

REF:WL-KO

SEP 7 1989

Dr. Harry J. Olson
Hawaii Natural Energy Institute
University of Hawaii at Manoa
Holmes Hall 246
2540 Dole Street
Honolulu, Hawaii 96822

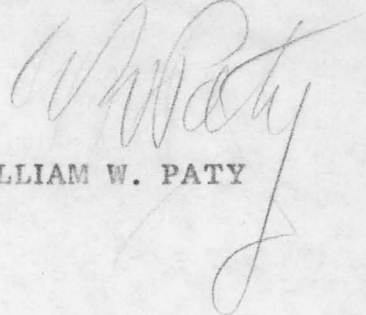
Dear Dr. Olson:

Thank you for your letter of August 21, 1989 advising the Department of Land and Natural Resources of your plans to conduct a down-hole temperature survey in Kapoho State Well 1-A located at Kapoho, Puna, Hawaii.

In answer to your inquiry as to whether any permits are required for the proposed temperature survey, our Department's Administrative Rules, Chapter 13-183, entitled "Rules on Leasing and Drilling of Geothermal Resources" does not require the issuance of a permit for such scientific monitoring purposes.

However, upon completion of such testing, please submit the results of the survey to our office.

Very truly yours,



WILLIAM W. PATY

MT:DN:DL:ko



University of Hawaii



Center for Ocean Resources Technology
JKK Look Laboratory, 811 Olomehane Street
Honolulu, Hawaii 96813

August 21, 1989

Mr. Manabu Tagamori
Deputy Director
Commission of Water Management
Department of Land and Natural Resources
Kalanimoku Building #227
1151 Punchbowl Street
Honolulu, Hawaii 96809

DIV. OF WATER &
LAND DEVELOPMENT

89 AUG 21 PM 2: 53

RECEIVED

Re: Temperature Measurements in Geothermal Wells

Dear Mr. Tagamori:

The University of Hawaii at Manoa (UHM) and the Pacific International Center for High Technology Research (PICHTER) are attempting to formulate a joint geothermal research program with a consortium consisting of the Japanese Ministry of International Trade and Industry (MITI), and four large Japanese industrial companies headed by Sumitomo Metal Industries, Ltd. The first phase of the program, in which UHM and PICHTER could achieve partnership status, involves the testing of a Down Hole Coaxial Heat Exchanger (DHCE), in an existing geothermal well in Hawaii. This program for geothermal research and development, if successful, has the potential to result in multi-million dollar annual funding for a period of four years, followed by the construction and operation of a pilot geothermal generating plant in Hawaii.

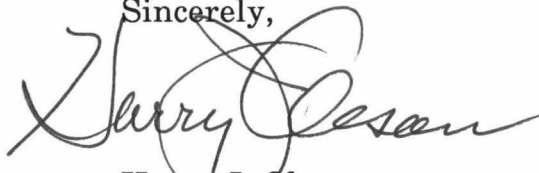
The KS-1A and KS-2 wells have been identified as the only wells in Hawaii that may meet the requirements of the DHCE program. Puna Geothermal Venture, the owner of these wells, has indicated willingness to discuss offering these geothermal wells for testing of the DHCE, providing that UHM obtains any permissions or permits, if necessary, for a temperature survey to determine if the wells have the required temperature levels and profiles for the contemplated research.

The KS-1A and KS-2 wells are currently shut-in and plugged to a depth of approximately 3,000 feet. Neither of the wells has appreciable wellhead pressure at present; and no flowing or venting would be involved during the temperature measurements. The temperature measurements would involve the opening of the

wellhead valve and lowering a temperature probe to the top of the existing plug, retrieving the probe from the well, and closing the wellhead valve. The survey would be conducted by using either a thermister probe or a Kuster tool, and involve equipment that would fit into the back of a pickup truck or a small pickup trailer. The survey would be run during daylight hours as soon as possible, and would take a day or less to complete.

I have contacted Maurice A. Richard, PGM's Hawaii Regional Development Manager, for formal, written permission to take temperature measurements in the KS-1A and KS-2 wells, and would appreciate it if you would let me know if the Department of Land and Natural Resources will require a permit for the proposed temperature measurements. If I can provide any additional information, I would be pleased to meet with you or your staff to explain the measurements in more detail.

Sincerely,

A handwritten signature in black ink, appearing to read "Harry Olson", with a large, stylized flourish extending from the end of the name.

Harry J. Olson
Spark M. Matsunaga Fellow in
Geothermal Energy Research
University of Hawaii at Manoa

446
ORMAT®



24 October 1988

Mr. William Paty, Chairman
Board of Land & Natural Resources
Kalanimoku Building
1151 Punchbowl Street #220
Honolulu, HI 96813

Lease/Drilling Bonds

Dear Mr. Paty:

Pursuant to State Administrative Rules Title 13, Chapter 183, Sections 34 and 68, we submit the attached bonds with Amor VIII Corporation as Principal and American Motorists Insurance Company as Surety. These new Amor VIII bonds will replace bonds previously submitted by Thermal Power Company

<u>Bonds</u>	<u>Ormat/Amor VIII</u>	<u>Thermal Power</u>
R-1 Performance bond	3SM 714 750 00	553 4472
R-2 Performance bond	3SM 714 751 00	553 4471
R-4 Performance bond	3SM 714 752 00	930 4593
Well Indemnity bond	3SM 714 749 00	567 7792

As always, if you have any questions regarding the above matter, or require additional information, please do not hesitate to call our office at 524-8940 through October 28th.

We are in the process of relocating our office to Hilo. After November 15, 1988 please forward any correspondence to us at:

Ormat Energy Systems, Inc.
101 Aupuni Street Suite 1014-B
Hilo, Hawaii 96720
(808) 961-2184 Fax: 961-3531

Sincerely yours,

Maurice A. Richard
Hawaii Regional
Development Manager

encl
MAR/cn:0034
cc: M. Shimabukuro-DLNR

ORMAT ENERGY SYSTEMS, INC. 220 S. King St. #1750 Hon., HI 96813
(808) 524-8940
610 East Glendale Ave., Sparks, Nevada 89431-5811 • Telephone (702) 356-9111 • Facsimile (702) 356-9125 • Telex 170030

BOND NO. 3SM 714 749 00

Premium \$7,500.00 Per Year

GEOHERMAL RESOURCES WELL INDEMNITY BOND
(\$250,000 Statewide Well Bond)

KNOW ALL MEN BY THESE PRESENTS:

That we, Amor VIII Corporation, as principal; and American Motorists Insurance Co. organized and existing under and by virtue of the laws of the STATE OF Illinois and authorized to transact surety business in the STATE OF HAWAII, as surety, are held and firmly bound unto the State of Hawaii in the full and just sum of TWO HUNDRED FIFTY THOUSAND AND NO/100 DOLLARS (\$250,000.00) lawful money of the United States of America, to be paid to the said State of Hawaii, for which payment, well and truly to be made, we do hereby bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed, delivered and dated this 7th day of October, 1988.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT,

WHEREAS, said principal is about to acquire, drill, redrill, deepen, operate, maintain or abandon a geothermal resources wells in the State of Hawaii and is required to file this bond in connection therewith in accordance with Rule 9.4 of Regulation 8 of the Department of Land and Natural Resources, State of Hawaii.

NOW, THEREFORE, if said Amor VIII Corporation, the above bounden principal, shall well and truly comply with all the provisions of said Regulation 8 and shall obey all lawful orders of the Chairman of the Board of Land and Natural Resources, or his representative, if not appealed to the Board of Land and Natural Resources, or upon affirmance thereof by the Board of Land and Natural Resources, if appealed thereto, and shall pay all charges, costs, and expenses incurred by the Chairman or his representative, in respect of such well or the property or properties of said principal, or assessed against such well or the property or properties of such principal, in pursuance of the provisions of said Regulation 8, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Amor VIII Corporation, ✓

By: J. A. Rego

Approved as to form:

STATE OF CALIFORNIA,)
COUNTY OF Los Angeles) SS.



On this 7th day of OCT 07 1988, 1988, before me Angela A. Rego

AMERICAN MOTORISTS INSURANCE COMPANY

Home Office: Long Grove, IL 60049



POWER OF ATTORNEY

Know All Men By These Presents:

That the American Motorists Insurance Company, a corporation organized and existing under the laws of the State of Illinois, and having its principal office in Long Grove, Illinois, does hereby appoint *****
William J. Shupper of Los Angeles, California*****

its true and lawful agent(s) and attorney(s)-in-fact, to make, execute, seal, and deliver during the period beginning with the date of issuance of this power and ending December 31, 1988, unless sooner revoked for and on its behalf as surety, and as its act and deed: **Any and all bonds and undertakings provided the amount of no one bond or undertaking exceeds TWO MILLION DOLLARS (\$2,000,000.00)*******

EXCEPTION: NO AUTHORITY is granted to make, execute, seal and deliver any bond or undertaking which guarantees the payment or collection of any promissory note, check, draft or letter of credit.

This authority does not permit the same obligation to be split into two or more bonds in order to bring each such bond within the dollar limit of authority as set forth herein.

This appointment may be revoked at any time by the American Motorists Insurance Company.

The execution of such bonds and undertakings in pursuance of these presents shall be as binding upon the said American Motorists Insurance Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal office in Long Grove, Illinois.

THIS APPOINTMENT SHALL CEASE AND TERMINATE WITHOUT NOTICE AS OF DECEMBER 31, 1988.

This Power of Attorney is executed by authority of a resolution adopted by the Board of Directors of said American Motorists Insurance Company on May 20, 1981 at Long Grove, Illinois, a true and accurate copy of which is hereinafter set forth and is hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the Chairman, the President, or any Vice President, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings, obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

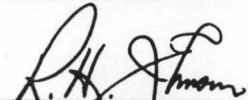
This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the Board of Directors of the Company at a meeting duly called and held on the 20th day of May, 1981:

"VOTED, That the signature of the Chairman of the Board, the Chairman, the President, any Vice President, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to resolution adopted by the Board of Directors on May 20th, 1981 and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company."

In Testimony Whereof, the American Motorists Insurance Company has caused this instrument to be signed and its corporate seal to be affixed by its authorized officers, this 8th day of August, 19 86.

Attested and Certified:

AMERICAN MOTORISTS INSURANCE COMPANY


R. H. Johnson, Secretary



By



G. H. Kasbohm, Vice President

**STATE OF ILLINOIS
COUNTY OF LAKE ss**

I, Olga W. Bennett, a Notary Public, do hereby certify that G. H. Kasbohm and R. H. Johnson personally known to me to be the same persons whose names are respectively as Vice President and Secretary of the American Motorists Insurance Company, a Corporation of the State of Illinois, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary act for the uses and purposes therein set forth.




Olga W. Bennett, Notary Public

My commission expires: November 18, 1988

1-22-88

1:30 pm

Mtg w/ R. Patterson, D. Lam, D. Nakano

RE: Temporary plugging of KS-1A

Current Status: Well head being monitored for change in press. due to gas buildup w/in casing (H_2S gas cap).

a water and Amine mixture being added to well to inhibit corrosion.

When press. in well reaches 600 psi, the gases are bled and burnt on-site.

(The reduction of gas press. caused water level in well to rise and fall between 200' (@ 300 psi) to 6-700' (@ 600 psi).

The gases are now being burnt about every 2 weeks and amine mixture being added about once a month.

Pipeline project on hold at this time.

(over)

Procedure to set plug in KS-1A

1. Burn gases and then pump water at 14 gpm to cool the well for about 8 hours.
2. Increase flow rate by 7 gpm after each 4 hours and continue pumping till WHP is zero.
3. Flow water into KS-1A under gravity till temperature at 3000' is below 200°F. Water level is expected at about 600' depth at this time.
4. Insert 9 5/8" wiper plug at wellhead and push it down in 9 5/8" casing. (Note: wiper plug will go through non concentric casing at the top due to its flexible sides).
5. Mix 250 linear feet of cement with 40% silica flour, 3% gel and 0.5% CFR-2.. (All of this except cement is available at HT&T yard). Slurry weight 15.5 lbs per gallon. Batch mix cement in ready mix truck and pump with B. J. cement pump through 3" side valve.
6. Put another 9 5/8" wiper plug at well head and displace cement to 3000' depth. Displace it with 220 bbls of amine water. This volume of water will determine the depth of the plug.

Calculations

casing volume per foot = 0.411 cuft/ft
volume of 250 linear ft cement = $250 \times .411 = 102.76$ cuft
for 40% SiO₂ flour, class G, 15.5 lbs/gal slurry, one sack of cement produces 1.62 cuft of slurry volume (Red book, p.68).

$$\text{number of sacks} = \frac{102.76}{1.62} = 63.43 \text{ sacks}$$

so 65 sacks of cement needed.

water requirement = $6.8 \times 65 = 442$ gallons of water needed to mix cement.

3000' ft to displacement = $0.411 \times 3000 = 1233$ cuft = 220 bbls

cement density = 94/lbs/cuft = 94 lbs/sk

weight of cement = $94 \times 65 = 6110$ lbs.

3% Gel (by weight) = $0.03 \times 6110 = 183.3$ lbs.

0.5% CFR-2 (by weight) = $0.005 \times 6110 = 30.55$ lbs.

70 lbs of SiO₂ flour = 1 cuft

volume of 40% SiO₂ flour = $65 \text{ cuft cement} \times 0.4 = 26$ cuft

weight of SiO₂ flour = $26 \times 70 = 1820$ lbs.

October 7, 1987

Mr. Ralph A. Patterson
Project Manager
Thermal Power Company
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

Dear Mr. Patterson:

In accordance with Section 13-183-6 of the Department of Land and Natural Resources' Administrative Rules on the Leasing and Drilling of Geothermal Resources, our Division will begin conducting bi-weekly inspections of geothermal wells--Kapoho State No. 1, 2, and 1-A.

Since vehicular access to the wells would facilitate inspection, we respectfully request a key to the access gate at the geothermal project site for use by our inspector on Hawaii, Mr. Morris Ota.

We look forward to your consideration and cooperation on this matter. Should you have any questions, please contact Mr. George Matsumoto at 548-7619.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

DN:DL:dh

Dean

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

Dear Mr. Patterson:

Second Amendment Plan of Operations
Geothermal Mining Lease R-2, Hawaii

Your second amendment to the Plan of Operations covered by State Geothermal Resource Mining Lease R-2, has been reviewed in accordance with the Department's Administrative Rules, Title 13, Chapter 183.

You are hereby granted approval of your proposed amendments to the Plan of Operations subject to all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and the following conditions:

- (1) The applicant shall submit a detailed map showing the pipeline (10-inch steam and 3-inch brine) route from Well KS-1A to the HGP-A plant, including the proposed extension of the pipelines to Well KS-2.
- (2) The applicant shall notify the Department of any changes to the maintenance and operation of the existing air and noise monitoring program.
- (3) The applicant shall submit an as-built drawing of Well KS-2 and shall file with the Chairperson, an appropriate application for permission to modify the KS-2 well.
- (4) The applicant shall submit in a timely manner, all reports pertaining to the maintenance and operation of the plan and to revenues received by the HGP-A facility.
- (5) Prior to conducting any experimental well injection tests of geothermal fluids or gases, the applicant shall submit a subsequent amendment to the Plan of Operations to the Department for approval.

Mr. Ralph Patterson

-2-


April 25, 1987

- (6) The duration of the amended operations shall not exceed four (4) years from the date of approval.
- (7) All activities on the leased lands covered by State Geothermal Resource Mining Lease S-4602 shall be subject to the approval of the lessee.

Very truly yours,

WILLIAM W. PATY
Chairperson of the Board

cc: Board Members
Mr. Mike Shimabukuro
County of Hawaii Planning Dept.



RECEIVED

86 DEC 15 A9:11

DIV. OF WATER &
LAND DEVELOPMENT

CERTIFIED MAIL

September 4, 1986

Mr. Maurice Richard
Thermal Power Company
601 California Street
San Francisco, CA 94108

Dear Mr. Richard:

Time Extension to Special Permit No. 468
Tax Map Key: 1-4-01:portions 2 and 19

The Planning Commission at its duly held public hearing on August 28, 1986, voted to approve your request for a 4-year time extension (until October 15, 1990) to Condition No. 18 of Special Permit No. 468 which allowed the drilling and evaluation of two successful exploratory geothermal wells at Kapoho, Puna, Hawaii.

Approval of this request is based on the following:

The basic purpose of the Special Permit issued in 1980 was for the drilling and evaluation of two exploratory geothermal wells. The permit was subsequently amended in 1984 to include the phrase "two successful exploratory wells." "Successful" is defined as a well capable of producing 100,000 pounds of steam per hour. To date, three wells have been drilled (KS-1, KS-1A and KS-2). None of these wells are deemed "successful" and the applicant intends to do further testing and evaluation of the potential resource from one of the wells, namely KS-1A.

It is determined that the approval of the time extension request will not be contrary to the original reasons presented in the granting of the Special Permit. Further, the request will still be consistent with the purpose and intent of imposing such time performance conditions. The purpose of stipulating time performance conditions is to assure that the development granted by the Special Permit is implemented or comes to fruition in a timely fashion.

The drilling of KS-1A was completed during the latter part of 1985. It is felt that the additional time granted will allow the applicant to adequately complete its testing programs in order to assess the potential geothermal reservoir of this section of the Kapoho area.

Mr. Maurice Richard
September 4, 1986
Page 2

The work which has been done to date in compliance with the requirements of the Special Permit represents a significant investment and commitment by the applicant. Further, the applicant has proven to be a responsible operator in its cooperation with the governmental agencies, general public, and residents and landowners in the area. Thus far, the activities permitted by the Special Permit have been accomplished in compliance with all other permit conditions, ordinances and regulations.

The approval of this particular request will not result in any physical expansion of the two 2-acre drilling sites which were approved under this Special Permit.

Based on the foregoing, it is determined that approval of the 4-year time extension to Condition No. 18 until October 15, 1990, is warranted as it will provide the applicant with additional time to complete its exploratory and evaluation program.

Please feel free to contact the Planning Department if there are any questions on this matter.

Sincerely,



Arthur W. Martin
Chairman Pro Tem, Planning Commission

cc: Department of Public Works
Department of Water Supply
County Real Property Tax Division

bcc: Plan Approval Section

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Request for Extension of Confidentiality Period
for Kapoho State No.1-A

Pursuant to a request from Thermal Power Company, a meeting was held at the DOWALD conference room on August 13, 1986. In attendance were the following people:

Ralph Patterson	Thermal Power Co.
Richard Pittenger	Thermal Power Co.
Manabu Tagomori	DOWALD
Albert Ching	DOWALD
Dan Lum	DOWALD
Dean Nakano	DOWALD

The meeting was held to discuss the confidentiality period of records and reports submitted to DLNR. Chapter 183 of the Department's Administrative Rules on Leasing and Drilling of Geothermal Resources presently requires that all submitted data be kept confidential as a trade secret for a period of one year from date of receipt, or longer at the discretion on the board.

Per our records, the drilling of Kapoho State No. 1-A (KS 1-A) was completed on September 3, 1985 and well information and reports were received by DLNR on February 3, 1986. Pursuant to our rules, this submitted data shall be held confidential until February 4, 1987.

Mr. Patterson presented Thermal Power Co.'s request for an extension of the confidentiality period from one year to ten years, for some of the KS 1-A data submitted to DLNR. Mr. Pittenger further stated that the 10 year extension is being requested due to the proprietary nature of the data and the current competition between Puna Geothermal Venture (PGV) and True/Mid-Pacific Geothermal Venture.

Thermal Power was advised to submit the extension request in writing, indicating what type of data could be released and what should remain as proprietary. Mr. Patterson agreed and stated that a letter request would be forthcoming.

Mr. Patterson also provided the following information on the current status of Kapoho State No. 1-A:

- 1) The well is shut-in and is experiencing continuous gas build-up within the casing. This gas build-up is causing the water/gas interface to move downward within the casing as pressure increases. This increase of wellhead pressure requires periodic bleeding of the well and the burning off of methane gas.
- 2) Surveys have shown that some corrosion is taking place within the casing at the area of the water/gas interface. In order to inhibit this corrosion, a water/amine mixture is being injected into the well to coat the casing.
- 3) In addition, periodic down-hole temperature, pressure and caliper surveys are currently being conducted at KS 1-A.

Mr. Tagomori requested that the results of these periodic surveys be submitted to the Department as required by our rules and regulations.

Mr. Pittenger provided the following update on the status of the proposed KS 1-A and HGP-A pipeline project:

- 1) Certain details of the pipeline project are still under negotiation, and the final contract agreement between PGV, RCUH and NELH is currently being reviewed.
- 2) The contract is expected to be finalized within 2 weeks and a reply to DOWALD's earlier request for additional information concerning the project will be forthcoming.
- 3) The previous proposal for NELH and PGV to share any remaining revenue from the sale of steam over and above the cost to operate the HGP-A plant and the cost of the pipeline has been withdrawn.
- 4) The flow test data from the wellhead on through to the power plant facility will be made available to the public. However, all downhole data resulting from the pipeline project will be held confidential.

Mr. Patterson concluded the meeting by stating that a petition to modify the Underground Injection Control (UIC) line in the Kilauea lower east rift zone has been submitted to the Department of Health for consideration. The petition requests that a portion of the Kapoho area on the island of Hawaii be reclassified as an exempt aquifer in accordance with the Department of Health's Administrative Rules, Title 11, Chapter 23, Section 11-23-04.



