quality standards will provide assurances that PGV will keep up with the technological improvements. The applicable standards and BACT go hand in hand. BACT issues should be resolved by the federal and State agencies that administer compliance with air quality standards.

Proposed Amendment to Condition No. 19:

19. The permittee shall control all project emissions of hydrogen sulfide during normal power plant operation **in accordance to the State Department of Health Clean Air Branch regulations and NSP requirements** [so that the increase in the ambient hydrogen sulfide concentration due to these project emissions shall not exceed 5 ppb at or beyond the project boundary].

Reason:

The NSP and applicable regulations contain more detailed specifications and set permissible levels of H₂S ambient concentrators of 5 ppb above background on a one-hour average. This condition should be consistent with the NSP and applicable regulations. Thus, referral to those standards is an appropriate alternative to the current language.

20. With regard to air emissions, the permittee shall submit to the County Civil Defense and the Planning Department a map and accompanying text that describes predetermined “worst case” impacted areas.

Proposed Amendments to Condition No. 21:

21. **The permittee shall comply with the Hawaii Administrative Rules Title 11, Chapter 46, Community Noise Control Program.** [Prior to commencing any activity approved under this Geothermal Resource Permit on the project site, the permittee shall submit to, and secure the approval of, the Planning Director of a noise monitoring program designed to adequately ensure project compliance with the noise impact limitations contained in this Geothermal Resource Permit. The program shall include the monitoring of noise immediately prior to and during all periods of activity approved under this Geothermal Resource Permit. The monitoring and sampling shall be conducted by a qualified contractor, and the samples analyzed by a qualified laboratory, selected by the permittee but subject to the approval of the Planning Director. The selected contractor and laboratory shall operate under contract to, and shall be funded by the permittee. This program should also allow the correlation of any complaints of noise from the public with the level of measured noise, the meteorological conditions, and the type of operations which occurred at the site.] The data obtained shall be **made available for inspection by** [submitted to] the Planning Director in accordance with the requirements contained in this Geothermal Resource Permit for submittal of all collected environmental monitoring data.

Reason:

As with the data and reports prepared for air quality and water quality monitoring, PGV proposes that the information be available for inspection by the Planning Director upon request.

Proposed Amendment to Condition No. 22:

22. The permittee shall apply “Best Available Control Technology” (BACT) for noise emissions to all aspects of the project to minimize project noise **in compliance with the Hawaii Administrative Rules Title 11, Chapter 46, Community Noise Control Program.** BACT means the maximum degree of control for noise concerns taking into account what is known to be practical and economically viable. [BACT for each aspect of the project shall be determined by the Planning Director in consultation with other appropriate governmental agencies involved in the control or regulation of noise from geothermal development projects. Such determination shall be made prior to issuance of any construction permit for that aspect of the project. BACT shall be subject to review by the Planning Director every five years, commencing with the date of approval of the Geothermal Resource Permit for the wellfield operations, and with the date of full power plant operation for the power plant.]

Reason:

See Reason for amendment to Condition No. 18 above.

Proposed Amendment to Condition No. 23:

23. The permittee shall **comply with** [notify the Planning Department and] **the State Department of Health Clean Air Branch (NSP) permit notice requirements prior to any geothermal well and pipeline cleanout utilizing geothermal steam.** [any resident within 3500 feet of the permittee's project boundary who has previously requested such notice, at least twenty-four (24) hours in advance of the open venting of each geothermal well and pipeline cleanout and 14 days before commencement of drilling. Initial notification to residents shall be made in writing, offering the opportunity to be placed on the notification list. Any other person may request to be on the list. The permittee shall notify the Planning Department immediately prior to the open venting of any geothermal well and pipeline cleanout. The permittee shall notify the Planning Department following completion of each geothermal well, prior to the demobilization of the drilling rig.]

Reason:

Under the NSP, pipeline cleanout is required but only with abatement measures, and unabated pipeline cleanout (previously referred to as "open venting") is prohibited. Prior to any abated cleanout, the Department of Health must be notified a minimum of two (2) working days in advance, the public notified by newspaper at least 24 hours in advance, and all residents within 3,500 feet of the property provided with notice a minimum of 24 hours in advance. The NSP provides adequate notification guidelines.