Dean Nakano

Dear

AUG 27 1986

Mr. Albert Lono Lyman
Planning Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

The Department of Land and Natural Resources has no objections to the approval of the amendment referenced in your memorandum dated July 22, 1986, regarding Thermal Power Company's request for a three-year extension of Special Use Permit #468. The approval of the amendment authorizing the continuation of exploratory evaluations of geothermal well, Kapoho State No. 1-A, and additional geophysical surveys is not in conflict with our Department's Administrative Rules or the provisions of State Geothermal Resource Mining Leases R-2 and S-4602.

Thank you for the opportunity to review and comment on the request by Thermal Power Company. In addition, the Department respectfully asks that copies of Rule 12 as adopted recently by the Planning Commission be forwarded to our office at your earliest convenience. Should you have any questions, please contact Mr. Manabu Tagomori at 548-7533.

Very truly yours,



SUSUMU ONO
Chairperson of the Board



791

RECEIVED

PLANNING DEPARTMENT

25 AUPUNI STREET • HILO, HAWAII 96720
(808) 961-8288

DANTE K. CARPENTER
Mayor

ALBERT LONO LYMAN
Director

ILIMA A. PIHANAIA
Deputy Director

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

August 19, 1986

COUNTY OF
HAWAII

RECEIVED

AUG 22 12:50

DIV. OF WATER &
LAND DEVELOPMENT

Susumu Ono, Chairman
Department of Land and
Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

Time Extension to Special Permit No. 468
Thermal Power Company

This is a follow-up to our memorandum of July 22, 1986 requesting comments on the request filed by Thermal Power Company for a time extension to Special Permit No. 468 which allowed for drilling and evaluation of two successful exploratory geothermal wells on four acres of land situated within the State Land Use Agricultural District at Kapoho, Puna.

The Planning Commission will be conducting a public hearing on the request on August 28, 1986. We would, therefore, appreciate any comments that you may have on the request to extend the life of the Special Permit by that date.

Enclosed for your use is another copy of the request. Should you have any questions, please feel free to contact us.

Sincerely,

ALBERT LONO LYMAN
Planning Director

NH:wk

Encl.

MEMORANDUM:

PLANNING DEPARTMENT — County of Hawaii, Hilo, Hawaii 96720

To: DPW R & D Dept. of Agr.
DWS Police Helco-Eng.Div. Date: July 22, 1986
Highways Fire DLNR
Health Soil Conserv. Rod/Brian

From: Planning Director *A. Law*

Subject: Amendment to Special Permit No. 468
Extension to Life of Permit
Thermal Power Company
TMK: 1-4-01:Pors. 2 & 19

The attached amendment to Special Permit 468 is being transmitted for your review and comments. May we please have your written comments by August 5, 1986.

Thank you very much.

NH:lv
Att.

JUL 23 1986



Diamond Shamrock
Thermal Power Company

RECEIVED

'86 JUL 14 AM 7 52

PLANNING DEPT.
COUNTY OF HAWAII
FILE NO

Al Lono Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

July 11, 1986

Dear Mr. Lyman:

Enclosed please find a request to extend Special Use Permit #468 for a period of three years. PGV is requesting no change in any permit conditions. All conditions will be complied with as in the original permit.

The exploration program carried out under the existing Special Use Permit #468 issued to Puna Geothermal Venture by Hawaii County provided for the drilling, completion and flow testing of two exploratory wells on the Kapoho State lease. This permit was extended for three years on November 22, 1983. The Special Use Permit was amended on February 9, 1984 to allow a replacement well to be drilled. The purpose of these wells was to demonstrate the northeastward extension of the high temperature geothermal reservoir discovered in 1976 by the Hawaii Geothermal Project.

Continuing exploratory evaluations require the extension of the existing Special Use Permit for three years. Three separate technical programs are contemplated, with a common objective of obtaining substantial additional information about the extent, behaviour and processes of the Kapoho geothermal reservoir. This work is preparatory to the development of the commercial phase of the project. These programs are explained below.

Thermal Power Company

A subsidiary of Diamond Shamrock, 601 California Street, San Francisco, California 94108
Phone 415 981-5700, Telex 34387 DIASHAM SFO

1. Long term test of PGV Well KS-1A. KS-1A will be used in a flow mode to supply geothermal effluent to the HGP-A Plant and Puna Research Facility. Well KS-1A, with a 2444-foot perforated interval between 4061 and 6505 feet, is believed to be completed in the upper portion of the geothermal reservoir; this reservoir is believed to extend to greater unknown depths. The HGP-A discovery well, with a 3550-foot completion interval between 2900 and 6450 feet, may be producing from two different zones and fluid sources. An intended 3-4 year flow test will be evaluated against the five year production record of the HGP-A well to obtain new insights to optimal reservoir development and production.
2. Continuing evaluation of the KS-1A well. In a safe and cost effective program correlated with ongoing studies of the KGP-A well, an evaluation will be made of the KS-1A well including shut-in wellbore observations and sampling of pressure, temperature, fluids and chemical species correlated with depth.
3. Geophysical Analysis:

Additional geophysical surveys (to be executed and) calibrated with all existing well data, to refine a baseline data bank on the geothermal reservoir extent, internal qualities and production potential.

In addition to the technical evaluation of the wells, further studies of the Kapoho leasehold for wellfield development are to be carried out in support of the planned 25 MW power plant. These are expected to include studies of well pad locations, surface usage plans and hydrology studies and fluid injection tests.

We appreciate your prompt attention to this matter. If more information is required, please contact us immediately.

Sincerely,

Maurice A. Richard
Senior Engineer

KJT/dg
0307E

cc: R.A. Patterson/R.T.Pittenger/M.A.Richard
K.J. Tobias/S/R. Office

Dean

May 8, 1986

Mr. Joe L. Iovenitti
Senior Geologist
Diamond Shamrock
Thermal Power Company
3333 Mendocino Ave., Suite 120
Santa Rosa, California 95401


Dear Mr. Iovenitti:

As requested, the Department of Land and Natural Resources is forwarding two copies each of the Underground Injection Control Maps for the following USGS topographic quadrangles: Pahoa South, Pahoa North, and Kapoho.

Furthermore, please be advised that the Department has not received the data for Kapoho State No. 1-A as requested in our earlier letter to your office dated April 1, 1986. Pursuant to the Department's Administrative Rules, Title 13, Chapter 183, "Rules on Leasing and Drilling of Geothermal Resources", we had requested for our records, the temperature, pressure and spinner surveys, in addition to the water sample analyses conducted by Pruett Industries International.

Your timely submittal of all data related to the production or utilization of geothermal resources will be greatly appreciated and shall be kept confidential. Should you have any questions or if we can be of any further assistance, please contact me at (808) 548-7533.

Sincerely,


MANABU TAGOMORI
Manager-Chief Engineer

DN:ko
Enc.



Diamond Shamrock
Thermal Power Company

April 22, 1986

State of Hawaii
Dept. of Land & Natural Resources
Division of Water & Land Development
P.O. Box 373
Honolulu, HI 96809

Attn: Mr. Manabu Tagamori

Gentlemen:

As per my telephone conversation with Mr. Dean Nakano, Thermal Power Company requests two copies of the "Underground Injection Control" line map as designated by State of Hawaii Department of Health, for the following U.S.G.S. topographic maps: Pahoa South, Pahoa North, and Kapoho, all in Hawaii County.

Thermal will cover any handling and/or postage fees associated with this request. Your cooperation is appreciated.

Sincerely yours,

Joe Iovenitti

J. L. Iovenitti
Senior Geologist

JLI/bbd
JLI031

RECEIVED
86 APR 25 4 8: 56
DIV. OF WATER &
LAND DEVELOPMENT

Thermal Power Company

A subsidiary of Diamond Shamrock, 601 California Street, San Francisco, California 94108
Phone 415 981-5700, Telex 34387 DIASHAM SFO



Diamond Shamrock
Thermal Power Company

March 24, 1986

State of Hawaii
Department of Land and Natural Resources
Division of Water and Land Development
Kalanimaku Bldg., Room 227
1151 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Mr. Manabu Tagamori

Gentlemen:

Thermal Power Company requests the chemical results of the top of the basal water analyses from samples collected from Thermal's KS-1 and KS-1A and Barnwell Industries, Inc. Ashida 1, Lanipuna-1 and 1 Redrill, and Lanipuna-6.

Your cooperation in this matter is appreciated.

Sincerely,

J. L. Iovenitti
Senior Geologist

JLI/ma

cc J. J. Hebein
R. A. Patterson

Thermal Power Company

A subsidiary of Diamond Shamrock, 3333 Mendocino Avenue, Suite 120, Santa Rosa, California 95401
Phone 707 576-7022

DONE 3/25/86

April 1, 1986

Mr. Ralph A. Patterson
Project Manager
Thermal Power Company
220 South King St., Suite 1750
Honolulu, Hawaii 96813

Dear Mr. Patterson:

The Department of Land and Natural Resources has been advised that periodic wireline surveys are being conducted at Kapoho State No. 1-A. It is our understanding that temperature, pressure and spinner surveys, in addition to water sample analyses are being conducted by Pruett Industries International.

In accordance with DLNR's Administrative Rules, Title 13, Chapter 183, "Rules on Leasing and Drilling of Geothermal Resources", we request the timely submittal of all data related to the production or utilization of geothermal resources. All submitted information concerning Kapoho State No. 1-A will be kept confidential as a trade secret for a period of one year from the date of receipt, or longer at the discretion of the Board.

Your attention to this matter is greatly appreciated. Should you have any questions, please contact me at 548-7533.

Sincerely,


MANABU TAGOMORI
Manager-Chief Engineer

DN:ko

Jul visit well
10/31 end

TO: INITIAL:

PLEASE:

FILE IN:

REMARKS:

See Me

Call

Review & Comment

Take Action

Investigate & Report

Draft Reply

Acknowledge Receipt

Type Draft

Type Final

Xerox copies

File

Mail

S. Samuels

W. Kovanagi

D. Hamada

K. Oshiro

M. Tagomori

H. Sakai

H. Morimatsu

J. Sato

FOR YOUR:

Approval

Signature

Information

4:00pm/ will contact local DOH (Harold Matsumura)
also rec'd call and I have notified Honolulu DOH
from Ralph Patterson (Deanna Lau) of the above beating. Dean
advising same.

Dean

January 22, 1986

Mr. Ralph A. Patterson
Project Manager
Thermal Power Company
220 South King St., Suite 1750
Honolulu, Hawaii 96813

Dear Mr. Patterson:

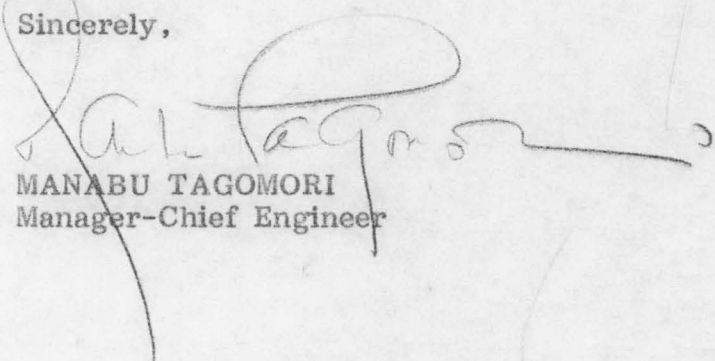
In accordance with the Department of Land and Natural Resources Administrative Rule 13-183, Rules on Leasing and Drilling of Geothermal Resources, we request the timely submittal of the following data for Kapoho State-1A:

- o Drilling log and core report
- o Well history report
- o Well summary report
- o Drawing of as-built section of completed well
- o Induction electrical log

In addition, as specified in the Geothermal Resource Mining Lease R-2, please furnish all physical and factual exploration results, logs, surveys, well test data and any other data resulting from operations under the lease.

Thank you for your continued cooperation and we look forward to the receipt of all the requested information. Should you have any questions, please feel free to contact me at 548-7533.

Sincerely,


MANABU TAGOMORI
Manager-Chief Engineer

DN:ko



Diamond Shamrock

Thermal Power Company

*clean -
jls jls*

Ralph A. Patterson, Jr.
Hawaii Project Manager

28 October 1985

Mr. Albert L. Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

Dear Mr. Lyman:

In the course of our flow testing of the KS-1A geothermal well after the initial 4-hour venting on 14 October, we have observed a gradual increase in the total mass flow of the well. At the same time, the geothermal liquid samples have remained dirty and there have been several cases of abrasive materials passing through the test piping, as evidenced by the sounds in the pipes.

Accordingly, under the terms of Special Use Permit #468, we are requesting permission to conduct a second period of vertical venting to further clean out the wellbore, as follows:

Date: Wednesday, 30 October 1985
Time: Begin at 8:00 a.m. for no more than 8 hours
Schedule: It is planned to shut-in the well for 15 minutes then open it to vertical flow for 15 minutes; shut-in for 30 minutes and then open vent for 30 minutes; shut-in for 60 minutes and then open for 60 minutes. The 60-minute cycle would then be repeated as necessary if debris continues to be discharged.

As was the case during the 14 October event and the flow testing since that time, we will continue to monitor noise, air emissions and plume dispersal as outlined in my letter of 23 September 1985 which forwarded the Test Monitoring Plan for the KS-1A well. Area residents will be notified of the testing through the newspapers and by a press release to the Hilo radio stations. The narrative report of the test period will include the vertical venting commentary for this second event.

85 OCT 29 P 3:11
DIV. OF WATER &
LAND DEVELOPMENT

RECEIVED

Mr. Albert L. Lyman
Page Two
28 October 1985

A revised testing schedule is enclosed.

Please call me if you have any questions.

Sincerely yours,

A handwritten signature in cursive script that reads "Ralph A. Patterson". The signature is written in dark ink and is positioned to the right of the typed name.

RAP/crn
enclosures

cc: DOWALD
D'Olier
Pittenger
Bowden
Goyal
Tobias
Nakaji

Revised: 10/28/85

FLOW TEST PROGRAM FOR KS-1A

Geothermal well flow testing is the most critical undertaking faced in the Puna Geothermal Field. The task is complex, difficult and vulnerable to upset. Several iterations of our objectives and procedures, against our experience with KS-1 and KS-2, have simplified and focused our flow test program for KS-1A. The chief elements are as follows:

- o Water injection test immediately following completion of drilling and casing.
- o Slow static wellbore warm-up followed by controlled low volume flows to achieve gradual and complete heat-up of casing and concrete sheaths.
- o Initial full opening on vertical venting to flush debris.
- o Twenty days of continuous flow to separator for precise identification of steam volumes and liquid fraction.
- o Noise abatement by use of a rock muffler and H₂S abatement by chemicals during the flow test.

Schedule (estimated)

3 Sept.	Complete drilling activities; release drill rig.
4 Sept.	Injection test.
4-11 Sept.	Rig move-out.
4 Sept.- 6 Oct.	Static well warm-up.
7-13 Oct.	Low rate flow (trickle flow).
14 Oct.	Vertical venting on initial full flow.
14 Oct.-4 Nov.	Flow testing through rock muffler with abatement systems.
30 Oct.	Vertical Venting
31 Oct.	Flow test suspended.
31 Oct.-11 Nov.	Well stabilization.
12-15 Nov.	N ₂ gas injected into well bore (tentative).
16 Nov.	Well shut-in.

RECEIVED

85 OCT 31 A9:34

DIV. OF WATER &
LAND DEVELOPMENT

October 29, 1985

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Diamond Shamrock
Thermal Power Company
220 South King St., Suite 1750
Honolulu, HI 96813

Dear Mr. Patterson:

This letter responds to your request outlined in your letter dated October 28, 1985, to conduct a second period of vertical venting of the KS-1A geothermal well.

Your request is approved subject to:

1. Compliance with the venting schedule indicated in your October 28 letter.
2. Notification of area residents prior to commencing the venting.
3. Monitoring of noise and air emissions and plume dispersal as outlined in your September 23 letter.
4. Compliance with all other applicable conditions of Special Permit No. 468.

Sincerely,



ALBERT LONO LYMAN
Planning Director

ALL:aeb

cc: ✓ DOWALD
K. Tobias
A. Nakagi



PLANNING DEPARTMENT

25 AUPUNI STREET

COUNTY OF HAWAII

HILO, HAWAII 96720



Hawaii 25 years of statehood. A lifetime of



Dept. of Land & Natural Resources
Water & Land Development
P. O. Box 621
Honolulu, HI 96809



Diamond Shamrock

Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

16 October 1985

Mr. Manabu Tagomori
DLNR - Division of
Water & Land Development
Kalanimoku Bldg. Room 227
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Tagomori:

In response to your request of October 9th, I have enclosed a copy of the daily drilling report for 23 August 1985, which reported the BOPE test for the 9-5/8" casing.

Please note that we have moved our Honolulu office, and change your records accordingly.

Sincerely yours,

RAP/crn
enclosure

cc: Mr. W. L. D'Olier

RECEIVED
85 OCT 17 P 3: 05
DIV. OF WATER &
LAND DEVELOPMENT

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

RECEIVED
OCT 10 1985



RECEIVED

OCT

WLD
F-KS-1A Drilling

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

P. O. BOX 373
HONOLULU, HAWAII 96809

October 9, 1985

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
1600 Kapiolani Blvd., Suite 808
Honolulu, Hawaii 96814

Dear Mr. Patterson:

Thank you for submitting the daily drilling reports covering the testing of the blow-out prevention equipment (BOPE) that occurred on July 30 and August 11, 1985. However, we have not received the results of the last BOPE test on the 9-5/8 inch casing that occurred on August 24, 1985.

Please forward the requested information at your earliest convenience. All correspondence should be addressed to Manabu Tagomori at the Division of Water and Land Development, P.O. Box 373, Honolulu, Hawaii 96809.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

DN:dh

DAILY DRILLING REPORT — GEOTHERMAL										30 CSG 84K		
WELL NO. KS1A					AFE NO. 84005					20" CSG. 1377		
REPORT NO. 47					DATE 8-23-85					3 3/8" CSG. 2701		
TOTAL RIG DAYS 47					TIME FROM SPUD 46+6.5hr.					7 5/8" CSG. 4061		
DEPTH @ 2400 HRS. 4068'					FOOTAGE DRLD.					LINER		
HRS. DRILLED					HRS. TRIPPED					HRS. REPAIR		
HRS. OTHER 24					COOLING TOWER IN USE, <input type="checkbox"/> YES <input type="checkbox"/> NO					RIG NO. WR14		
MUD WT.		VIS.		W.L.		CK.		PH.		CHL.		
P.V.		GELS		% SAND		% SOLIDS		% LOST CIRC. MTL.		YP		
GALVONIC PROBE			CORRATOR			SULPHIDE			OXY.		AIR-H2O RATIO	
FORM. DRLD.				FLOW LINE TEMP. °F				SUCTION TEMP. °F				
MAX. TEMP. °F				DEVIATION SURVEYS:								
BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT.	HRS.	WT.	RPM	COND.
												T B G
												T B G
												T B G
PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM		NOZZLE VEL.		ANNULUS VEL.		
AIR COMP. NO		CFM		PSI		TEMP. °F		CHEM.		RATIO		RATE
DRILLING ASSEMBLY, TOTAL LENGTH AND DESCRIPTION:												
TOTAL STRING WT.					TOTAL PICKUP WT.					ROTARY TORQUE HIGH AVERAGE LOW		
STEAM ENTRIES, DEPTH, LBS.												
REMARKS FOR 24 HOUR PERIOD:												
finished nipple up BOPs, tested blind rams @ 1000psi - held ok for 15 min, move 5" DP and 11" DC's off pipe rack, put 16-7 3/4" DC and 4" DP on pipe rack, change liners and swabs #1 pump, - 7 1/4" to 6", install new screen on shell shaker, clean all mud pits @ 24:00 hours												
socket, airblower rental + purchase - 969 2-4" hoses - 175 1 man standby - 150 trucking + labor + freight												
COSTS												
TANGIBLES												
CASING												
VALVES												
FLANGES												
OTHER												
INTANGIBLE												
LOCATION												
RIG MOVES												
RIG 10725												
ABATEMENT												
BITS												
DRILL EQUIP. MAIN.												
DRILL. EQUIP. RENTAL 1500												
FUEL, WATER POWER												
MUD												
SUPERVISION & LABOR 700												
CEMENT SERVICES												



Diamond Shamrock

Thermal Power Company

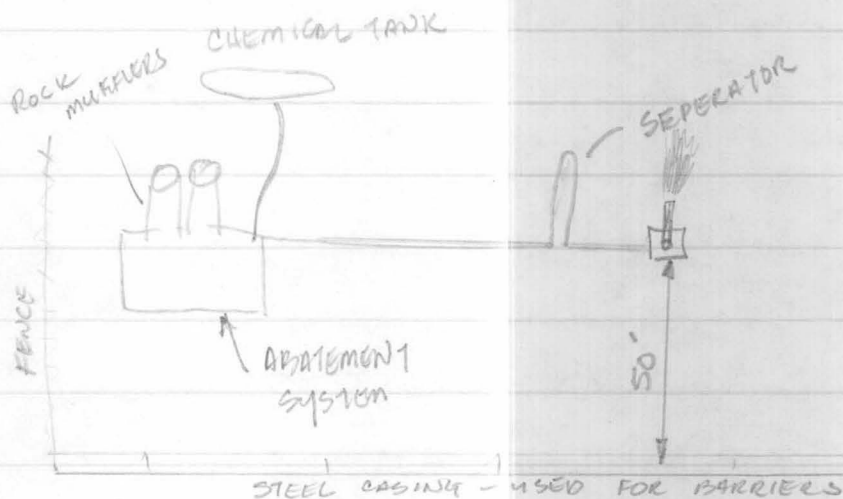
Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

MR. MANABU TAGOMORI
DLNR - Div. of Water & La
Kalanimoku Bldg. Room 227
1151 Punchbowl Street
Honolulu, HI 96813

OCTOBER 14, 1985

KAPOHO 1A

- 1) INITIAL OPENING 0800 HRS. VERTICAL VENTING.
- 2) 1150 HRS. CONNECT TO 10" LINE LEADING TO
^{CHEMICAL}
 H_2S ABATENT SYSTEM AND ROCK MUFFLERS.



0930 HRS 115-118 DECIBELS APPROX 50' AWAY

70-75

" AT GATE,

70-75

" AT HGA VISITOR CENTER,

October 9, 1985

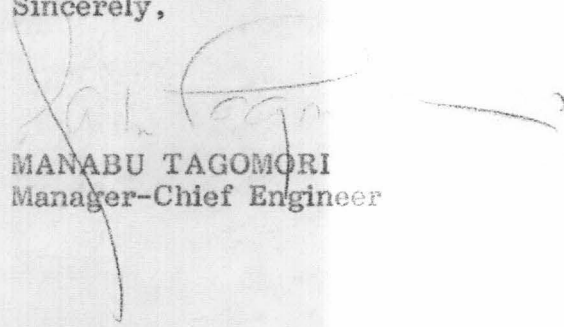
Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
1600 Kapiolani Blvd., Suite 808
Honolulu, Hawaii 96814

Dear Mr. Patterson:

Thank you for submitting the daily drilling reports covering the testing of the blow-out prevention equipment (BOPE) that occurred on July 30 and August 11, 1985. However, we have not received the results of the last BOPE test on the 9-5/8 inch casing that occurred on August 24, 1985.

Please forward the requested information at your earliest convenience. All correspondence should be addressed to Manabu Tagomori at the Division of Water and Land Development, P.O. Box 373, Honolulu, Hawaii 96809.

Sincerely,


MANABU TAGOMORI
Manager-Chief Engineer

DN:dh

October 9, 1985

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
1600 Kapiolani Blvd., Suite 808
Honolulu, Hawaii 96814

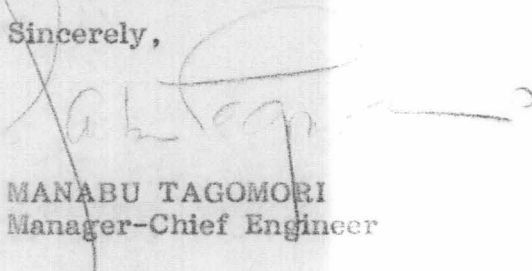
Dear Mr. Patterson:

Thank you for submitting the PGV Emergency Response Plan and the recent revisions to the first edition. However, I would like to note one correction that should be made on page 7 under "Emergency Contact List".

The emergency phone numbers to contact me at work/home should be corrected to read (808) 548-7533/(808) 988-6541, respectively.

Your attention to this matter will be greatly appreciated.

Sincerely,


MANABU TAGOMORI
Manager-Chief Engineer

DN:dh



Diamond Shamrock

Thermal Power Company

9 October 1985

Ralph A. Patterson, Jr.
Hawaii Project Manager

Mr. Albert L. Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

In confirmation of our telephone conversation, we now expect to be ready for vertical venting of the KS-1A well early Monday, October 14th. Appropriate media release of this information will be made.

Sincerely yours,

Ralph Patterson

RAP/crn

cc: W. L. D'Olier
K. P. Goyal
A. A. Nakaji
DOWALD

RECEIVED
85 OCT 10 P 3: 51
DIV. OF WATER &
LAND DEVELOPMENT



Diamond Shamrock

Thermal Power Company

Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

MR. MANABU TAGOMORI
DLNR-Div. of Water & Land Dev.
Kalanimoku Bldg. Rm. 227
1151 Punchbowl Street
Honolulu, HI 96813



DIVISION OF WATER AND LAND DEVELOPMENT

FROM: DATE: 10/9 FILE IN:

TO: INITIAL: PLEASE: REMARKS:

<u> </u>	<u> </u>	M. TAGOMORI	<u> </u>	See Me
<u> </u>	<u> </u>	T. Fujii	<u> </u>	Take Action By <u> </u>
<u> </u>	<u> </u>	H. Sakai	<u> </u>	Route to Your Branch
<u> </u>	<u> </u>	H. Morimatsu	<u> </u>	Review & Comment
<u> </u>	<u> </u>	A. Ching	<u> </u>	Draft Reply By <u> </u>
<u> </u>	<u> </u>	G. Morimoto	<u> </u>	Acknowledge Receipt
<u> </u>	<u> </u>	G. Matsumoto	<u> </u>	Xerox <u> </u> copies
<u> </u>	<u> </u>	P. Matsuo	<u> </u>	File <u> </u>
<u> </u>	<u> </u>	L. Asari	<u> </u>	For Information
<u> </u>	<u> </u>	D. Lum	<u> </u>	J. Sato
<u> </u>	<u> </u>	S. Samuels	<u> </u>	D. Hamada
<u> </u>	<u> </u>	<u> </u>	<u> </u>	L. Nanbu
<u> </u>	<u> </u>	<u> </u>	<u> </u>	J. Siarot
<u> </u>	<u> </u>	<u> </u>	<u> </u>	E. Yonamine
<u> </u>	<u> </u>	<u> </u>	<u> </u>	K. Oshiro

Pling Dept
doing great job
in cc to us.

I want to
reassign - Pl.
planner to
cc them on
growth matter.

COPY

PLANNING DEPARTMENT
25 AUPUNI STREET

COUNTY OF HAWAII
HILO, HAWAII 96720

RECEIVED
85 OCT 9 A 8:51
DIV. OF WATER &
LAND DEVELOPMENT
October 7, 1985

Mr. Ralph Patterson
Hawaii Project Manager
Thermal Power Company
Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

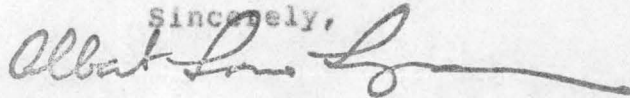
Dear Mr. Patterson:

Thermal Power
Flow Test Program For KS-1A

This is to acknowledge receipt of your letter of September 30, 1985, enclosing your latest revised flow test schedule. Please inform me if your schedule will require significant revisions.

Meanwhile, should you have any questions on this matter, please call me.

Sincerely,



ALBERT LONO LYMAN
Planning Director

RN:aeb

cc: Planning Commission
/ Dept. of Water & Land Dev.



PLANNING DEPARTMENT

25 AUPUNI STREET

COUNTY OF HAWAII

HILO, HAWAII 96720

Hawaii: 25 years of statehood. A lifetime of



Division of Water & Land Development
Dept. of Land and Natural Resources
P. O. Box 373
Honolulu, HI 96809

DIVISION OF WATER AND LAND DEVELOPMENT

FROM:  DATE: 10-1 FILE IN:

TO: INITIAL:

PLEASE:

REMARKS:

M. TAGOMORI

See Me

Take Action By

Route to Your Branch

Review & Comment

Draft Reply By

Acknowledge Receipt

Xerox copies

File

G. Matsumoto

For Information

P. Matsuo

L. Asari

D. Lum

J. Sato

D. Hamada

L. Nanbu

J. Siarot

E. Yonamine

K. Oshiro

COPY

PLANNING DEPARTMENT
25 AUPUNI STREET

COUNTY OF HAWAII
HILO, HAWAII 96720

September 26, 1985

Mr. Ralph Patterson
Hawaii Project Manager
Thermal Power Company
Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

Dear Mr. Patterson:

Thermal Power
Flow Test Program For KS-1A

This is to acknowledge receipt of your letter of September 23, 1985 enclosing your revised tentative schedule and outline of the monitoring program you will use during your Flow Test Program for KS-1A. You may continue in accordance with these submittals. My staff will schedule their activities accordingly. Please inform me if your schedule will require significant revisions.

Meanwhile, should you have any questions on this matter, please call me.

Sincerely,



ALBERT LONO LYMAN
Planning Director

RN/ALL:ds/aeb

cc: Planning Commission
✓Dept. of Water & Land Dev.

RECEIVED
SEP 30 11:21
DIV. OF WATER &
LAND DEVELOPMENT



Diamond Shamrock

Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

30 September 1985

Mr. Albert L. Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

A revised flow test schedule for the KS-1A well is enclosed. With the beginning of the low rate flow on October 2nd, the rest of our test schedule will be easier to predict.

I will keep you or your staff apprised of any further changes to the expected schedule. Thank you for your patience.

Sincerely yours,

Ralph Patterson

RAP/crn

cc: DOWALD

RECEIVED
85 OCT 1 P 3: 59
DIV. OF WATER &
LAND DEVELOPMENT

Revised: 9/30/85

FLOW TEST PROGRAM FOR KS-1A

Geothermal well flow testing is the most critical undertaking faced in the Puna Geothermal Field. The task is complex, difficult and vulnerable to upset. Several iterations of our objectives and procedures, against our experience with KS-1 and KS-2, have simplified and focused our flow test program for KS-1A. The chief elements are as follows:

- o Water injection test immediately following completion of drilling and casing.
- o Slow static wellbore warm-up followed by controlled low volume flows to achieve gradual and complete heat-up of casing and concrete sheaths.
- o Initial full opening on vertical venting to flush debris.
- o Twenty days of continuous flow to separator for precise identification of steam volumes and liquid fraction.
- o Noise abatement by use of a rock muffler and H₂S abatement by chemicals during the flow test.

Schedule (estimated)

3 Sept.	Complete drilling activities; release drill rig.
4 Sept.	Injection test.
4-11 Sept.	Rig move-out.
4-24 Sept.	Static well warm-up.
2-8 Oct.	Low rate flow (trickle flow).
8 Oct.	Vertical venting on initial full flow.
8-29 Oct.	Flow testing through rock muffler with abatement systems.
30 Oct.	Flow test suspended.
31 Oct.-21 Nov.	Well stabilization.
25-27 Nov.	N ₂ gas injected into well bore.
28 Nov.	Well shut-in.



Diamond Shamrock

Thermal Power Company

Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

MR. MANABU TAGOMORI
DLNR - DOWALD
Kalanimoku Bldg. #227
1151 Punchbowl St.
Honolulu, HI 96813



DIVISION OF WATER AND LAND DEVELOPMENT

FROM: DATE: 9-25 FILE IN:

TO: INITIAL: PLEASE: REMARKS:

M. TAGOMORI

See Me

T. Fujii

Take Action By

H. Sakai

Route to Your Branch

H. Morimatsu

Review & Comment

A. Ching

Draft Reply By

G. Morimoto

Acknowledge Receipt

G. Matsumoto

Xerox copies

P. Matsuo

File

L. Asari

For Information

D. Lum

J. Sato

S. Samuels

D. Hamada

L. Nanbu

J. Siarot

E. Yonamine

K. Oshiro

Low rate flow (trickle flow)

to commence @ 2 Oct.

Full venting @ 8 Oct.

(Spoke w/ Ralph Patterson -
30 Sep 85 - Ed)



Diamond Shamrock

Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

23 September 1985

Mr. Albert Lono Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

We are in receipt of your letter of September 10th and have enclosed an outline of the monitoring program which will be used during the venting. For your information, we are also preparing notifications to surrounding residences for the testing of water catchment systems before and after the venting.

A revised tentative schedule is enclosed.

Sincerely yours,

Ralph Patterson

RAP/crn
enclosure

cc: Dept. of Water & Land Dev.
D'Olier
Pittenger
Tobias
Goyal
Bowden
Nakaji

RECEIVED
DIV. OF WATER &
LAND DEVELOPMENT

85 SEP 25 10:58

Revised: 9/23/85

FLOW TEST PROGRAM FOR KS-1A

Geothermal well flow testing is the most critical undertaking faced in the Puna Geothermal Field. The task is complex, difficult and vulnerable to upset. Several iterations of our objectives and procedures, against our experience with KS-1 and KS-2, have simplified and focused our flow test program for KS-1A. The chief elements are as follows:

- 0 Water injection test immediately following completion of drilling and casing.
- 0 Slow static wellbore warm-up followed by controlled low volume flows to achieve gradual and complete heat-up of casing and concrete sheaths.
- 0 Initial full opening on vertical venting to flush debris.
- 0 Twenty days of continuous flow to separator for precise identification of steam volumes and liquid fraction.
- 0 Noise abatement by use of a rock muffler and H₂S abatement by chemicals during the flow test.

Schedule (estimated)

3 Sept.	Complete drilling activities; release drill rig.
4 Sept.	Injection test.
4-11 Sept.	Rig move-out.
4-24 Sept.	Static well warm-up.
<i>Wed 2 Oct. →</i> 24-30 Sept.	Low rate flow (trickle flow).
<i>8 Oct</i> 1 Oct.	Vertical venting on initial full flow.
1-22 Oct.	Flow testing through rock muffler with abatement systems.
23 Oct.	Flow test suspended.
24 Oct.-14 Nov.	Well stabilization.
15-17 Nov.	N ₂ gas injected into well bore.
18 Nov.	Well shut-in.

KS-1A WELL TEST MONITORING PLAN

Background

Thermal Power Company has been operating an air quality and noise monitoring network in the Puna geothermal area since mid-1981. This network provides air emission levels, noise levels, and meteorological information on a regular basis.

The total air monitoring network, which includes both the Thermal Power and HGP programs, consists of a combination of Colortech cards and continuous H₂S analyzers. A network of 15 Colormetric cards is collected every 10 days. Four continuous H₂S analyzers are currently in operation: one southwest of the Lanipuna 6 well site, one about 1.75 miles northeast of HGP (station 36) one at HGP-A and one about 1.25 miles southwest of HGP (station 16). The KS-1 drill site and station 36 are also instrumented with 10-meter meteorological towers and measure wind speed, wind direction, and temperature. Station 36 and HGP-A also monitor relative humidity, precipitation, standard deviation of horizontal wind direction, and solar radiation.

The attached map indicates the locations of the monitoring stations.

Noise monitoring is conducted on a regular basis, when the Colortech cards are read, at the following stations, located in reference to the HGP-A well site.

Station #1	Rift	.5 mi.	E	of HGP-A
2	Schroeders Hill	1.1 mi.	SW	"
3	Kubera's	.5 mi.	SE	"
4	Colortech #25	.6 mi.	NE	"
5	Colortech #35	.4 mi.	NW	"
6	Pomerencs	1.1 mi.	ENE	"
7	TPC Gate (CT #27)	.2 mi	N	"
8	Colortech #39	.7 mi.	NNW	of HGP-A
9	Colortec #13	1.0 mi.	W	"

Noise, meteorological and H₂S data is summarized and provided to the County on a semi-annual basis. Nineteen such reports have been furnished.

KS-1A Monitoring During Tests

A flow test schedule has been provided under separate cover.

During the testing of the KS-1A well, additional monitoring and public notification will be provided as follows:

1. Notification - Area residents in Nanawale and Leilani Estates, Lanipuna Gardens, Kaniahiku Village, and the Chow ranch area will be notified of the testing by a flyer distributed to the individual houses prior to the open venting of the well. A draft of the notice is enclosed.

In addition, a press release on the venting schedule will be provided to the Hawaii Tribune Herald and the Hilo radio stations listed in the PGV emergency plan.

2. Water catchment tests - The six residential catchment systems previously tested for lead, arsenic, and mercury will be sampled before and after open venting. Analysis of the collected samples will be by Industrial Analytical Labs of Honolulu, as before. The six catchment systems to be tested are shown on the attached map.
3. Noise - Special monitoring at the KS-1A site and at the other 9 noise monitoring sites will be conducted before, during, and after the venting.
4. Air emissions - recording H₂S monitors and Colortech cards will be read and a record made of the period covering the venting.
5. Meteorology stations - The data from the met stations will be recorded for the venting period.
6. Plume size and dispersal - An on-site log will record the size and apparent dispersal pattern of the vented plume during the venting.
7. Flow test - During the long term flow test, when noise and H₂S will be abated by the rock muffler and chemical injection, the regular meteorology and emissions monitoring schedule will be followed. Noise measurements will be conducted 3 times a week during this period.
8. Report - A narrative report of the open venting period and the flow test, with collected data during the venting and flow testing, will be provided to the County within 60 days of the end of the flow testing.

9/23/85

23 September 1985

TO: Residents of Puna in the vicinity of the Puu Honuaula
FROM: Thermal Power Company

The Puna Geothermal Venture recently completed the drilling of a third exploratory well, named the Kapoho State 1A, at the Puu Honuaula site. The well has been drilled in compliance with State regulations and the County Special Use Permit #468, and we are getting ready now for testing which will involve the actual flowing of the well.

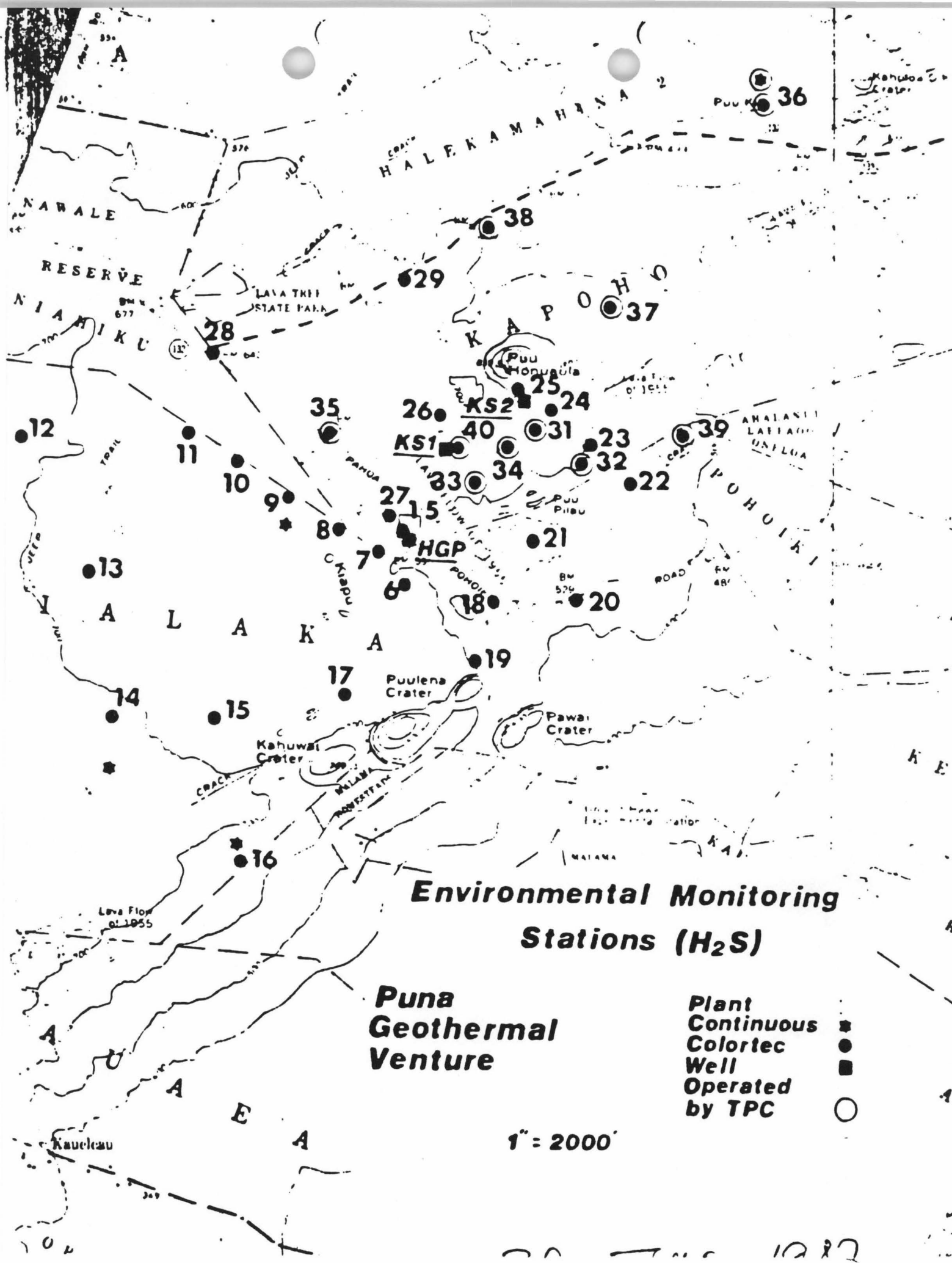
As a result of tests on our first two wells, we have found that a brief period of open venting, or stacking, of the wells is necessary. Open venting serves to clear the well of abrasive material left from the drilling. This material can be damaging to the pipes, instrumentation and other equipment at the surface, and could also cause plugging of the well if not removed when the well is first flowed. In the interests of safety and the protection of the well itself, a period of 8-10 hours of open venting has been scheduled.