Proposed Amendment to Condition No. 24:

24. [Until such time as] **The permittee shall comply with** noise regulations [are] adopted by the State, [or County, the permittee shall comply with the following guidelines which shall be enforced by the Planning Department:
- a. During power plant and wellfield operations, the permittee shall not exceed a general noise level of 55 dBA during daytime and 45 dBA at night at the current nearest residence. For the purposes of these guidelines, "night" is defined as the hours between 7:00 p.m and 7:00 a.m.;
 - b. The allowable noise levels may be exceeded by the maximum of 10 dBA; however, in any event, the generally allowed noise level should not be exceeded more than 10 percent of the time within any 20-minute period, and the permittee shall conduct all operations so as to minimize the occurrence, frequency, and duration of this impact noise;

- c. The noise level guidelines specified above shall be waived only for the specified duration of authorized open geothermal well venting from all wells, steam pipeline cleanout period, and the drilling and testing of wells from well pads E and F. During these authorized periods, BACT shall be applied. In addition, during the drilling and testing of wells from well pads E and F, the permittee shall meet a general noise level of 55 dBA during the day and 50 dBA during the night at the current nearest residence; and
- d. For the purposes of these noise conditions, the “nearest residence” is hereby defined as: For three years following the date of granting of the Geothermal Resource Permit, that permanently occupied dwelling nearest the applicable noise emission point as of the date of the granting of this permit; for all following years, that permanently occupied dwelling nearest the applicable noise emission point.
- e. Sound level measurements shall be conducted using standard procedures with sound level meters using the “A” weighting and “slow” meter response unless otherwise stated.]

Reason:

The noise control rules have now been adopted by the State Department of Health as HAR, Title 11, Chapter 46.

25. Pursuant to Article 12-8 of the Rules of Practice and Procedure of the County of Hawaii Planning Commission, prior to initiating construction of the project, the permittee shall submit the following to the Planning Director:

- a. Copies of approved permits and other applicable approvals for the project from other county, state, or federal agencies as applicable;
- b. Final plans or provisions for monitoring environmental effects of the project as required by this Geothermal Resource Permit or otherwise required to ensure compliance with County rules and the rules of the State Department of Health and Board of Land and Natural Resources and other permit-issuing agencies;
- c. A final plan of action to deal with emergency situations which may threaten the health, safety, and welfare of the employees and other persons in the vicinity of the proposed project site; and
- d. A final site plan and elevations of proposed temporary and/or permanent structures for the project.

26. Prior to commencing any activity approved under this Geothermal Resource Permit on the project site, the permittee shall submit to, and secure the final approval of, the

Hawaii County Civil Defense Director a final plan of action to deal with emergency situations which may threaten the health, safety, and welfare of the employees and other persons in the vicinity of the proposed project site. The plan shall include but not be limited to, the following elements:

- a. A description of the project facilities and operations, with site plans identifying areas of potential hazards, such as high pressure piping and the presence, storage and transportation of flammable or hazardous materials, such as lubrication or fuel oil, isopentane, hydrogen sulfide, and sodium hydroxide;
- b. A description of emergency services available off-site to respond to any emergency;
- c. A description of the current onsite chain of command and responsibilities of project personnel in the event of an emergency; and
- d. A description of potential project emergency situations, such as loss of well control, chemical spills, hydrogen sulfide exposure, pipeline rupture, fires, contaminated solids, etc. identifying:
 - (i) technical data on the nature of the hazard (for example, the concentrations of hydrogen sulfide in the various areas and the hazard associated with these concentrations, the corrosive characteristics of the abatement chemicals), or any data regarding the possible aerial extent of each potential emergency situation;
 - (ii) the warning systems (such as hydrogen sulfide detectors) used to alert personnel of the hazard;
 - (iii) the location and use of equipment used to control the hazard (such as fire protection equipment or isolation valves) or repair hazardous equipment (such as welding equipment or casing sleeves), and safety equipment for personnel (such as respiratory packs), including identification of the personnel trained in the use of that equipment; and
 - (iv) provisions for the monitoring, detection, and inspection of wells and plant facilities for the prevention of emergency situations.
- e. Provisions to address natural hazards (such as lava flows, earthquakes, and storms) that identify warning systems, control options, steps for securing and shutting down the facility, personnel evacuation, and notification to appropriate agencies;
- f. The location and capabilities of available medical services and facilities and plans for treating and transporting injured persons;

- g. Evacuation plans, including meeting points, personnel rosters, and escape routes;
- h. Training requirements for personnel, including procedures for emergency shutdown, handling of emergency equipment, spill prevention, first aid and rescue, fire fighting procedures, and evacuation training;
- i. Provisions for periodic emergency preparedness drills for personnel;
- j. Detailed procedures to be used to facilitate coordination with appropriate federal, state, and county officials during and after any emergency situation; and
- k. Procedures to be used to identify and inform all residents within applicable distances of the project of the possible emergency situations, warnings, and responses in advance of commencement of project operations and the methods by which all individuals affected by a given emergency will be notified and evacuated, as necessary.