Open venting of KS-1A is now scheduled for daylight hours on October , though the testing schedule cannot be firmly established more than a couple of days in advance. In addition to this notice, we will be making radio and newspaper announcements of the scheduled start of the test, so that nearby residents can be aware of our schedule.

We apologize for any inconvenience this initial clean-out period may bring to you. Be assured that we have carefully structured a testing procedure to keep vertical venting to the shortest required time.

After vertical venting is completed, the steam will be flowed into a rock muffler which was proven successful and within County noise guidelines. Chemical abatement will be utilized to keep H₂S odor from becoming a nuisance. Total flow testing should take 3 to 4 weeks.

We appreciate your interest in our project and would be happy to discuss this testing program with you. Our answering service number in Hilo is 961-2184. If you have any written comments, our Honolulu office is at 220 South King Street, Suite 1750, Honolulu, Hawaii, 96813.



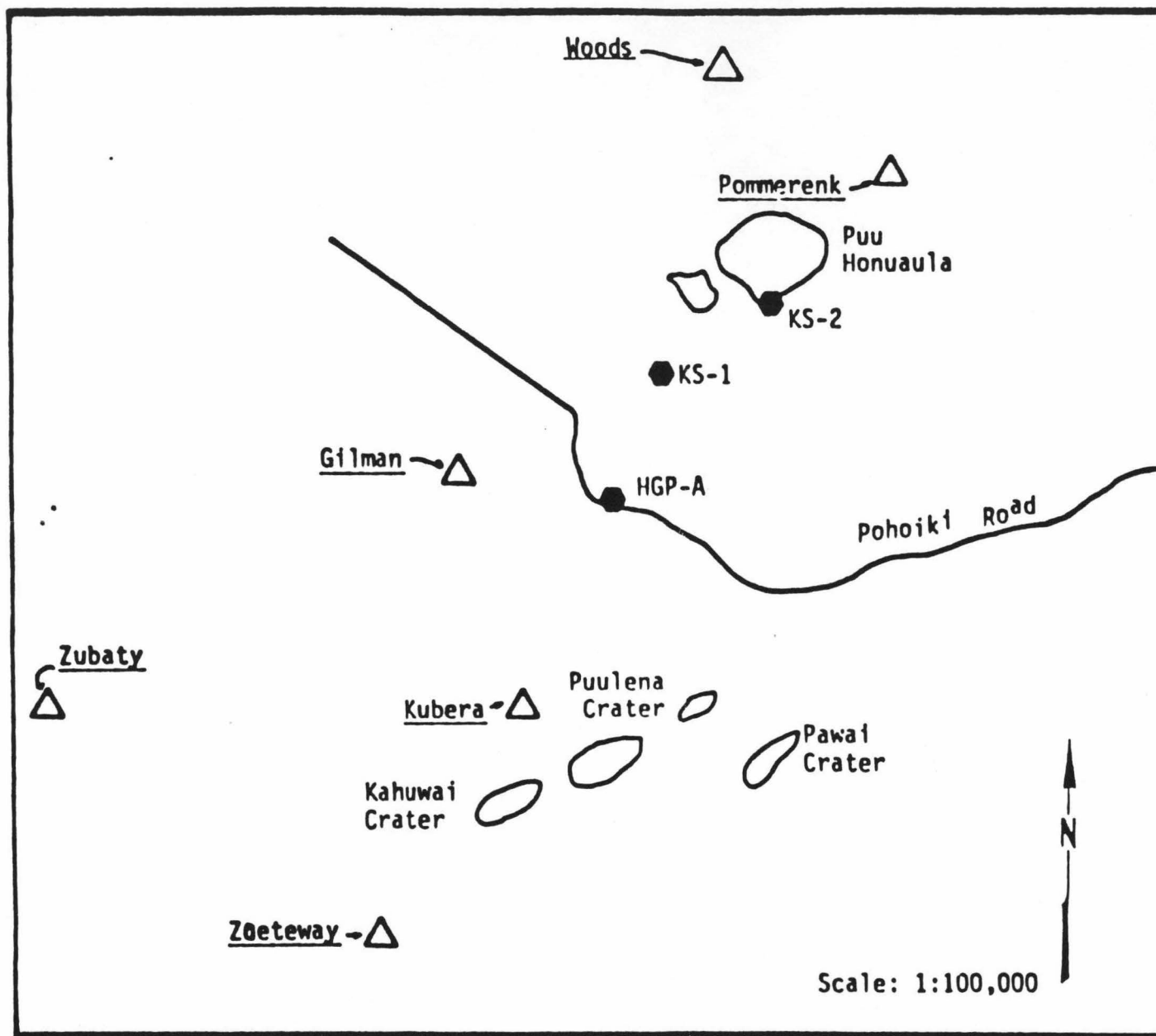
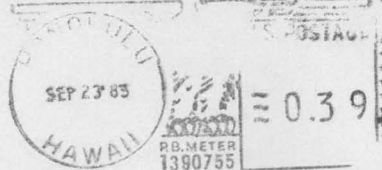


Figure 1. Location map for residence watchment system sampling.



Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

Diamond Shamrock
Thermal Power Company

TO: MR. MANABU TAGOMORI
DLNR-Div. of Water & Land Dev.
Kalanimoku Bldg. Rm. 227
1151 Punchbowl Street
Honolulu, Hawaii 96813

Return Postage Guaranteed

COPY

PLANNING DEPARTMENT
25 AUPUNI STREET

COUNTY OF HAWAII

HILO, HAWAII 96720

DIV. OF WATER &
AND DEVELOPMENT

SEP 16 P12: 08

RECEIVED

September 10, 1985

Mr. Ralph A. Patterson, Hawaii Project Manager
Thermal Power Company
Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

Dear Mr. Patterson:

Special Permit No. 468
Request for Vertical Venting at KS-1A

This is to acknowledge receipt of your letter of August 22, 1985 and the Flow Test Program for KS-1A submitted on September 5, 1985.

Upon reviewing your submittals, I have determined that your successful completion of the Flow Test Program for KS-1A is dependent upon vertical venting on initial full flow prior to flow testing of the geothermal fluids. Although this vertical venting will occur without abatement measures for minimizing noise and hydrogen sulfide emissions, I have determined that this is the only reasonable alternative. As such you will be complying with Condition No. 8 of Special Permit 468.

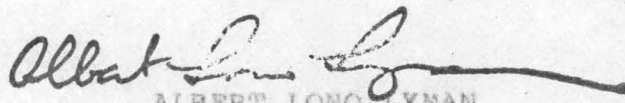
As you know, Special Permit No. 468 (as amended) also sets twenty one conditions. These include "advising the County and State agencies, the general public, and residents nearest the well site of the specific date in a timely manner" and "monitoring and recording the air emissions, noise, vented plume size and dispersal." Vertical venting shall therefore require your notifying surrounding residents and the general public of the dates and time of the venting events; monitoring and recording the air emissions, noise, vented plume size and dispersal; and collecting water samples from the water tanks prior to and after vertical venting you have

Mr. Ralph A. Patterson
Page 2
September 10, 1985

previously monitored for comparative analysis. A detailed outline of your monitoring program shall be submitted for our review and approval a week prior to the venting, and a report of the monitoring and recording of emissions and of water samples shall be submitted to the Planning Department within sixty days after the venting is completed.

When your schedule becomes more definite please inform us at your earliest convenience. Meanwhile, should you have any questions on this matter, please call me.

Sincerely,



ALBERT LONO LYMAN
Planning Director

RN/ALL:ds

cc: Planning Commission
✓DOWALD



PLANNING DEPARTMENT

25 AUPUNI STREET

COUNTY OF HAWAII

HILO, HAWAII 96720



Division of Water & Land Development
P. O. Box 373
Honolulu, Hawaii 96809



Diamond Shamrock

Thermal Power Company

WL

1875

RECEIVED

85 AUG 26 P 1: 45

Ralph A. Patterson, Jr.
Hawaii Project Manager

22 August 1985

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

DIV. OF WATER &
LAND DEVELOPMENT

85 AUG 27 A 10: 06

RECEIVED

Mr. Albert L. Lyman
County Planning Director
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

In response to your letter of 14 August, we submit the following for your consideration.

1. The attempt to "modify the steam collection and test abatement equipment" was a conceptual rather than a physical/mechanical one. Had the conceptual evaluations produced a reasonable alternative to vertical venting that alternative would have been translated into physical modifications of equipment followed by testing on KS-1A. However, since even conceptually, a better alternative could not be developed, no equipment modification could be made, nor field tested. Vertical venting remains as the best means to clean a Hawaii geothermal well given the present state of the art and existing conditions.
2. The "research" conducted in evaluation alternatives to vertical venting consisted of a series of in-house discussions. As indicated previously, the three alternatives ultimately considered were 1) redundant capacity, 2) reduced flow, and 3) modified venting. The attachment to my 1 August letter entitled, "Vertical Venting Alternatives" is a statement of the "research". There was and is no formal analytical laboratory type of report.

Also, to remove any confusion about the criteria for determining the completion of vertical venting, we further submit the following points.

- A. On initial opening to full flow, the flow will appear dark gray and not uniform. Variations in noise and flow rate are expected as pressure changes. Peak noise levels up to 120 dba will occur.

Mr. Albert L. Lyman
Page Two
22 August 1985

- B. In time, the color will gradually lighten to light gray or white and the pressure and noise fluctuations will diminish in frequency of occurrence and intensity.
- C. The indications of a clean flow will include a white steam plume with little fluctuation and steady noise levels. A small clear flow may appear just above the discharge point indicating the presence of 100% steam. At this time, the test engineer will judge the flow to be clean.
- D. The exact duration of each of the above phases is not predictable.

It is our sincere desire to convey complete and accurate information to you and your staff to expedite consideration of our request. We are on a critical time schedule, hence, any effort you may provide in approving our request at the earliest possible time would be very much appreciated.

Sincerely yours,

A handwritten signature in dark ink, reading "Ralph Tetterton". The signature is written in a cursive, flowing style with a large initial "R".

RAP/crn

cc: Mayor Dante Carpenter
✓ Mr. Susumu Ono, BLNR



Diamond Shamrock

Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

22 August 1985

Mr. Albert L. Lyman
County Planning Director
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

In response to your letter of 14 August, we submit the following for your consideration.

1. The attempt to "modify the steam collection and test abatement equipment" was a conceptual rather than a physical/mechanical one. Had the conceptual evaluations produced a reasonable alternative to vertical venting that alternative would have been translated into physical modifications of equipment followed by testing on KS-1A. However, since even conceptually, a better alternative could not be developed, no equipment modification could be made, nor field tested. Vertical venting remains as the best means to clean a Hawaii geothermal well given the present state of the art and existing conditions.
2. The "research" conducted in evaluation alternatives to vertical venting consisted of a series of in-house discussions. As indicated previously, the three alternatives ultimately considered were 1) redundant capacity, 2) reduced flow, and 3) modified venting. The attachment to my 1 August letter entitled, "Vertical Venting Alternatives" is a statement of the "research". There was and is no formal analytical laboratory type of report.

Also, to remove any confusion about the criteria for determining the completion of vertical venting, we further submit the following points.

- A. On initial opening to full flow, the flow will appear dark gray and not uniform. Variations in noise and flow rate are expected as pressure changes. Peak noise levels up to 120 dba will occur.

Mr. Albert L. Lyman
Page Two
22 August 1985

- B. In time, the color will gradually lighten to light gray or white and the pressure and noise fluctuations will diminish in frequency of occurrence and intensity.
- C. The indications of a clean flow will include a white steam plume with little fluctuation and steady noise levels. A small clear flow may appear just above the discharge point indicating the presence of 100% steam. At this time, the test engineer will judge the flow to be clean.
- D. The exact duration of each of the above phases is not predictable.

It is our sincere desire to convey complete and accurate information to you and your staff to expedite consideration of our request. We are on a critical time schedule, hence, any effort you may provide in approving our request at the earliest possible time would be very much appreciated.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Ralph Tetterton". The signature is fluid and cursive, with a large, stylized initial "R".

RAP/crn

cc: Mayor Dante Carpenter
Mr. Susumu Ono, BLNR



Diamond Shamrock

Thermal Power Company

RECEIVED

85 AUG 22 P 3: 03

DIV. OF WATER &
LAND DEVELOPMENT
21 August 1985

Ralph A. Patterson, Jr.
Hawaii Project Manager

Mr. Dean Nakano
DLNR - Div. of Water and
Land Development
1151 Punchbowl Street Room 227
Honolulu, Hawaii 96813

Dear Dean:

I have enclosed the daily report which covers the testing of the BOP equipment on the 13-3/8 inch casing on 11 August 1985, per our telephone conversation.

Please let me know if you have any questions.

Sincerely yours,

RAP/crn
enclosure

cc: R. J. Bowden, Hilo
W. L. D'Olier

DAILY DRILLING REPORT — GEOTHERMAL										30" CSG 84KB.		
WELL NO. KS1A					AFE NO. 84D05					20" CSG. 1377		
REPORT NO. 35			DATE 8-11-85							B3/8" CSG. 2700		
TOTAL RIG DAYS 35			TIME FROM SPUD 34+6.5hr.							" CSG. RECEIVED		
DEPTH @ 2400 HRS. 2722			FOOTAGE DRLD.							LINER		
HRS. DRILLED			HRS. TRIPPED							TIE-BACK		
HRS. OTHER 24			COOLING TOWER IN USE, <input type="checkbox"/> YES <input type="checkbox"/> NO							AUG 15 1985		
MUD WT. 8.6		VIS. 29		W.L. 48		CK. 3/32		PH. 10.4		CHL. 300 YP 2		
P.V. 1		GELS 1/2		% SAND Trace		% SOLIDS 2		% LOST CIRC. MTL.				
GALVONIC PROBE		CORRATOR		SULPHIDE		OXY.		AIR-H2O RATIO 1				
FORM. DRLD.			FLOW LINE TEMP. °F				SUCTION TEMP. °F					
MAX. TEMP. °F		DEVIATION SURVEYS:										
BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT.	HRS.	WT.	RPM	COND.
8	12 1/4"	Hug	OWV	BN103	—	2722	inc	0	6	6-15	40-45	T B G
Drilled DV collar, plvgs, float collar, cement (clean-out run)												
T B G												
PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM		NOZZLE VEL.		ANNULUS VEL.		
AIR COMP. NO		CFM		PSI		TEMP. °F		CHEM.		RATIO 1		RATE
DRILLING ASSEMBLY, TOTAL LENGTH AND DESCRIPTION:												
TOTAL STRING WT.				TOTAL PICKUP WT.				ROTARY TORQUE HIGH AVERAGE LOW				
STEAM ENTRIES, DEPTH, LBS.												

REMARKS FOR 24 HOUR PERIOD:	COSTS
finish nipple-up BOP's, connect WRI BJ cement pump, Tested pipe rams @ 1000 psi for 15 minutes, Held ok, P.U. 12 1/4" bit, RIH top DV collar @ 2457', Tested 5" pipe rams, @ 1000 psi for 15 minutes, held ok, Tested hydril @ 700 psi for 15 minutes, Held ok, drilling Haliburton wiper plug, DV collar, RIH to float collar @ 2621, drilling float collar @ 24:00 hours.	TANGIBLES
	13 3/8" CASING 225,637
	VALVES
	float, DV, Pit collar 18,645
	FLANGES
	OTHER
	INTANGIBLE
	LOCATION
	RIG MOVES 10,725
	RIG
ABATEMENT	
#8 2200	
BITS	
wellhead 45,000	
DRILL EQUIP. MAIN.	
DRILL. EQUIP. RENTAL	
FUEL, WATER POWER	
MUD 1047	
SUPERVISION & LABOR 700	
	49,940



Diamond Shamrock

Thermal Power Company

Central Pacific Plaza
220 South King Street, Suite 1750
Honolulu, Hawaii 96813

MR. DEAN NAKANO
DLNR - DIV. OF WATER &
LAND DEV.
1151 Punchbowl Street Room 227
Honolulu, Hawaii 96813



Drule
COPY

PLANNING DEPARTMENT

719
COUNTY OF HAWAII

25 AUGUST STREET

HILO, HAWAII 96720

85 AUG 20 A10:49

85 AUG 19 A9:38
85 AUG 19 A9:38

DIV. OF WATER &
LAND DEVELOPMENT

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII
STATE OF HAWAII

August 14, 1985

Mr. Ralph Patterson
Hawaii Project Manager
Thermal Power Company
Suite 1750
220 South King Street
Honolulu, HI 96813

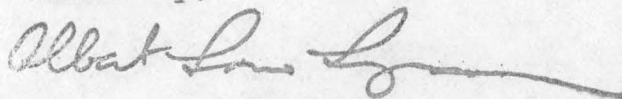
Dear Mr. Patterson:

This letter concerns your correspondence requesting permission to conduct vertical venting of the KS-1A well under Condition 8 of Special Use Permit 468.

The information that you have provided to date does not include documentation of the research referenced in your August 1, 1985 letter. It is appropriate that we should review the research results since you stated in your January 16, 1984 correspondence that modified equipment would be tested during the flow test of KS-1A, and that the modified equipment would, if successful, remove the need for vertical venting. The documentation of the research will provide us a basis to evaluate your August 1, 1985 statement that a "mechanical solution is detrimental to the technical aspects of the well and the health and safety aspects of the public."

Please contact me if you have any further questions.

Sincerely,



ALBERT LONO LYMAN
Planning Director

ALL:lv

cc: Mayor Dante Carpenter
Mr. Susumu Ono, Chairman, BLNR ✓
Ms. Kathryn Tobias (Thermal Power Co.-S.F.)

August 14, 1985

Mr. Ralph Patterson
Hawaii Project Manager
Thermal Power Company
Suite 1750
220 South King Street
Honolulu, HI 96813

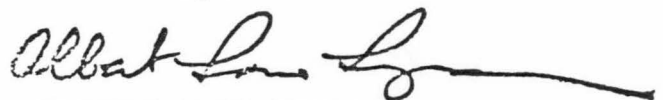
Dear Mr. Patterson:

This letter concerns your correspondence requesting permission to conduct vertical venting of the KS-1A well under Condition 8 of Special Use Permit 468.

The information that you have provided to date does not include documentation of the research referenced in your August 1, 1983 letter. It is appropriate that we should review the research results since you stated in your January 16, 1984 correspondence that modified equipment would be tested during the flow test of KS-1A, and that the modified equipment would, if successful, remove the need for vertical venting. The documentation of the research will provide us a basis to evaluate your August 1, 1985 statement that a "mechanical solution is detrimental to the technical aspects of the well and the health and safety aspects of the public."

Please contact me if you have any further questions.

Sincerely,



ALBERT LONO LYMAN
Planning Director

ALL:lv

cc: Mayor Dante Carpenter
Mr. Susumu Ono, Chairman, BLNR
Ms. Kathryn Tobias (Thermal Power Co.-S.F.)

AUG 14 1985



Diamond Shamrock

Thermal Power Company

RECEIVED

85 AUG 13 AIO: 17

Ralph A. Patterson, Jr.
Hawaii Project Manager

DIV. OF WATER &
LAND DEVELOPMENT

9 August 1985

Mr. Dean Nakano
DLNR - Div. of Water and
Land Development
1151 Punchbowl Street Room 227
Honolulu, Hawaii 96813

Dear Dean:

I have enclosed the daily report which covers the testing of the BOP equipment on the 20-inch casing on 30 July 1985, per our telephone conversation.

Please let me know if you have any questions.

Sincerely yours,

RAP/crn
enclosure

cc: R. J. Bowden, Hilo
W. L. D'Olier

WATER RESOURCES & FLOOD CONTROL DIVISION

From: Dean Date: 8/13/85 File in: _____

To Initial

_____	Manabu Tagomori	_____	See me
_____	Albert Ching	_____	Call
_____	Daniel Lum	_____	Take action by _____
_____	George Matsumoto	_____	Review & comment
_____	Nobu Kaneshiro	_____	Draft reply by _____
_____	Tom Nakama	_____	Type draft
_____	Paul Matsuo	_____	Type final
_____	Edwin Sakoda	_____	Xerox _____ copies
_____	Neal Imada	_____	Mail
_____	Joe Menor	_____	Acknowledge receipt
_____	Jon Kurio		
_____	Mitchell Ohye		
_____	Sherrie Samuels	_____	Approval
_____	Kay Oshiro	_____	Signature
_____	Doris Hamada	_____	Information

_____	R. Chuck	_____	J. Sakai	_____	B. Koyanagi
_____	T. Fujii	_____	E. Yonamine	_____	R. Jinnai
_____	J. Yoshimoto	_____		_____	

Per phone call from Don Thomas, he provided the following preliminary test results of the water sample from Kapoho State No. 1-A:

Na (Sodium) - 921 ppm
 K (Potassium) - 26 ppm
 Ca (Calcium) - 65.8 ppm
 Mg (Magnesium) - 2.71 ppm (?)
 Cl (Chloride) - 1098 ppm
 SO₄ (sulfate) - 74 ppm
 SiO₂ (silica) - 104.6 ppm

PH @ 8.5 suggests that sample may be contaminated from drilling mud.

R. Patterson

DAILY DRILLING REPORT — GEO THERMAL													
WELL NO. KS 1A						AFE NO. 84P05						30 CSG 84' KB	
REPORT NO. 23						DATE 30 JULY 1985						20' CSG. 1377 KB	
TOTAL RIG DAYS 23						TIME FROM SPUD 22D + 6.5H						" CSG. RECEIVED	
DEPTH @ 2400 HRS. 1391						FOOTAGE DRLD. 5						LINER AUG 0	
HRS. DRILLED 2						HRS. TRIPPED 3 1/2						TIE-BACK	
HRS. OTHER 13.5						COOLING TOWER IN USE, <input type="checkbox"/> YES <input type="checkbox"/> NO						HRS. REPAIR	
MUD WT. 8.7		VIS. 36		W.L. 27.3		CK. 3/32		PH. 9.5		CHL. 200		YP 7	
P.V. 8		GELS 3 1/2		% SAND 0.5		% SOLIDS 2		% LOST CIRC. MTL.					
GALVONIC PROBE		CORRATOR		SULPHIDE		OXY.		AIR-H2O RATIO					
FORM. DRLD. BASALT				FLOW LINE TEMP. °F 97				SUCTION TEMP. °F 95					
MAX. TEMP. °F				DEVIATION SURVEYS: NONE									

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT.	HRS.	WT.	RPM	COND.
3	17 1/2	HTC	DDW	AE309	NONE	1386	1NC	5	2	5-25,000	40-52	T B G
												T B G
												T B G

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZZLE VEL.	ANNULUS VEL.
1	7 1/4	14"	58	497	200	200		

AIR COMP. NO	CFM	PSI	TEMP. °F	CHEM.	RATIO	RATE

DRILLING ASSEMBLY, TOTAL LENGTH AND DESCRIPTION: **17 1/2 BIT (USED-MILL TOOTH) SHOCK SUB**

FOUR 11" DC FOUR 8" DC 3 SUB 255' TOTAL LENGTH

TOTAL STRING WT. 85,000	TOTAL PICKUP WT. 85,000	ROTARY TORQUE	HIGH	AVERAGE	LOW
--------------------------------	--------------------------------	---------------	------	---------	-----

STEAM ENTRIES, DEPTH, LBS.

REMARKS FOR 24 HOUR PERIOD:	COSTS
<p>COOLED CASING HEAD FLANGE, THEN RIGGED BLOWOUT PREVENTER: TESTED BOP AT 1000 PSIG FOR 30 MIN. HELD OK</p> <p>RAN OLD 17 1/2" BIT DRILLED CEMENT 1375-1377', CLEANED OUT TO 1386', DRILLED BASALT 1386-1391</p>	TANGIBLES CASING _____ VALVES _____ FLANGES _____ OTHER _____
	INTANGIBLE LOCATION _____ RIG MOVES 8 RIG 10725 ABATEMENT _____ BITS _____ DRILL EQUIP. MAIN. _____ DRILL. EQUIP. RENTAL 500 FUEL, WATER POWER _____ MUD 394 SUPERVISION & LABOR 700 CEMENT SERVICES _____

WATER RESOURCES & FLOOD CONTROL BRANCH

From: Dean Date: 8/9/85 File in: _____

To Initial

_____	Manabu Tagomori	_____	See me
_____	Albert Ching	_____	Call
_____	Daniel Lum	_____	Take action by _____
_____	George Matsumoto	_____	Review & comment
_____	Nobu Kaneshiro	_____	Draft reply by _____
_____	Tom Nakama	_____	Type draft
_____	Paul Matsuo	_____	Type final
_____	Edwin Sakoda	_____	Xerox _____ copies
_____	Neal Imada	_____	Mail
_____	Joe Menor	_____	Acknowledge receipt
_____	Jon Kurio		
_____	Mitchell Ohye		
_____	Sherrie Samuels	_____	Approval
_____	Kay Oshiro	_____	Signature
_____	Doris Hamada	_____	Information
_____	R. Chuck	_____	J. Sakai
_____	T. Fujii	_____	E. Yonamine
_____	J. Yoshimoto	_____	B. Koyanagi
			R. Jinnai

Rev's call from Buddy Bowden on 8-9-85 (11:00am).
2nd BOPE Test will probably be run on Saturday
(8-10-85) or on Sunday, if second stage of
cementing and casing spool/BOPE set up takes
longer than expected.

Have requested that Mr. Bowden contact
our office on Monday (8-12-85) to keep us
advised as to progress of Kepoho State No. 1-A.

Next BOPE Test for 9 5/8" casing will be
in approx. 12 days from today.

Also called Ralph Patterson to have him
send us a copy of the BOPE Test results
for all of the scheduled testing planned
for K.S. # 1-A.

Dean _____

WATER RESOURCES & FLOOD CONTROL BRANCH

From: Dean Date: 8/7/85 File in: 7

To Initial

<input checked="" type="checkbox"/>	<u>Manabu Tagomori</u>	<input type="checkbox"/> See me
<input checked="" type="checkbox"/>	<u>Albert Ching</u>	<input type="checkbox"/> Call
<input checked="" type="checkbox"/>	<u>Daniel Lum</u>	<input type="checkbox"/> Take action by _____
<input type="checkbox"/>	<u>George Matsumoto</u>	<input type="checkbox"/> Review & comment
<input type="checkbox"/>	<u>Nobu Kaneshiro</u>	<input type="checkbox"/> Draft reply by _____
<input type="checkbox"/>	<u>Tom Nakama</u>	<input type="checkbox"/> Type draft
<input type="checkbox"/>	<u>Paul Matsuo</u>	<input type="checkbox"/> Type final
<input checked="" type="checkbox"/>	<u>Edwin Sakoda</u>	<input type="checkbox"/> Xerox _____ copies
<input type="checkbox"/>	<u>Neal Imada</u>	<input type="checkbox"/> Mail
<input type="checkbox"/>	<u>Joe Menor</u>	<input type="checkbox"/> Acknowledge receipt
<input type="checkbox"/>	<u>Jon Kurio</u>	
<input type="checkbox"/>	<u>Mitchell Ohye</u>	
<input type="checkbox"/>	<u>Sherrie Samuels</u>	<input type="checkbox"/> Approval
<input type="checkbox"/>	<u>Kay Oshiro</u>	<input type="checkbox"/> Signature
<input type="checkbox"/>	<u>Doris Hamada</u>	<input type="checkbox"/> Information

<input checked="" type="checkbox"/>	<u>R. Chuck</u>	<input type="checkbox"/>	<u>J. Sakai</u>	<input type="checkbox"/>	<u>B. Koyanagi</u>
<input checked="" type="checkbox"/>	<u>T. Fujii</u>	<input type="checkbox"/>	<u>E. Yonamine</u>	<input type="checkbox"/>	<u>R. Jinnai</u>
<input type="checkbox"/>	<u>J. Yoshimoto</u>	<input type="checkbox"/>	<u>Dean</u>	<input type="checkbox"/>	

For your info:

Rec'd call from Buddy Bowden
in HLo advising us of the following:

1) As of 11:00 am today, the first
stage of cementing has been done
(bottom 240' of 13 3/8" casing).

2) They will wait 24-36 hrs to
let cement harden before
cementing the balance of the casing.

3) Estimated time of BOP test
will be sometime on Friday.

Dean

August 7, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Second Blowout - Prevention Equipment (BOPE)
Test for Geothermal Well, Kapoho State No. 1-A

At 9:30 a.m. on Tuesday, August 6, 1985, I received a call from Mr. Buddy Bowden in Hilo, advising us of the following details:

1. As of 8/6/85, Kapoho State No. 1-A had been drilled to a depth of 2,722 feet (17½" diam. hole).
2. The drillers will begin setting 13 3/8" casing to depth and cement the casing in 2 stages.
 - a. Drillers will cement the bottom 240 ft. of casing first and wait 24 to 36 hours before tensioning the 13 3/8" casing.
 - b. After setting extended casing into wellhead slips, the drillers will cement the balance of the casing annulus.
3. When cementing is completed, the existing BOPE will be removed and the 21¼" 2000 psi x 13 5/8" 3000 psi casing spool installed and pressure tested. This set up will require about 12 hours upon which the second BOPE unit will be installed.

The second BOPE test is tentatively set for late Thursday night(8/8/85) or sometime Friday (8/9/85).

Mr. Bowden agreed to contact our office on a daily basis and keep us advised as to their progress.



DEAN NAKANO

DN:ey

August 2, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Water Sample from Geothermal Well Kapoho State No. 1-A

On August 1, 1985, I met with Dr. Don Thomas at the Hawaii Institute of Geophysics and received the water sample taken from Kapoho State No. 1-A.

The one-gallon sample was taken by a representative from Thermal Power Co. and transported to Honolulu by Dr. Thomas.

Dr. Thomas provided the following data on the water sample and well:

- 1) Date of sampling - 7/20/85
- 2) Static water level @ 608 ft. (measured from ground elevation)
- 3) Sample taken @ 660 ft. depth
- 4) Water temperature recorded @ 110 °F

Note: Drilling mud was encountered in the well at 500 ft. depth and required repeated bailing prior to sampling.

The water sample is currently being forwarded to Mr. John Yee of the U.S. Geological Survey for the usual chemical analyses. A copy of the results will be forthcoming as soon as they become available.



DEAN NAKANO

DN:ko

August 2, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Water Sample from Geothermal Well Kapoho State No. 1-A

On August 1, 1985, I met with Dr. Don Thomas at the Hawaii Institute of Geophysics and received the water sample taken from Kapoho State No. 1-A.

The one-gallon sample was taken by a representative from Thermal Power Co. and transported to Honolulu by Dr. Thomas.

Dr. Thomas provided the following data on the water sample and well:

- 1) Date of sampling - 7/20/85
- 2) Static water level @ 608 ft. (measured from ground elevation)
- 3) Sample taken @ 660 ft. depth
- 4) Water temperature recorded @ 110 °F

Note: Drilling mud was encountered in the well at 500 ft. depth and required repeated bailing prior to sampling.

The water sample is currently being forwarded to Mr. John Yee of the U.S. Geological Survey for the usual chemical analyses. A copy of the results will be forthcoming as soon as they become available.



DEAN NAKANO

DN:ko



Diamond Shamrock

Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

1 August 1985

Mr. Albert L. Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

In my letter of May 2, 1985, the Puna Geothermal Venture (PGV) requested permission to conduct vertical venting of the KS-1A well under Condition 8 of Special Use Permit 468. As outlined, we anticipate a one-day test during daylight hours on a week day in September, 1985. The venting will last a maximum of 10 hours; however, it could last as little as 4-6 hours if the flow is cleaner than expected. Determination of the cleanliness of the flow stream, primarily by visual appearance, and the length of the flowing, will be made by Thermal Power's test engineer, Mr. Keshav Goyal, within the maximum planned flow time of 10 hours.

Vertical venting is a necessary procedure to clean out the flow stream. In the first PGV well drilled, a discharge of rock and mineral particulates occurred, requiring that the flow be brought to a stop when the particulates caused rapid failure of a 10-inch control valve. However, the action of suddenly closing in the well caused irreversible damage to the well when the solid particulates sank in the fluid column, forming multiple bridges (obstructions) of sediment which were not removed by the natural flow of the well. Vertical venting of the well will allow this particulate discharge to be cleaned out, with greatly reduced risk of damage to the well.

Vertical venting also serves as a deliberate safety action as well because it reduces possible thermal and pressure shock of the casing and wellhead equipment when the well is opened and shut-in repeatedly. The flow testing program will thus not have to be extended while emergency repairs are made, and more serious damage to the well may be avoided.

In my previous letter, I discussed the noise levels observed at the site and in nearby residential areas during venting at KS-2. Noise levels expected at KS-1A should not be greater due to topography - the KS-1A site is not quite as exposed.

Detected levels of hydrogen sulfide by the emissions measuring network during the venting at KS-2 were not significantly higher than the variations observed when no open venting is in progress. No complaints of H₂S odors were received by the Thermal Power telephone or reported to us by the County Planning Department staff.

Alternatives to Vertical Venting

TPC has considered three mechanical solutions to accomodate the discharge of iron sulfide and rock particulates during the initial flow testing of new completed Puna geothermal wells. These alternatives are:

Redundant Capacity - Contained initial flow with redundant pipe conduits and control valves to accommodate the expected failure by erosion.

Reduced Flow - Contained initial flows at reduced rate and velocity over a longer time interval.

Modified Venting - Vertical vented initial flow with reduced noise levels by mechanical mufflers.

These alternatives are described, in an enclosure to this letter, in a Thermal Power analysis which considered the experiences on the first wells and the comments made in a report of the flow testing prepared by W. L. Godare & Associates.

Summary

Our experience indicates that vertical venting as a part of the initial flowing of Puna geothermal wells is a necessary procedure to most effectively and rapidly clean up the flow stream of the initial discharge of rock and mineral particulates. The following conclusions support this procedure.

- Potential damage by thermal and pressure shock is reduced because the well does not have to be opened and shut repeatedly.
- The safety, reliability, and endurance of expensive wellhead and test equipment is increased.
- The flow testing program can remain on schedule and not be extended with emergency repair procedues.
- The aggregate public impacts of noise, emissions and traffic activity incident to flow testing are reduced.
- Greater safety is realized at the wellsite for testing and service personnel.

Mr. Albert L. Lyman
Page Three
1 August 1985

We intend to precede the initial full flow testing of KS-1A with a low flow well bleed to bring the wellbore to a high temperature. This will further reduce thermal shock possibilities and promote more rapid cleanup of the flow stream upon opening of the well.

I hope that these comments address the County's concerns expressed in your letter of May 28, 1985, and in our discussions with you and your staff.

Please contact Kathryn Tobias or me if you have any further questions.

Sincerely yours,

A handwritten signature in cursive script, reading "Ralph Peterson". The signature is written in dark ink and is positioned below the typed name "Ralph Peterson".

enclosure
RAP/crn

cc: Mayor Dante Carpenter
Mr. Susumu Ono/Chmn., BLNR

Vertical Venting Alternatives

Redundant Capacity

Evaluations indicated that dual horizontal discharge flow pipe runs and control valves could most safely be positioned 180 degrees apart on a common axis through the wellhead. On the assumption that erosive failure cannot be avoided, this configuration is designed to accommodate the particulate laden initial flows by using one leg and repairing the other leg and thereby maintaining the essential state of continuous flow to the desired cleaned up state. This is not a re-engineering of the system but a mere doubling of the containing surface hardware which does not manipulate the erosive flow to a minimal damage potential. This concept is not an attractive option. Very substantial cost increases obtain only a marginal reduction of the risks involved. This does not eliminate the problem with the particulate discharge, it merely reinforces the system in the event of another heavy discharge.

Reduced Flow

The evaluations for this alternative clearly indicate that opening initial geothermal well flows at reduced rate and velocity for longer time intervals does not guarantee cleanout of particulates. The physics of the problem require increased fluid flow mass and velocity as the effective parameters to achieve the earliest possible reduction of particulates. The prolonged flow test activity, manning and abatement functions will have an adverse public profile, with longer testing time and a higher possibility of mishap. We are concerned that the particulate discharge would be largely deferred to the point when the well is subsequently opened up to measure its maximum production potential.

Modified Venting

This alternative examined noise reduction in vertical venting by a cylindrical muffler sleeve over the discharge pipe. However, the size, weight and height of the muffler and its supporting structure raise questions of stability. A collapse of such a structure over the flowing wellhead would be a compounded disaster. This is an unacceptable risk that could lead to a long interval of uncontrolled flow and intractable costs. Another consideration was given to an expanding discharge pipe, to reduce fluid exit velocity and noise. However, the support and collapse issues with this variant involve the same risks as discussed above.

In summary, these considerations endorse the conclusion that vertical venting is the only method of cleaning up the initial flows of Puna geothermal wells which is safe and guaranteed to protect the well. This allows the dynamics of maximum wellbore flow discharge, blowing

straight up and aligned with the wellbore axis, to eject the particulate load with the lowest risk and in the shortest possible time. Although at one time it was thought that mechanical solutions might be the answer, our research during the last two years indicates that a mechanical solution is detrimental both to the technical aspects of the well and the health and safety aspects of the public. All mechanical solutions involve more noise, longer testing, and higher safety considerations due to the possible deferring of the particulate discharge.

July 31, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Blowout - Prevention Equipment (BOPE) Test for
Geothermal Well, Kapoho State No. 1-A

At 2:00 p.m. on Monday, July 29, 1985, I spoke to Mr. Buddy Bowden in Hilo, Hawaii. Mr. Bowden, drilling supervisor for Thermal Power Co., provided the following data regarding the progress of Kapoho State No. 1-A:

1. Total depth drilled to date - 1,386 feet.
2. 30" conductor pipe set to 84 feet depth (measured from Kelly Bushing).
3. 20" casing set with cement to 1,373 feet depth.

Mr. Bowden also stated that they are presently welding on the 21½ inch 2000 psi wellhead and will be installing the blowout-prevention equipment (BOPE) for testing on the morning of July 30, 1985.

I informed Mr. Bowden that pursuant to our drilling regulations (Chap. 183), adequate lead time is required to allow for travel to the site to witness the test. I further stated that arrangements to send a representative from the Department could not be made on such short notice. Mr. Bowden replied that he will try to provide more advance notice before the next BOPE test. I advised Mr. Bowden to contact our office on Tuesday morning regarding the progress of the pressure test at the site. Mr. Bowden said that if there were any further questions, he could be reached at the site by calling his mobile phone number (576) through the Hilo mobile operator.

After talking to Mr. Bowden, I called Mr. Ralph Patterson at the local office in Honolulu. I discussed the matter regarding the requirements of BOPE pressure tests and the problem of inadequate lead time provided by his crew at the site. Mr. Patterson apologized for the short notice, but stated that it was not feasible for him to postpone the testing until a representative from DLNR could go to the site to witness the test. He informed me that the cost for having his drilling crew on stand-by would be approximately \$12,000 dollars per day.

I requested that Mr. Patterson make the necessary arrangements with his crew to provide the Department with more lead time before the next BOPE test. The next test will be conducted after the 13 3/8 inch casing is cemented in place at approximately 2,800 feet depth.