Copies of the emergency plan shall be made available to the public by the applicant.

27. Reports and records of emergency situations shall be submitted to the Planning Department upon occurrence of such emergencies.

28. Within 48 hours after an earthquake registering 6 or above on the Richter Scale and/or within 48 hours after an eruption has occurred, all wells within 10 kilometers of the epicenter or eruptive center, shall be examined for any physical changes which would alter its downhole integrity. A report of this examination shall be filed with the Planning Department within 48 hours of the examination

Proposed Amendment to Condition No. 29:

29. In the event the Hawaii County Civil Defense Agency determines that an emergency situation resulted from the permitted geothermal activity, the [permittee] **Geothermal Asset Fund and procedures contained at Rule 14 of the Planning Commission Rules** shall [bear all costs of evacuation] **be used and followed to reimburse claimants for the cost of evacuation; provided that should there be insufficient funds in the Asset Fund to pay for such costs, the permittee shall bear such costs.** The Hawaii County Civil Defense Agency shall be responsible for public and media notification and evaluation of members of the public in the event the Agency deems such action necessary as a result of an emergency situation.

Reason:

The purpose of the amendment is to make it clear that evacuation costs arising from an emergency situation shall first be payable from the Geothermal Asset Fund.

Under Rule 14 of the Planning Commission Rules, the purpose of the Geothermal Asset fund is to compensate persons adversely affected by geothermal activities and to fund impact mitigation measures. Rule 14-16 specifically provides that the Fund may be used for temporary relocation and payment for adverse impacts. Compensation for the evacuation of members of the public deemed necessary by the Civil Defense Agency would fall within the purpose of the Rule, particularly since PGV has already contributed substantial amounts to the Fund. In addition, the provisions of Rule 14 are best suited for the handling of such claims, and avoids allegations that PGV has not honored such claims. The secondary liability for such costs is still retained by PGV.

30. Prior to the commencement of any surface disturbing activity, the permittee shall conduct an archaeological survey of those areas planned for surface disturbance not previously surveyed and submit the results of this survey to the Planning Department for review and approval.
31. If construction activities expose any cultural remains, the permittee shall immediately cease work in the area of the cultural remains and contact the Planning Department and the State Historic Preservation Office. As appropriate, a qualified archaeologist shall be retained by the permittee to implement any necessary mitigation measures and monitor further work. Work in the affected area shall not result until such time that clearance is obtained from the Planning Department.
32. The lighting used shall not interfere with the operations at the observatories located on Mauna Kea. To meet this requirement, the permittee shall comply with the requirements of Chapter 14, Article 9 of the Hawaii County Code, relating to outdoor lighting.
33. All lights shall be at a minimum level consistent with the safety of operations and shall be shielded or directed away from surrounding residential or populated areas and not interfere with important biological resources in the area.
34. The permittee shall submit to, and secure the approval of the Planning Director of a detailed landscaping and siting plan. The siting plan shall show plan and elevational views of all proposed temporary and/or permanent structures for the project. The plan shall also show the site topography, natural features and proposed berms, planting schedules, tree sizes, heights (actual size of trees to be planted), type of irrigation system, etc. Installation of approved landscaping improvements shall be commenced within three weeks from the completion of construction of each well pad, access road, or other facility. The plan shall also include:

- a. A landscaping maintenance program;
 - b. A line-of-sight analysis, being especially sensitive to views from surrounding residences, of the view planes from the site property lines, from the intersection of Leilani Avenue and the Pahoa-Pohoiki Road, for the intersection of the proposed access road and the Pahoa-Kapoho Road, from the intersection of Lauone Street and Hinalo Street in Lanipuna Gardens, and the intersection of the Kapoho-Kalapana Road and the access road to Vacationland; and
 - c. To the extent possible, the well sites and power plant shall be landscaped and sited to reflect the existing agricultural character of the area, and utilize native plantings.
35. To the extent compatible with engineering and aesthetic considerations, all exterior surfaces shall be rough texture, with no reflective metal, and no reflective glass surfaces oriented toward surrounding residential or populated areas within line of sight. The exterior of all project structures, including fluid conveyance pipelines, shall be painted in colors so as to blend in with the surrounding environment.
36. The permittee shall submit and secure approval of a revegetation/site reclamation plan meeting with the approval of the Planning Director in consultation with the Forestry Division of the Department of Land and Natural Resources. When construction is completed on any individual project site, or if the project area is abandoned, all denuded areas on and around the project site shall be revegetated in accordance with this plan. Said plan shall include appropriate security to assure its implementation in a timely manner.
37. The permittee shall obtain and maintain those bonds required for project operations by the rules and regulations of the Board of Land and Natural Resources and the Department of Health.
38. The permittee shall obtain and maintain builder's risk and comprehensive liability insurance for project construction and operation activities.
39. **In accordance with community notification requirements of the State Department of Health Noncovered Source Permit (NSP), the** [The] permittee shall notify each resident household within a radius of 3500 feet from any geothermal well at least twenty four (24) hours prior to[, and again the morning of,] any planned venting of **a geothermal well** [that well]. Each resident within this radius of 3500 feet shall be offered the opportunity to voluntarily leave the area during the well venting. The cost of such voluntary leaving, up to a maximum of \$100.00 per resident or \$200.00 per household, whichever is lesser, shall be borne by the [permittee] **Geothermal Asset Fund pursuant to the procedures contained in Rule 14 of the Rules of the Planning Commission**. Upon adequate demonstration [to the permittee] that any such resident is unable to pursue his normal, legitimate employment or business activity as a result of such voluntary leaving, the [permittee]