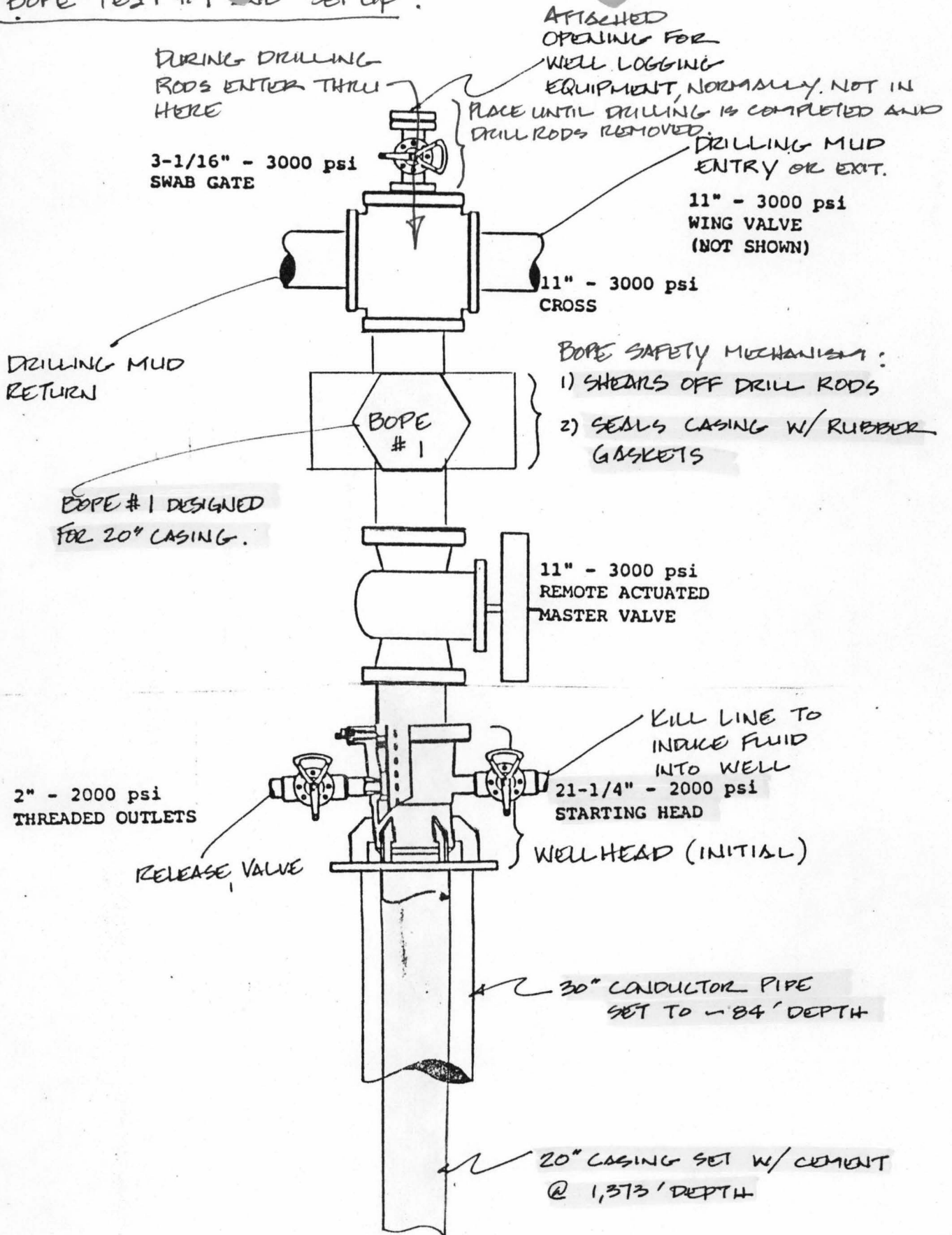


DEAN NAKANO

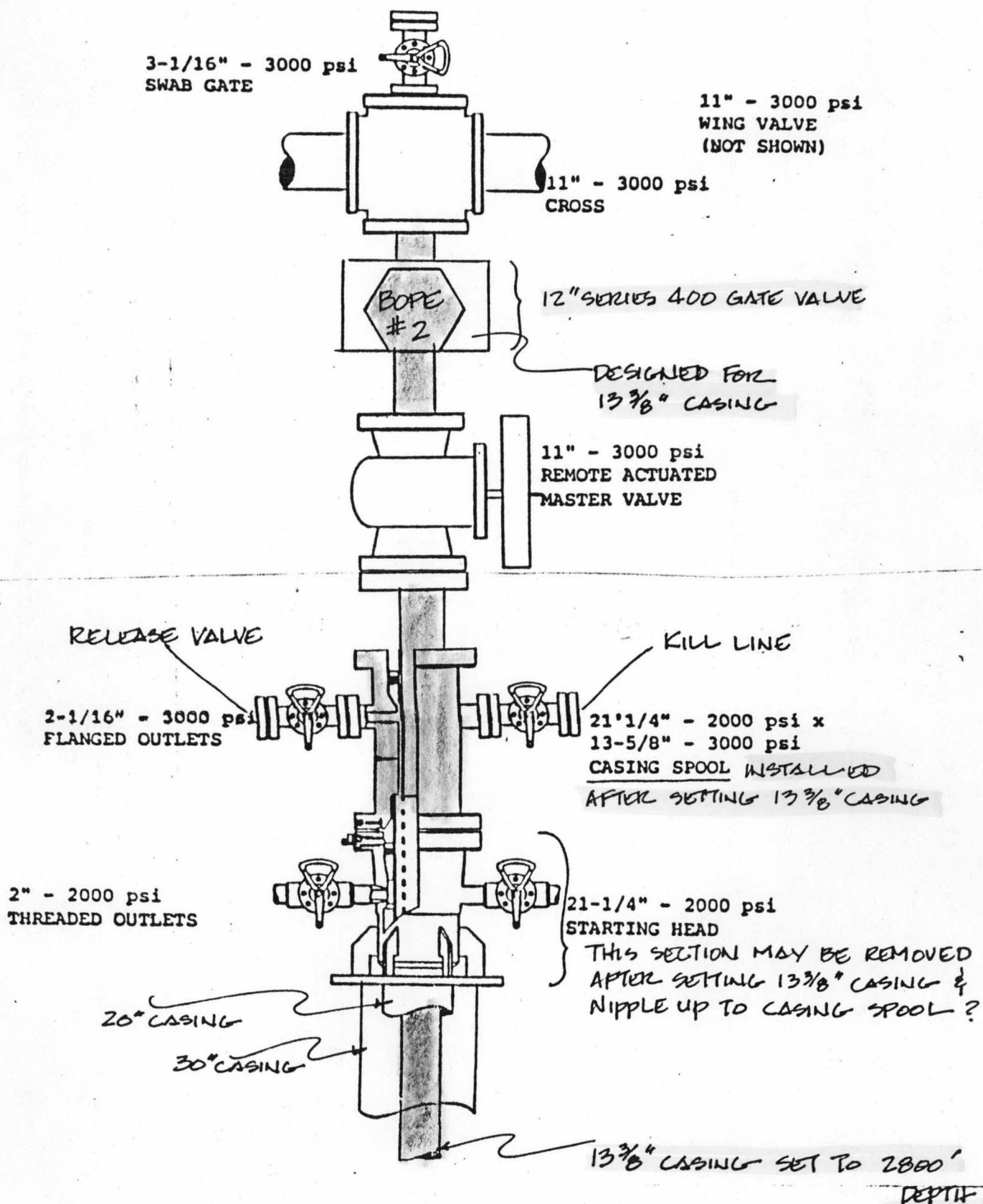
DN:ey

ATTACHMENT 1 TO PROPOSED DRILLING AND COMPLETION PROGRAM

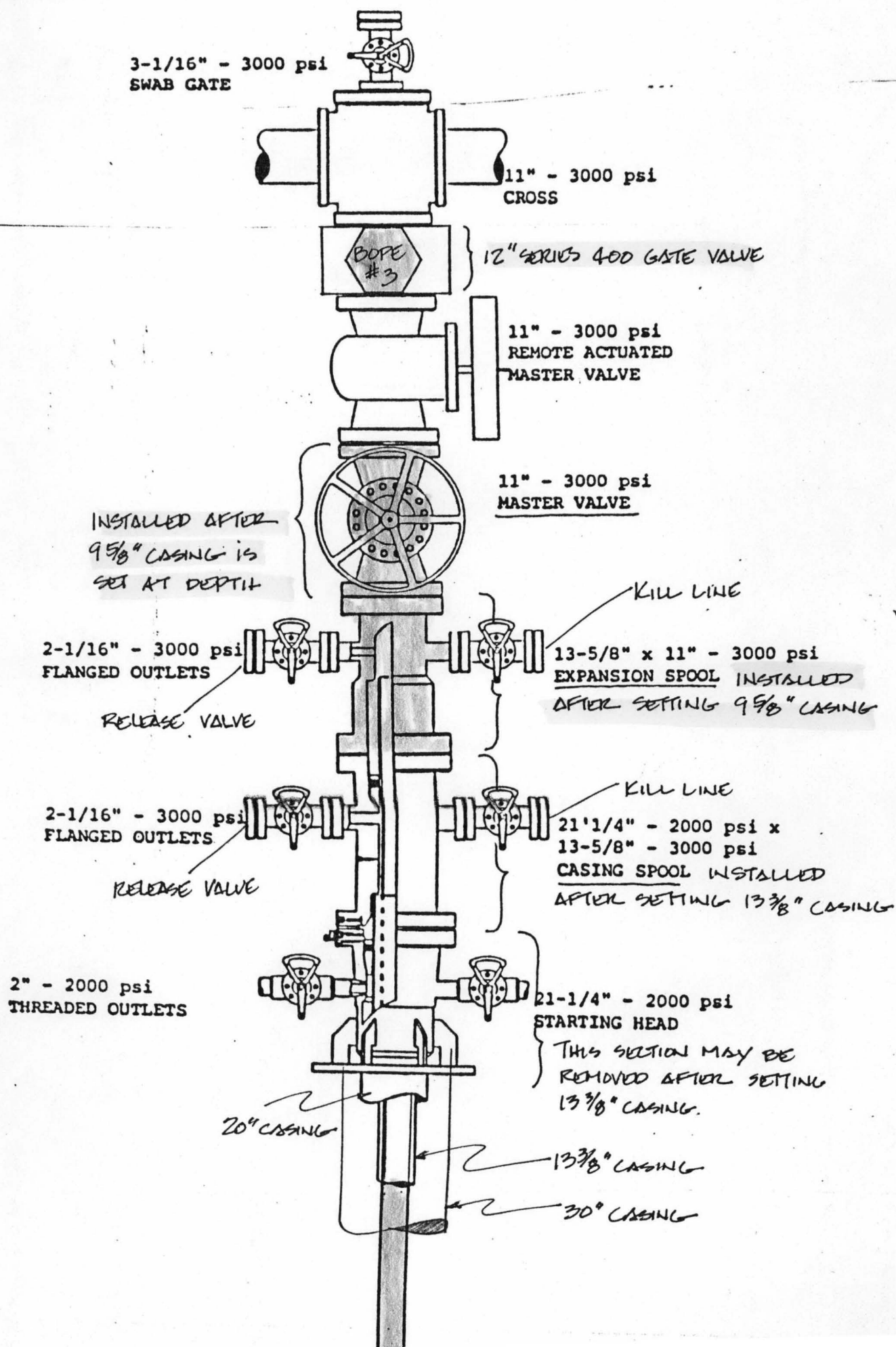
BOPE TEST #1 AND SET UP:



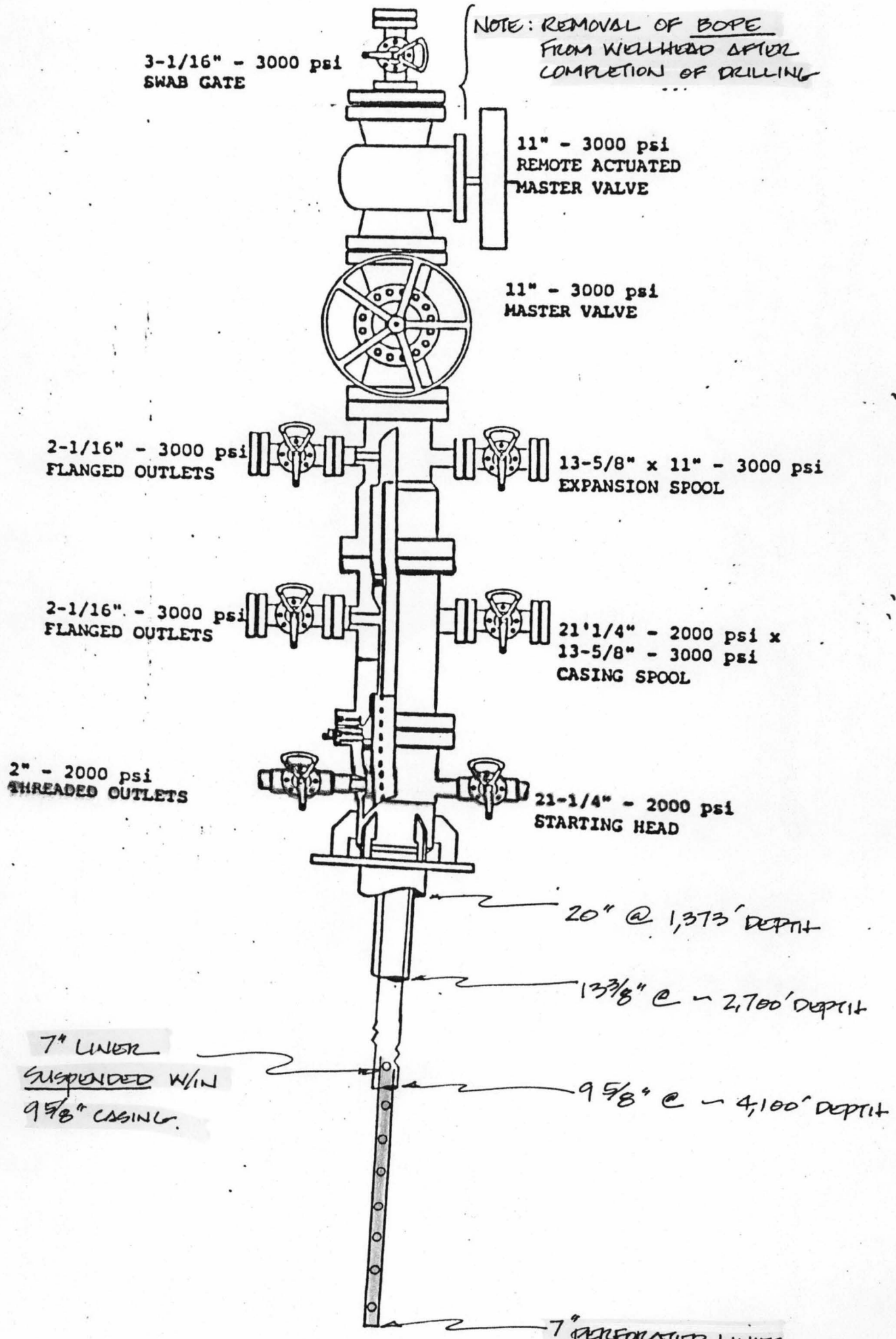
BOPE TEST #2 AND SET UP :



BOPE TEST #3 AND SET UP:



FINAL WELLHEAD AND CASING SET UP :



WELLHEAD DESIGN AS SUBMITTED BY THERMAL

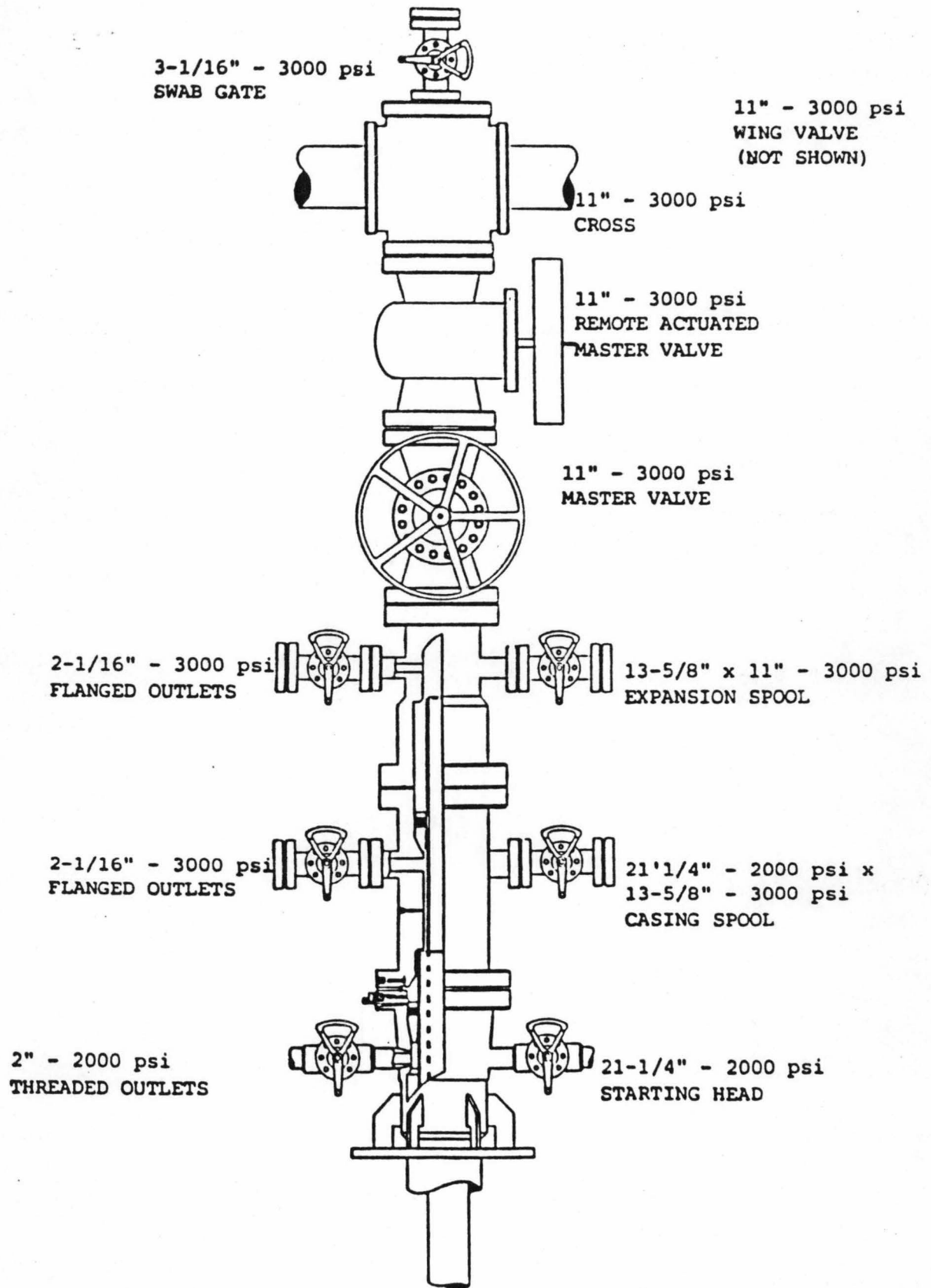


FIGURE 8

July 19, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Progress Report on Kapoho State No. 1-A

On July 18, 1985, I received a message to contact Mr. Jeff Hebein, geologist for Thermal Power Co. in Santa Rosa, California. At 11:35 a.m., I called Mr. Hebein long distance at the following phone number (707) 567-1398, and discussed the drilling status of Kapoho State No. 1-A.

Mr. Hebein stated that as of 6:00 a.m. this morning, drilling at the well had reached a depth of 436 feet. I informed him that Buddy Bowden, drilling supervisor at the site, had failed to contact our office regarding the progress of Kapoho State No. 1-A. Per an earlier request, Mr. Bowden was to have notified us when drilling had reached a depth of 300 feet, so that arrangements could be made for ground water sampling and static water level measurements.

Mr. Hebein estimated that drilling will reach the 600-foot target depth sometime on Friday, July 19, 1985, and that Mr. Bowden would contact our office to arrange a time when samples and measurements could be taken. I informed Mr. Hebein that adequate lead time is required to mobilize our personnel to the site and that Tuesday, July 23, 1985, would be the earliest that we could inspect the well.

In closing, Mr. Hebein requested that we mail to him all information pertaining to the Department's rules and regulations on geothermal activity, specifically the drilling and record requirements for Kapoho State No. 1-A. All correspondence are to be mailed to Thermal Power Co., Mendocino Ave., Suite #120, Santa Rosa, California 95401.



DEAN NAKANO

DN:ko

WATER SOURCES & FLOOD CONTROL BRANCH

From: Dean Date: 7/30/85 File in: _____

To Initial

<input checked="" type="checkbox"/> <u>W</u> Manabu Tagomori _____ Albert Ching _____ Daniel Lum _____ George Matsumoto _____ Nobu Kaneshiro _____ Tom Nakama _____ Paul Matsuo _____ Edwin Sakoda _____ Neal Imada _____ Joe Menor _____ Jon Kurio _____ Mitchell Ohye _____ Sherrie Samuels _____ Kay Oshiro _____ Doris Hamada	See me Call Take action by _____ Review & comment Draft reply by _____ Type draft Type final Xerox _____ copies Mail Acknowledge receipt Approval Signature <input checked="" type="checkbox"/> Information
---	---

_____ R. Chuck	_____ J. Sakai	_____ B. Koyanagi
_____ T. Fujii	_____ E. Yonamine	_____ R. Jinnai
_____ J. Yoshimoto	_____	_____

Manabu,

Reid call from Hilo - Buddy Bowden stated that things are progressing slower than expected. The 21 1/4" well head was welded on and allowed to cool for 10 hrs after being wrapped in an asbestos blanket. The (BOPE) test is planned for ~ 9:00 pm tonite, if all goes well at the site.

He also said that he will contact us w/in 10 days regarding the next BOPE Test.

Note: Also got call from Jeff Hebein - geologist for Thermal Power Co. He will be stopping by @ 10:30 am on Wed. 7-31-85 to discuss some of the drilling & record requirements. Do you want to attend mtg? n.

July 31, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Blowout - Prevention Equipment (BOPE) Test for
Geothermal Well, Kapoho State No. 1-A

At 2:00 p.m. on Monday, July 29, 1985, I spoke to Mr. Buddy Bowden in Hilo, Hawaii. Mr. Bowden, drilling supervisor for Thermal Power Co., provided the following data regarding the progress of Kapoho State No. 1-A:

1. Total depth drilled to date - 1,386 feet.
2. 30" conductor pipe set to 84 feet depth (measured from Kelly Bushing).
3. 20" casing set with cement to 1,373 feet depth.

Mr. Bowden also stated that they are presently welding on the 21½ inch 2000 psi wellhead and will be installing the blowout-prevention equipment (BOPE) for testing on the morning of July 30, 1985.

I informed Mr. Bowden that pursuant to our drilling regulations (Chap. 183), adequate lead time is required to allow for travel to the site to witness the test. I further stated that arrangements to send a representative from the Department could not be made on such short notice. Mr. Bowden replied that he will try to provide more advance notice before the next BOPE test. I advised Mr. Bowden to contact our office on Tuesday morning regarding the progress of the pressure test at the site. Mr. Bowden said that if there were any further questions, he could be reached at the site by calling his mobile phone number (576) through the Hilo mobile operator.

After talking to Mr. Bowden, I called Mr. Ralph Patterson at the local office in Honolulu. I discussed the matter regarding the requirements of BOPE pressure tests and the problem of inadequate lead time provided by his crew at the site. Mr. Patterson apologized for the short notice, but stated that it was not feasible for him to postpone the testing until a representative from DLNR could go to the site to witness the test. He informed me that the cost for having his drilling crew on stand-by would be approximately \$12,000 dollars per day.

I requested that Mr. Patterson make the necessary arrangements with his crew to provide the Department with more lead time before the next BOPE test. The next test will be conducted after the 13 3/8 inch casing is cemented in place at approximately 2,800 feet depth.



DEAN NAKANO

DN:ey

July 19, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Progress Report on Kapoho State No. 1-A

On July 18, 1985, I received a message to contact Mr. Jeff Hebein, geologist for Thermal Power Co. in Santa Rosa, California. At 11:35 a.m., I called Mr. Hebein long distance at the following phone number (707) 567-1398, and discussed the drilling status of Kapoho State No. 1-A.

Mr. Hebein stated that as of 6:00 a.m. this morning, drilling at the well had reached a depth of 436 feet. I informed him that Buddy Bowden, drilling supervisor at the site, had failed to contact our office regarding the progress of Kapoho State No. 1-A. Per an earlier request, Mr. Bowden was to have notified us when drilling had reached a depth of 300 feet, so that arrangements could be made for ground water sampling and static water level measurements.

Mr. Hebein estimated that drilling will reach the 600-foot target depth sometime on Friday, July 19, 1985, and that Mr. Bowden would contact our office to arrange a time when samples and measurements could be taken. I informed Mr. Hebein that adequate lead time is required to mobilize our personnel to the site and that Tuesday, July 23, 1985, would be the earliest that we could inspect the well.

In closing, Mr. Hebein requested that we mail to him all information pertaining to the Department's rules and regulations on geothermal activity, specifically the drilling and record requirements for Kapoho State No. 1-A. All correspondence are to be mailed to Thermal Power Co., Mendocino Ave., Suite #120, Santa Rosa, California 95401.



DEAN NAKANO

DN:ko

July 15, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Well Inspection of Kapoho State No. 1-A

On July 8, 1985, I visited the site of the geothermal well Kapoho State No. 1-A, located at Pohoiki, Hawaii.

Mr. Ralph Patterson, Hawaii Project Manager for Thermal Power Co., operator of the Puna Geothermal Venture, conducted dedication ceremonies prior to the start of drilling.

Thermal Power Co. has contracted with Water Resources International Inc. to drill Kapoho State No. 1-A to a total depth of 7500 feet or less. Based on the previous wells, the exploratory drilling program is expected to be completed in approximately 60 days.

I spoke to Mr. Buddy Bowden, drilling supervisor, at the site and discussed the drilling and record requirements as outlined in our geothermal well drilling permit and the approved plan of operation regarding the measurement of the static water level and ground water sampling.


Mr. Bowden estimated that drilling would proceed at about 150 to 200 feet per day after initially setting 30-inch casing (conductor pipe) to about 100-foot depth. The drilling rig rotary table is approximately 20 feet above ground elevation and will be remeasured when water level readings are taken.

Mr. Bowden stated that he would contact our office when drilling reaches the 300-foot depth and notify us when water samples and water level measurements can be taken. He projected that drilling will reach the estimated ground water level of 600-foot depth on July 15, 1985 or thereabouts.

Mr. Patterson informed me that the ongoing monitoring of noise and H₂S levels will continue throughout the exploratory drilling and testing program of Kapoho State No. 1-A. Thermal Power Co. has also established a Hilo telephone number (961-2184) for inquiries about drilling operations, as required under the county permits issued.

Upon completion of the well inspection, I visited the Black Sand Subdivision located off of Highway 130 near the 17-mile marker just after the Keauohana Forest Reserve. The subdivision extends approximately 1.5 miles in the northwest direction from the highway and is located near the southeastern corner of the proposed Kilauea Middle East Rift GRS. While driving through the site, I counted approximately 15 residences within the subdivision.

Construction has begun on the Puna Geothermal Research Facility located adjacent to the existing HGA-P plant. The Research Facility now being built by the University of Hawaii's Natural Energy Institute will develop and study potential economic activities related to geothermal development in the Puna district.



DEAN NAKANO

DN:ko

July 2, 1985

MEMORANDUM FOR THE RECORD

FROM: Dean Nakano

SUBJECT: Records and Drilling Requirements of Kapoho State
No. 1-A

Pursuant to DLNR's Administrative Rules, Title 13, Chapter 183, on "Leasing and Drilling of Geothermal Resources" and the Geothermal Well Drilling Permit for Kapoho State No. 1-A, the following checklist of items are required:

- 1) §13-183-57(a). The drill site and completed well must be marked with lessee's or operator's name, lease number, and the number of the well.
- 2) §13-183-59(a). The lessee shall remove any derrick, equipment, or facilities within sixty days after lessee has ceased making use thereof in its operations.
- 3) §13-183-59(d). Wastes shall be discharged in accordance with all federal, state, and local requirements.
- 4) §13-183-59(i). Access to drilling or production sites by the public shall be controlled by the lessee to prevent accidents or injury to persons or property.
- 5) §13-183-60. In the event of any disaster and pollution that may affect public or the environment, caused by or resulting from operations under the lease, the lessee shall suspend all development activities except for those which are corrective or mitigative, and shall immediately notify the chairperson. Development activities shall not resume until corrective measures have been taken and authorization has been made by the chairperson.
- 6) §13-183-71(a). All wells shall be cased in a manner to protect and prevent, or to minimize damage to the environment, ground water resources, geothermal resources, life, health, and property. Department specifications for casing strings shall be determined on a well-to-well basis.
- 7) §13-183-72. The temperature of the return drilling mud must be logged continuously.
- 8) §13-183-73. All wells, except observation wells, shall be logged with an induction electrical log.
- 9) §13-183-74(a). Blowout-prevention equipment (BOPE) pressure tests may be required prior to drilling out the shoe of the surface casing. The decision to require or observe BOPE pressure tests shall be made on a well-to-well basis. The chairperson shall be contacted in advance to allow travel time to witness the test.

July 2, 1985

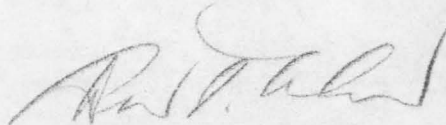
- 10) §13-183-76(a). The chairperson shall require casing tests, cementing tests, directional tests, or equipment tests as necessary to prevent and minimize damage to life, health, property, natural resources, geothermal and ground water resources, and the environment.
- 11) §13-183-81. The operator of any well proposed to be abandoned shall file with the chairperson an application for permit to abandon, prior to abandonment. The operator's abandonment plans shall be subject to approval and revision prior to issuance of a permit by the chairperson.
- 12) §13-183-82(a). No well shall be plugged and abandoned until the manner and method of plugging have been approved or prescribed by the chairperson.
 - (b). Before any well abandonment work is commenced, notice shall be given by the operator to the chairperson, showing the condition of the well and the proposed method of abandonment.
 - (c). Good quality, heavy drilling fluid approved by the chairperson shall be used to replace any water and fill all portions of the hole not plugged with cement.
 - (e). A history of the well shall be filed within sixty days after completion of abandonment, provided that in the case of an exploratory well, the report shall be filed within six months after abandonment.
 - (f). Any well bond shall remain in full force and effect until the well is properly abandoned. Written approval of the abandonment shall be obtained from the chairperson before any bond is released.
- 13) §13-183-84. Well records required include lithologic logs, core records, water-bearing and geothermal heat-bearing formations, and other well surveys. These records shall be kept in the local office and subject to inspection by the chairperson during business hours.
- 14) §13-183-85. Reports to be filed (forms provided by DLNR) within six months after completion of any well shall become the property of the state. These reports include: Drilling log and core report (ie. driller's logs), well history report (daily chronology of drilling operation activities), well summary report, and reports on any other operations not specifically mentioned herein.
- 15) §13-183-87(c). Due to the differing natural environmental conditions among geothermal areas, the extent and frequency of monitoring activities shall be approved by the chairperson on an individual well basis. Techniques and standards to be used by the operator for meeting the environmental baseline data requirements shall be subject to the approval of the chairperson.

July 2, 1985

(e). Plans for drilling operations shall provide for the reclamation and revegetation of all disturbed lands in a manner approved by the chairperson.

(h). Previously unknown archaeological, historical, cultural or unique sites discovered during any operations shall be immediately reported to the chairperson, and operations on that site shall cease until said site can be assessed for its archaeological value.

- 16) Item (2) of Well Drilling Permit. The operator shall contact DLNR within reasonable time to allow the Department's representative to travel to the site, to measure and/or verify the measurement of the static water level and to sample ground water.
- 17) Item (3) of Well Drilling Permit. The operator shall obtain the chairperson's approval prior to the execution of any contemplated changes in the proposed drilling program.
- 18) Sub-paragraph (2) of 180-day drilling permit extension. The operator shall obtain written state authorization before allowing any brine, minerals, or other refuse from any well to be deposited on or pass into waters of the ocean, bay, inlet, rivers, lakes or other bodies of water.



DEAN NAKANO

DN:ko

Dean - file

JUL -9 1985

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
1600 Kapiolani Blvd., Suite 808
Honolulu, Hawaii 96814

Dear Mr. Patterson:

Thank you for your recent letter notifying the Department of Land and Natural Resources of the scheduled drilling start of Kapoho State No. 1-A.

Pursuant to the conditions of the Geothermal Well Drilling Permit and your submitted Drilling and Completion Procedures, the Department's representative shall be notified with reasonable time allowed for travel to the site, to measure and/or verify the measurement of the static water level, collect ground water samples, and observe pressure tests of blowout-pressure equipment.

If you have any questions, please contact Manabu Tagomori at 548-7533.

Very truly yours,

/S/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko

JUL -9 1985

Mr. William Sewake, Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sewake:

Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

Very truly yours,

/S/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board


MT:DN:ko

JUL -9 1985

Mr. Albert Lono Lyman
Director, Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

Very truly yours,

/S/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board


MT:DN:ko

JUL -9 1985

MEMORANDUM

TO: Honorable Leslie Matsubara, Director
Department of Health

FROM: Susumu Ono, Chairperson
Board of Land and Natural Resources

SUBJECT: Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

/S/ SUSUMU ONO

SUSUMU ONO

DN
MT:DN:ko

JUL -9 1985

MEMORANDUM

TO: Honorable Kent Keith, Director
Dept. of Planning and Economic Development

FROM: Susumu Ono, Chairperson
Board of Land and Natural Resources

SUBJECT: Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

/s/ SUSUMU ONO

SUSUMU ONO

MT: *DN*:ko

JUL -9 1985

MEMORANDUM

TO: Honorable Letitia N. Uyehara, Director
Office of Environmental Quality Control

FROM: Susumu Ono, Chairperson
Board of Land and Natural Resources


SUBJECT: Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

/S/ SUSUMU ONO

SUSUMU ONO

MT:  DN:ko

JUL -9 1985

MEMORANDUM

TO: Members, Board of Land and Natural Resources

FROM: Susumu Ono, Chairperson
Board of Land and Natural Resources

SUBJECT: Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

/S/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko

JUL -9 1985

MEMORANDUM

TO: Division Heads, DLNR

FROM: Susumu Ono, Chairperson
Board of Land and Natural Resources

SUBJECT: Geothermal Well Kapoho State No. 1-A

For your information, Thermal Power Company will begin drilling the geothermal well designated Kapoho State No. 1-A in Puna, Hawaii, on July 8, 1985. The site of Kapoho State No. 1-A is located approximately 200 feet southeast of Kapoho State No. 1.

The expiration date of the Geothermal Well Drilling Permit approved by the Department of Land and Natural Resources is September 24, 1985.

/S/ SUSUMU ONO

SUSUMU ONO


MT:DN:ko

For Immediate Release

RECEIVED

85 JUL 5 A9:23

Honolulu, Hawaii - July 2, 1985

DIV. OF WATER &
LAND DEVELOPMENT

Thermal Power Company, operator of the Puna Geothermal Venture (PGV), announced today that drilling will begin on July 8th on an exploratory geothermal well on the island of Hawaii. Dedication ceremonies will take place prior to the start of the drilling.

The well, which is designated Kapoho State 1A, is the third in a series of exploratory wells being drilled at the Pu'u Honuaula drill site, adjacent to the HGP-A geothermal well and power plant, which provides electricity to the Hawaii Electric Light Company (HELCO) and is the only operating geothermal plant in Hawaii.

Puna Geothermal Venture completed two other wells at the Pu'u Honuaula drill site in 1981 and 1982, both of which produced steam flows, according to Ralph Patterson, Project Manager for the venture. Tests on the first two wells provided data concerning the unique chemical and physical characteristics of the geothermal reservoir in the Lower East Rift Zone of the Kilauea Volcano. Thermal Power has developed a special well design for the third well based on the data and other detailed studies.

Thermal Power Company will utilize the contract drilling services of Water Resources International, Inc., a Hawaii-based company which also provided the same drilling services on the venture's previous wells. The drilling of the well, permitted by both State and County agencies as part of the venture's exploratory program is expected to take 60 days. Thermal Power has estimated that the well will be drilled to over 6000 feet in search of the steam reservoir under the Puna Lower East Rift Zone.

Drilling and testing of the well will comply with all of the requirements in the permits issued to the venture by State and County agencies. During the drilling and testing operations, special noise mitigation equipment will be employed. Any air emissions will be monitored with special equipment and treated as required with chemicals to reduce hydrogen sulfide gas emissions to acceptable levels. A network of air and noise measurement stations in the project area provides environmental data to the venture and government agencies.

Thermal Power Company has established a Hilo telephone number for inquiries about the drilling operations, as required under County permits. This number is 961-2184.

Contact Ralph Patterson
Honolulu, Hawaii (808) 944-5545



Diamond Shamrock
Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

THERMAL POWER COMPANY

as Operator of the

Puna Geothermal Venture

is relocating its Hawaii Project Office to:

Central Pacific Plaza
220 South King Street Suite 1750
Honolulu, Hawaii 96813

Telephone: (808) 524-8940

Effective 1 July 1985

Thermal Power Company

A subsidiary of Diamond Shamrock, 1600 Kapiolani Boulevard, Suite 808, Honolulu, Hawaii 96814
Phone 808 944-5545



Diamond Shamrock
Thermal Power Company

1600 Kapiolani Boulevard, Suite 808
Honolulu, Hawaii 96814

MR. MANABU TAGOMORI

DLNR

DIV. OF WATER & LAND DEV.

1151 Punchbowl Street Rm. 227

Honolulu, Hawaii 96813





Diamond Shamrock
Thermal Power Company

RECEIVED

85 JUN 27 P 2: 03

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

Ralph A. Patterson, Jr.
Hawaii Project Manager

Mr. Susumu Ono
Chairman
Board of Land and
Natural Resources
Kalanimoku Bldg. Room 130
1151 Punchbowl Street
Honolulu, Hawaii 96813

DIV. OF WATER &
LAND DEVELOPMENT

85 JUL 1 A10: 38

RECEIVED

Dear Mr. Ono:

After a period of evaluation and redesign of our drilling program and some consolidation of the rules governing geothermal activities, the Puna Geothermal Venture will begin drilling its third exploratory well, designated Kapoho State 1A, at the Honuaula drill site, on July 8, 1985.

We will hold a brief dedication ceremony at the site, which is just off the Pahoa-Pohoiki Road, south of the Lava Tree State Park, at 9:30 a.m. on Monday, the 8th. Some refreshments will be served after the ceremony.

We would be pleased to have you, or a representative, join us for this event.

If you can attend, please call Colleen Nakamura at 944-5545 in Honolulu, or leave word with Al Nakaji in Hilo at 935-6073.

Sincerely yours,

RAP/crn

Thermal Power Company

A subsidiary of Diamond Shamrock, 1600 Kapiolani Boulevard, Suite 808, Honolulu, Hawaii 96814
Phone 808 944-5545



Diamond Shamrock
Thermal Power Company

RECEIVED

85 JUN 25 A10:35

DIV. OF WATER &
LAND DEVELOPMENT
21 June 1985

1540
RECEIVED

85 JUN 24 P1:34

Ralph A. Patterson, Jr.
Hawaii Project Manager
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

Mr. Susumu Ono
Chairman
Board of Land and
Natural Resources
Kalanimoku Building
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Ono:

This letter will notify you that Thermal Power Company, as operator, will begin drilling the geothermal well designated Kapoho State 1A (KS-1A) in Puna, Hawaii County, on July 8, 1985.

Kapoho State 1A is permitted by a Geothermal Well Drilling Permit approved by the Department on March 28, 1984, and extended by letter dated January 21, 1985.

If there are any questions please direct them to me at the Honolulu office of Thermal Power Company.

Sincerely yours,

Ralph A. Patterson, Jr.

RAP/crn

cc: Pittenger
D'Olier
Kumin
Tobias
St. John
Humme

Thermal Power Company

A subsidiary of Diamond Shamrock, 1600 Kapiolani Boulevard, Suite 808, Honolulu, Hawaii 96814
Phone 808 944-5545

COPY

PLANNING DEPARTMENT

25 AUPUNI STREET

COUNTY OF HAWAII

HILO, HAWAII 96720

85 MAY 30 A 8: 17

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

May 28, 1985

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
1600 Kapiolani Boulevard, Suite 808
Honolulu, Hawaii 96814

Dear Mr. Patterson:

Special Permit No. 468
Request for Open Venting at KS-1A

We have received Thermal Power Company's (TPC) letter of 2 May 1985 requesting permission "to schedule vertical venting as a deliberate safety action prior to the initial flow testing of its third geothermal well, Kapoho State 1A." The letter states that Puna Geothermal Venture's "experience indicates that vertical venting . . . is a necessary procedure to most effectively and rapidly clean up the flow stream and reduce an initial discharge of rock and mineral particulates from the production zones below 4,000 feet."

As you are well aware Condition 8 of Special Permit 468, as amended by the Planning Commission on March 22, 1984, requires:

"That unabated open venting of geothermal steam shall be prohibited unless prior approval is received from the Planning Department or designee. The Planning Department or its designee shall permit unabated open venting only when all other reasonable alternatives have been deemed to be unacceptable. Venting for all other situations shall be permitted only when accompanied by appropriate sound and chemical abatement techniques approved by the Planning Department or its designee. (Emphasis added)"

RECEIVED
85 MAY 31 P 3: 53
DIV. OF WATER &
LAND DEVELOPMENT

Mr. Ralph A. Patterson, Jr.
Page 2
May 28, 1985

In TPC's "Request for Amendment to Special Use Permit #468 Exploratory Geothermal Drilling and Evaluation" dated 16 January 1984, TPC stated that it "is attempting to modify the steam collection and test abatement equipment to address the problem of abrasive particles in the initial flow of the Hawaii geothermal wells. The modified equipment will be tested during the flow test of the replacement well. If successful, the modifications will remove the need for vertical venting. Prior to any possibility of planned vertical venting, TPC will request approval from the County Planning Department as soon as possible if emergency procedures become necessary. (Emphasis added)"

It appears that TPC has concluded that vertical venting is the preferred solution to the "problem of abrasive particles" without field testing the equipment modification(s). We would appreciate a synopsis of the rationale for this conclusion.

We applaud your concern for the safety and reliability to both equipment and personnel. However, the duration of the proposed venting raises concerns related to the general public's health, safety, and welfare, particularly with respect to noise and hydrogen sulfide emissions over the period proposed.

After we have had the opportunity to review your response, we will contact your office to arrange a meeting in Hilo.

Sincerely,



ALBERT LONO LYMAN
Planning Director

ALL/RN:ds

cc: ✓BLNR
Planning Commission
Mayor

May 28, 1985

Mr. Ralph A. Patterson, Jr.
Hawaii Project Manager
Thermal Power Company
1600 Kapiolani Boulevard, Suite 808
Honolulu, Hawaii 96814

Dear Mr. Patterson:

Special Permit No. 468
Request for Open Venting at KS-1A

We have received Thermal Power Company's (TPC) letter of 2 May 1985 requesting permission "to schedule vertical venting as a deliberate safety action prior to the initial flow testing of its third geothermal well, Kaponoh State 1A." The letter states that Puna Geothermal Venture's "experience indicates that vertical venting . . . is a necessary procedure to most effectively and rapidly clean up the flow stream and reduce an initial discharge of rock and mineral particulates from the production zones below 4,000 feet."

As you are well aware Condition 8 of Special Permit 468, as amended by the Planning Commission on March 22, 1984, requires:

"That unabated open venting of geothermal steam shall be prohibited unless prior approval is received from the Planning Department or designee. The Planning Department or its designee shall permit unabated open venting only when all other reasonable alternatives have been deemed to be unacceptable. Venting for all other situations shall be permitted only when accompanied by appropriate sound and chemical abatement techniques approved by the Planning Department or its designee. (Emphasis added)"

MAY 29 1985

Mr. Ralph A. Patterson, Jr.

Page 2

May 28, 1985

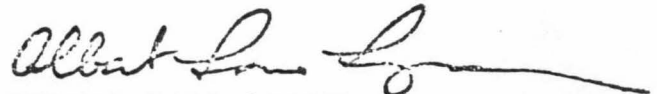
In TPC's "Request for Amendment to Special Use Permit #468 Exploratory Geothermal Drilling and Evaluation" dated 16 January 1984, TPC stated that it "is attempting to modify the steam collection and test abatement equipment to address the problem of abrasive particles in the initial flow of the Hawaii geothermal wells. The modified equipment will be tested during the flow test of the replacement well. If successful, the modifications will remove the need for vertical venting. Prior to any possibility of planned vertical venting, TPC will request approval from the County Planning Department as soon as possible if emergency procedures become necessary. (Emphasis added)"

It appears that TPC has concluded that vertical venting is the preferred solution to the "problem of abrasive particles" without field testing the equipment modification(s). We would appreciate a synopsis of the rationale for this conclusion.

We applaud your concern for the safety and reliability to both equipment and personnel. However, the duration of the proposed venting raises concerns related to the general public's health, safety, and welfare, particularly with respect to noise and hydrogen sulfide emissions over the period proposed.