Geothermal Asset Fund shall reimburse that resident for that one day's lost income, in an amount not greater than \$150.00, **pursuant to the procedures contained in Rule 14 of the Rules of the Planning Commission. In the event that there are insufficient funds in the Geothermal Asset Fund to pay for the cost of such voluntary leaving or loss of income, the permittee shall pay for such costs.**

Reason:

See Reason for amendment to Condition No. 29.

Proposed Amendment to Condition No. 40:

40. Upon adequate demonstration to the **Geothermal Asset Fund pursuant to the provisions of Rule 14 of the Rules of the Planning Commission**, [permittee] that any adverse alteration of the quality of the water has occurred as a result of venting to the atmosphere, the **Geothermal Asset Fund** [permittee] shall [immediately rinse the water catchment system and replace the] **bear the cost of rinsing the water catchment system and replacing the** stored water of any water catchment system within a radius of 3500 feet of any well. Upon adequate demonstration to the **Geothermal Asset Fund pursuant to the procedures contained in Rule 14 of the Rules of the Planning Commission** [permittee] that any agricultural crop damage resulted directly from any of the permittee's well venting operations, the **Geothermal Asset Fund** [permittee] shall also provide compensation to the owner of agricultural operations located within a radius of 3500 feet of that well. In either situation, compensation will only be considered if the agricultural crops and water catchment system are inventoried and registered with the **County Planning Department** [permittee] prior to the venting. Other requests shall be considered by the **Geothermal Asset Fund** [permittee] on a case-by-case basis.

Reason:

See Reason for amendment to Condition No. 29.

41. The permittee shall establish and publish a telephone number for use by local individuals for the lodging of complaints or inquiries regarding status of operations. A designated representative of the permittee shall be available, 24 hours a day, to respond to any local complaints or inquiries.
42. Large vehicle deliveries to the project site shall be limited to daylight hours. For the purposes of this condition, daylight hours is defined as the hours between 7:00 a.m. and 7:00 p.m. This condition shall not apply for vehicles responding to emergencies.
43. An extension of time for the performance of conditions within the permit may be granted by the Planning Director upon the following circumstances: 1) the non-performance is the result of conditions that could not have been foreseen or are beyond the control of the applicants, successors, or assigns and that are not the result of their fault or negligence; 2) granting of the time extension would not be contrary to

the General Plan or Zoning Code; 3) granting of the time extension would not be contrary to the original reasons for the granting of the Geothermal Resource Permit; and 4) the time extension granted shall be for a period not to exceed one (1) year and 5) if the applicant should require an additional extension of time, the Planning Director shall submit the applicant's request to the Planning Commission for appropriate action.

44. All other applicable rules, regulations, and requirements, including those of the State Department of Health and the State Department of Land and Natural Resources shall be complied with.
45. The permittee shall obtain, and comply with the provisions of, permits to drill, modify use or abandon, as appropriate, from the State Board of Lands and Natural Resources for each geothermal well approved under this Geothermal Resource Permit.
46. The permittee shall obtain and comply with the provisions of, Underground Injection Control Permits, as appropriate, from the State Department of Health for all geothermal injection wells approved under this Geothermal Resource Permit. A copy of the UIC Permit and any conditions shall be available in the County Planning Department.
47. The permittee shall obtain, and comply with the provisions of, Authorities to Construct and Permits to Operate from the State Department of Health for all applicable project operations approved under this Geothermal Resource Permit.

Proposed Amendment to Condition No. 48:

48. [The permittee shall secure all necessary approvals and clearances including Plan Approval pursuant to Chapter 25 of the Hawaii County Code, within one (1) year from the effective date of the Geothermal Resource Permit.]

Reason:

PGV has proposed that it be provided with the flexibility to generate up to 60 MW of power from the site in phases, depending upon energy requirements of HELCO and the issuance of operating permits. Operating permits will have to be obtained from other agencies with oversight jurisdiction. Setting an arbitrary one-year time limit is not consistent with this purpose.

Proposed Amendment to Condition No. 49:

49. [Construction shall commence within one (1) year from the date of receipt of Final Plan Approval.]

Reason:

See Reason for proposed amendment to Condition No. 48 above.

50. The permittee shall submit a written semiannual status report to the Planning Commission on the permittee's best efforts to address/comply with the "Other Agreements and Recommendations" as contained in Section 5 of the final report on "Mediation of Geothermal Resource Permit Application 87-1" dated August 21, 1989, regarding but not limited to the collateral agreements and commitments the permittee made during the mediation process, and which the permittee considers to be contractual obligations subject to the issuance of a satisfactory Geothermal Resource Permit. The status report shall be submitted by February 15 (covering the preceding period of July 1 through December 31) and August 15 (covering the preceding period of January 1 through June 30) of each year.

Proposed Amendment to Condition No. 51:

51. Prior to the issuance of the first building/construction permit under this Geothermal Resources Permit (GRP) by the County of Hawaii, the State of Hawaii and the permittee shall each contribute towards a Geothermal Asset Fund or other appropriate existing fund for the purposes of geothermal impact mitigation efforts within the District of Puna. The permittee's initial contribution to the fund shall be a sum of \$60,00, due within thirty (30) days after the effective date of this GRP permit, and annual sums of \$50,000 due on or before the anniversary date of this GRP permit over a period of eight (8) consecutive years thereafter for a total of \$460,000. Annual contributions thereafter shall be determined between the permittee and the State of Hawaii or \$50,000 annually, whichever is greater. **In the event that the amount of the Fund reaches the sum of One Million Dollars (\$1,000,000.00) or more, the permittee may discontinue making annual contributions; provided, however, that in the even that the amount of the Fund is depleted to an amount less than One Million Dollars (\$1,000,000.00), permittee shall recommence to make annual contributions of up to \$50,000.00 in order to replenish the Fund in an amount of One Million Dollars (\$1,000,000.00).** The State's initial annual contribution to the Geothermal Asset Fund shall be the net revenues derived from the resources generated by the HGP-A well, or a similar amount from other State funding sources less any allocations entitled to the Office of Hawaiian Affairs and operating and maintenance costs. In the event that future enabling legislation provides for a percentage of the State's geothermal royalties to be allocated to the County, upon concurrence with the County Council, said royalties may also be deposited to the fund. The administration and expenditure of assets from this Geothermal Asset Fund shall be in accordance with rules, regulations, and procedures developed for that purpose by the County in accordance with Chapter 91, Hawaii Revised Statutes, and with participation of Puna residents or representatives thereof, which shall include, but not be limited to, provisions and criteria to enable the first priority of distribution for temporary or permanent relocation of those property owners who are found, in accordance with criteria established in the rules, to be adversely impacted by the activities authorized, provided that such relief is applied for within a period of one (1) year of the impact. A priority list of impact mitigation projects may be established by the County Council or agency designed by the Council in conjunction with Puna residents or designated representatives thereof, with the exception of upgrading existing subdivisions in the Puna District to current subdivision standards

and specifications of the County of Hawaii. Should any other district(s) of the County of Hawaii be proved to be negatively impacted by activities authorized under this or any other subsequent GRP, that district shall receive a pro rata share of the fund assets as may be determined by the County Council or agency designated by the Council with expenditures to follow a prioritized schedule determined as outlined above. The rights granted to the permittee shall not be conditioned upon any contribution or further participation by the State in the fund nor with respect to the creation, management, and operation of the fund other than set forth above.

Reason:

The Geothermal Asset Fund is now over the sum of one million dollars. A total of \$1,800.00 in claims has been paid since its inception. While there may be claims in the future, maintaining it at a level of One Million Dollars should be adequate, given the past claim history. PGV would replenish the Fund at annual contributions of up to \$50,000.00 to maintain it at that level if it becomes necessary. Otherwise, PGV plans to contribute the \$50,000.00 annual amount towards causes that will more immediately and directly benefit the community.

ATTACHMENT B

Power Plant/Wellfield/Location Layout