After we have had the opportunity to review your response, we will contact your office to arrange a meeting in Hilo.

Sincerely,



ALBERT LONG LYMAN
Planning Director

ALL/kn:ds

cc: BLNR
Planning Commission
Mayor



Diamond Shamrock
Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

2 May 1985

Mr. Albert L. Lyman
Planning Director
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Lyman:

Thermal Power Company, operator for the Puna Geothermal Venture (PGV) plans to schedule vertical venting as a deliberate safety action prior to the initial flow testing of its third geothermal well, Kapoho State 1A. The plan contemplates one 10-hour vertical venting event in daylight hours during one week day in September, 1985. PGV will advise County and State agencies, the public, and residents nearest the well site of the specific date in a timely manner. PGV monitoring will record the air emissions, noise and vented plume size and dispersal during this activity.

In accordance with Condition 8 of Special Use Permit 468, we have detailed below the reasons for requesting the vertical venting, primarily for safety. We understand that the permission for this venting will be provided by the Planning Director.

PGV Experience in Vertical Venting

Well Kapoho State 1

Vertical venting was not intended or attempted during the initial flow activity at this well on 16 December 1981. After only 40 minutes of full open flow from the wellhead into the horizontal flow test line, a new WKM, 600 series, 10" butterfly control gate was cut through a 1" thick portion by the high velocity flow stream containing black iron sulfide particulates of grit size. These hard, sharp edged, highly abrasive solids are discharged from the geothermal reservoir below 4,000 feet depth. The amazingly rapid erosion of the valve was safely controlled by an immediate closure of double master gates on the KS-1 wellhead. Further testing was substantially delayed until Thermal Power Company redesigned its flow test equipment and procedures.

Well Kapoho State 2

Vertical venting, upon initial wellbore opening to full flow, was utilized and safely executed during the flow testing of this well in April and June 1982. A total of 15 individual vertical venting actions were taken, with a total cumulated venting time of 12 hours, 24 minutes. The longest single venting was 4 hours, 32 minutes. The vented plumes of geothermal effluent and initial

Thermal Power Company

A subsidiary of Diamond Shamrock, 1600 Kapiolani Boulevard, Suite 808, Honolulu, Hawaii 96814
Phone 808 944-5545

Mr. Albert A. Lyman
Page Two
2 May 1985

rock particulate discharge lifted several hundred feet and usually drifted south. No large rocks were ever ejected and attendant H₂S emissions were wind dispersed without correlated community complaints. High noise levels, up to approximately 120 decibels at the well site, occurred during the venting, which was confined to daylight hours and week days. Noise levels at the property line and at measuring points in nearby communities were much lower than that, in the range of 65-70 decibels maximum. No control valve failure or major erosion was noted. However, both the 20" diameter discharge pipeline to the rock muffler and several abatement chemical injection ports failed due to abrasive solids in the flow stream.

Summary


PGV experience indicates that vertical venting as a part of the initial flowing of all Puna geothermal wells is a necessary procedure to most effectively and rapidly clean up the flow stream and reduce an initial discharge of rock and mineral particulates from the production zones below 4,000 feet. The following conclusions support this procedure.

- o The safety, reliability, and endurance of expensive wellhead and test equipment is increased.
- o Increased equipment reliability yields the following benefits:
 - The flow testing program can remain on schedule and not be extended with disruptive emergency repair procedures.
 - The aggregate public impacts of noise, emissions and traffic activity incident to flow testing, are reduced.
 - Greater safety is realized at the wellsite for testing and service personnel.

Scheduled Vertical Venting: Well Kapoho State 1A

We intend to precede the initial full flow testing with a contained low velocity bleed rate to bring the wellbore to a high temperature. This will reduce thermal shock possibilities and promote more rapid cleanup of the effluent mass upon opening to vertical discharge. The well will then be vented, with permission, as described in paragraph 1 of this letter.

Sincerely yours,

A handwritten signature in cursive script, reading "Ralph Vatterson". The signature is written in dark ink and is positioned below the "Sincerely yours," text.

RAP/crn



COUNTY OF
HAWAII

PLANNING DEPARTMENT

25 AUPUNI STREET • HILO, HAWAII 96720
(808) 961-8288

RECEIVED
85 FEB 5 A 9:31
Dante K. Carpenter Mayor
Albert Lono Lyman Director
Ilima Piliapala Deputy Director
LAND RESOURCES
HAWAII

January 31, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Geothermal Drilling Permit Extension
Kapoho State No. 1-A

Thank you for sending us the copy of the permit issued to Thermal Power Company for the 180-day extension for Kapoho State No. 1-A. The new expiration date of September 24, 1985 is well within the October 15, 1986 expiration date for Special Permit No. 468 issued by the Hawaii County Planning Commission.

Sincerely,

for Ilima Piliapala
ALBERT LONO LYMAN
Planning Director

RN:ds

RECEIVED
85 FEB 5 A 10:15
DIV. OF WATER &
LAND DEVELOPMENT

JAN 23 1985

MEMORANDUM

TO: Honorable Letitia N. Uyehara, Director
Office of Environmental Quality Control

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension,
Kapoho State No. 1-A

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1-A. The new expiration date is September 24, 1985. The extension allows for Kapoho State No. 1-A to be drilled using higher grade casing and couplings in addition to a different design than in the Puna Geothermal Venture's previous exploratory wells at this site.

A copy of the permit is attached.

#6/SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko
Attach.

JAN 23 1985

MEMORANDUM

TO: Honorable Leslie Matsubara
Director, Department of Health

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension,
Kapoho State No. 1-A

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1-A. The new expiration date is September 24, 1985. The extension allows for Kapoho State No. 1-A to be drilled using higher grade casing and couplings in addition to a different design than in the Puna Geothermal Venture's previous exploratory wells at this site.

A copy of the permit is attached.

18/SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko
Attach.

'JAN 23 1985

MEMORANDUM

TO: The Honorable Kent Keith, Director
Dept. of Planning & Economic Development

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension,
Kapoho State No. 1-A

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1-A. The new expiration date is September 24, 1985. The extension allows for Kapoho State No. 1-A to be drilled using higher grade casing and couplings in addition to a different design than in the Puna Geothermal Venture's previous exploratory wells at this site.

A copy of the permit is attached.

18/SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko
Attach.

JAN 23 1985

MEMORANDUM

TO: All Division Heads
Dept. of Land & Natural Resources

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension,
Kapoho State No. 1-A

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1-A. The new expiration date is September 24, 1985. The extension allows for Kapoho State No. 1-A to be drilled using higher grade casing and couplings in addition to a different design than in the Puna Geothermal Venture's previous exploratory wells at this site.

A copy of the permit is attached.

JS/SUSUMU/ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko
Attach.

JAN 23 1985

MEMORANDUM

TO: Members of the Board of Land & Natural
Resources

FROM: Susumu Ono

SUBJECT: Geothermal Drilling Permit Extension,
Kapoho State No. 1-A

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1-A. The new expiration date is September 24, 1985. The extension allows for Kapoho State No. 1-A to be drilled using higher grade casing and couplings in addition to a different design than in the Puna Geothermal Venture's previous exploratory wells at this site.

A copy of the permit is attached.

/s/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

MT:DN:ko
Attach.

JAN 23 1985

Mr. Albert Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Honolulu, Hawaii 96720

Dear Mr. Lyman:

Geothermal Drilling Permit Extension,
Kapoho State No. 1-A

For your information, the Department of Land and Natural Resources has issued a 180-day extension to Thermal Power Company for Kapoho State No. 1-A. The new expiration date is September 24, 1985. The extension allows for Kapoho State No. 1-A to be drilled using higher grade casing and couplings in addition to a different design than in the Puna Geothermal Venture's previous exploratory wells at this site.

A copy of the permit is attached.

Very truly yours,

/s/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

DM
MT:DN:ko
Attach.

RAP copy

DRAFT

3 October 1984

Mr. Susumu Ono
Chairman
Board of Land and
Natural Resources
Kalanimoku Building
1151 Punchbowl Street
Honolulu, Hawaii 96813

DRAFT

Dear Mr. Ono:

In accordance with the Department of Land and Natural Resources Administrative Rules, Title 13, Chapter 183-65 (7) (c), a 180 day extension of our geothermal drilling permit for the well designated Kapoho State #1-A, on DLNR Geothermal Resources Mining Lease R-2, is requested.

A permit to drill Kapoho State 1-A was issued by your office on 28 March 1984, based on the application filed by Thermal Power Company on 30 January 1984.

As outlined in the permit application, Kapoho State 1-A will be of a different design, using higher grade casing and couplings than in the Puna Geothermal Venture's previous exploratory wells at this site. Because of the limited number of suppliers of this casing, and our specifications for premium couplings which are only machined by a small number of manufacturers, the logistics of the casing purchase and delivery have caused us to delay the start of drilling.

Based on the casing and coupling delivery dates in Hilo, we now expect that we will begin drilling Kapoho State 1-A, in accordance with the previously approved program, during the last part of March, or early in April of 1985. Thus a 180 day extension of the drilling permit is requested.

Please contact me at the Honolulu office of Thermal Power Company - 1600 Kapiolani Boulevard, Suite 808, Honolulu, Hawaii, 96814; telephone 944-5545 - if you or your staff have any questions about the above request.

Sincerely yours,

Ralph A. Patterson, Jr.

Hawaii Project Manager

RAP/crn

cc: R. T. Pittenger, Thermal Power Co.

W. L. D'Olier, Thermal Power Co.

R. Chuck, Mgr., Div. of Water & Land Dev.

WATER RESOURCES & FLOOD CONTROL BRANCH

From: DES Date: 3/12/84 File in: _____

To Initial

<input checked="" type="checkbox"/>	Manabu Tagomori	<input type="checkbox"/> See me
<input type="checkbox"/>	Albert Ching	<input type="checkbox"/> Call
<input type="checkbox"/>	Daniel Lum	<input type="checkbox"/> Take action by _____
<input type="checkbox"/>	George Matsumoto	<input type="checkbox"/> Review & comment
<input type="checkbox"/>	Nobu Kaneshiro	<input type="checkbox"/> Draft reply by _____
<input type="checkbox"/>	Tom Nakama	<input type="checkbox"/> Type draft
<input type="checkbox"/>	Paul Matsuo	<input type="checkbox"/> Type final
<input type="checkbox"/>	Edwin Sakoda	<input type="checkbox"/> Xerox _____ copies
<input type="checkbox"/>	Neal Imada	<input type="checkbox"/> Mail
<input type="checkbox"/>	Joe Menor	<input type="checkbox"/> Acknowledge receipt
<input type="checkbox"/>	Jon Kurio	
<input type="checkbox"/>	Mitchell Ohye	
<input type="checkbox"/>	Sherrie Samuels	<input type="checkbox"/> Approval
<input type="checkbox"/>	Kay Oshiro	<input type="checkbox"/> Signature
<input type="checkbox"/>	Doris Hamada	<input checked="" type="checkbox"/> Information

<input type="checkbox"/> R. Chuck	<input type="checkbox"/> J. Sakai	<input type="checkbox"/> B. Koyanagi
<input type="checkbox"/> T. Fujii	<input type="checkbox"/> E. Yonamine	<input type="checkbox"/> R. Jinnai
<input type="checkbox"/> J. Yoshimoto	<input type="checkbox"/> _____	<input type="checkbox"/> _____

- 1) Attached is a sketch of well sites for KS #1 and proposed KS #1A, (Plan view) indicating radius of calculated deviation of 411'±, that extends beyond fenced area of site. Also noted is a cross-sectional view of wellbore indicating deviation w/ respect to total depth drilled (7,278 ft.).
- 2) Need to know the following:
 - a) Location of KS #1A (Actual measurements)
 - b) Confirm dimensions of fenced area.
- 3) Also attached is calculation sheet of deviation based on figures from Thermal Probe

THERMAL POWER COMPANY, Operator
 KAPOHO STATE I

KSI-A
 * 60-70' may be
 KSI
 * Corrid - nothing

$$\tan A^\circ = \frac{X}{\text{DEPTH}}$$

WHERE X = DEVIATION IN FEET FROM CENTER

$$X = \tan A^\circ (\text{DEPTH})$$

Wellbore Deviation Surveys

✓ Direct. incl
 Survey
 may not have been
 made

	Depth in feet	Deviation in degrees
	0	
85	85 - 0.37'	0.25
265	350 - 4.63'	1.00
398	748 - 12.16'	1.75
132	880 - 4.61'	2.00
813	1753 - 26.67'	1.75
438	2191 - 26.79'	3.50
269	2460 - 18.81'	4.00
388	2848 - 23.73'	3.50
482	3330 - 33.70'	4.00
236	3566 - 15.47'	3.75
468	4034 - 34.78'	4.25
981	5015 - 60.00'	7.50? (Assume 3.50)
558	5573 - 29.24'	3.00
957	6530 - 66.92'	4.00
760	7290	Assume 4.00 to bottom
	- 53.14	

411.02' DEVIATION BASED ON
 INCREMENTAL MEASUREMENTS

OR

True depth
 Possible maximum drift from center

$$\begin{aligned}
 &= 7,278 \text{ feet} \\
 &= 395 \text{ feet} \\
 &X = \tan 4^\circ (7,278') \\
 &= 508.93' \text{ DEVIATION BASED ON TOTAL DEPTH AND } 4^\circ \text{ ANGLE OF DRIFT.}
 \end{aligned}$$

JMR/tti
 12/07/81

THERMAL POWER COMPANY, Operator
KAPOHO STATE 1

Wellbore Deviation Surveys

<u>Depth in feet</u>	<u>Deviation in degrees</u>
85	0.25
350	1.00
748	1.75
880	2.00
1753	1.75
2191	3.50
2460	4.00
2848	3.50
3330	4.00
3566	3.75
4034	4.25
5015	7.50? (Assume 3.50)
5573	3.00
6530	4.00
7290	Assume 4.00 to bottom

True depth = 7,278 feet

Possible maximum drift from center = 395 feet

JMR/tti
12/07/81

MEMORANDUM

1097

PLANNING DEPARTMENT

County of Hawaii,

Hilo, Hawaii 96720

To: Melvin Koizumi, Deputy Director, DOH
(Honolulu)

Date: Feb. 28, 1984

✓ Manabu Tagomori, DLNR (Honolulu)
Dr. Donald Thomas, Hawaii Institute of Geophysics

From: Planning Director

Subject: Amendment request to Condition No. 1 of Special Permit
No. 468 - Thermal Power/Dillingham Corporation Geothermal
Exploration and Evaluation

Enclosed is a request submitted by Thermal Power for an amendment to Condition No. 1 of Special Permit No. 468 granted by the Planning Commission on October 15, 1980.

Your review and comments on Thermal Power's request would be greatly appreciated.

Should you have any questions, please feel free to contact Rodney Nakano or Brian Nishimura of this office at 961-8288.

BN:ds
Enc.

RECEIVED
84 MAR 1 11:09
DIV. OF WATER &
LAND DEVELOPMENT

RECEIVED
84 MAR 1 12:52
DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII
RECEIVED
84 MAR 2 4:57
DIV. OF WATER &
LAND DEVELOPMENT

16 January 1984

Hawaii County Planning Commission

**REQUEST FOR AMENDMENT TO SPECIAL USE PERMIT #468
EXPLORATORY GEOTHERMAL WELL
DRILLING AND EVALUATION**

On October 15, 1980 the Hawaii County Planning Commission granted Thermal Power Company (Thermal Power), a Special Use Permit #468 (SP #468) for geothermal exploration and evaluation in Kapoho, Puna, Hawaii. On November 28, 1983, a time extension of SP #468 was granted, subject to a number of additional conditions. For the past three years Thermal Power has been voluntarily conducting our activities to address the concerns covered by the new conditions. We will continue to perform all activities to comply with the conditions of SP #468. Attachment A describes our compliance program.

The original application and SP #468 granted by the County Planning Commission, had a specific intent. As summarized in the County Planning Commission's findings for SP #468: "The purpose of the subject application is to determine and define the existence and potential size of a geothermal resource, in commercial quantities, at this particular location". The original application proposed to drill two exploratory wells which in conjunction with the HGP-A well would provide the information necessary to make a determination about the Puna geothermal resource. The request for two wells was reflected in Condition 1 of the original SP #468 which approved drilling two wells. Although exploratory wells have to be "successful" in terms of tapping a geothermal resource and in terms of well adequacy in order to generate data for a resource evaluation, Condition 1 merely referred to two wells without any explicit reference to whether the wells were "successful". Other permits issued by the Commission define successful wells.

After completing the two wells (to the extent such wells could be completed) and conducting a lengthy technical review of the data to identify remaining information needs, Thermal Power has determined that a successful replacement well, (KS 1-A) is essential to adequately complete the collection of the information needed for evaluation of the resource. Thermal Power is requesting that Condition 1 of SP #468, as awarded October 15, 1980, be modified to describe a successful well. Specifically, it is requested that Condition 1 be modified to read: "That a maximum of two successful wells be permitted for drilling. Successful, for purposes of this condition is defined as a well capable of

producing 100,000 pounds of steam per hour." This will permit the drilling of KS 1-A. Wells drilled under Condition 1 are still exploratory in nature as the resource evaluation is dependent on the information to be obtained. We understand that approval by the Planning Commission will not constitute approval of a development project.

There are two major reasons why we have determined specifically that KS 1-A is needed to complete the resource evaluation:

- 1.) The data obtained from Kapoho State #1 well (KS-1) and Kapoho State #2 well (KS-2) is distinctly different from the resource in the HGP-A well. This difference raises questions about the reservoir which can only be addressed through additional data.
- 2.) The KS-1 well has an obstruction left in the hole from the drilling program. The drilling procedures for the replacement well have been substantially changed to avoid any further difficulties of this type. The obstruction consists of part of a drill string which was lost in the hole. It has been determined by well drilling experts that the obstructions in KS-1 cannot be removed. By reducing the flow from the well, the obstruction prevents an adequate assessment of the well's long term productive potential. Long-term flow tests are necessary to provide the reservoir stability data required by the Hawaiian Electric Company's Request for Proposal to evaluate the potential size and uses of the resource.

Thermal Power understands that the County would like to minimize the impacts of exploratory drilling and testing activities while still obtaining the information necessary to complete the evaluation of the Puna geothermal resource. The proposed modifications to Condition 1 will not alter the reasons for which the permit was originally proposed or subsequently approved. The evaluation of the potential energy resource is the purpose of the three year program in which our joint venture has invested over \$10 million to date. In cooperation with the County Planning Commission's goal of exploring the alternative energy potential of the Big Island while minimizing any impacts to the community, Thermal Power has voluntarily and consistently provided the best available abatement and monitoring methods, and upon the County's request has provided information to assist with the County's development of regulatory controls. Throughout our past activities, Thermal Power has notified and coordinated with the community. We will continue to be responsible operators while completing our evaluation of Hawaii's geothermal resource.

Activity Description

The additional exploratory well specifically contemplated would be located on the existing well pad at KS-1. No land will be disturbed in connection with the replacement well. Drilling operations are scheduled for 24 hours per day, 7 days per week for approximately 10 weeks. Modification of the noise abatement equipment in the field during previous drilling efforts has resulted in a noise abatement program which will meet the County's noise guidelines, as specifically

required in SP #468. No air emissions are associated with the mud drilling method. Entry to the KS-1 well pad will utilize existing private roads. Traffic on the existing roads will not be opened to the public and will be kept to a minimum with an average of 10 employees on site during any working period.

Some brief (1-4 hour) flow testing of the well might be required to evaluate the well while drilling. After the well is completed, long-term flow tests would be conducted. The tests may consist of flowing the replacement well and the KS-2 well alternatively. The data from the flow tests will allow Thermal Power to determine the chemical and physical characteristics of the resource's stabilized flow. Flow testing will include abatement to minimize noise and odor.

During all activities on the site Thermal Power will continue our monitoring programs as described in Attachment A, Compliance with Conditions of SP #468. Over the last two and one-half years the monitoring data has shown that the abatement methods used by Thermal Power during drilling and testing programs are successfully reducing H₂S emissions below the proposed air quality standard being developed by the Hawaii State Department of Health.

Archaeological and environmental baseline studies were previously conducted by Thermal Power for the KS-1 and KS-2 well pads and road areas. These studies supported the conclusions of the previous Environmental Baseline Study done in 1977 in connection with the HGP-A well. No rare or endangered species have been found in the exploratory area and no archaeological sites have been discovered. Thermal Power is currently conducting expanded environmental and archaeological studies in a one mile radius of the existing wellsites. If at any one time during operations under the amended permit, any archaeological sites or rare and endangered species are discovered, appropriate County and State officials will be notified and every effort will be made to avoid any adverse disturbance.

In addition to the conditions for SP #468, Thermal Power Company will be complying with all the requirements of Chapter 184 H.R.S. the State Department of Land and Natural Resources relative to drilling for geothermal resources in Hawaii. These regulations cover all aspects of drilling operations. As a courtesy to the community Thermal Power plans to continue to notify residents as directed by the Planning Department prior to initiating the drilling and subsequent testing activities.

Additionally, we request the deletion of the sentence on page 7 of the Planning Commission's letter of November 28, 1983 which reads: "Should any of the foregoing conditions not be met, the permit shall be automatically void." The language found in Special Permit #468 authorizing the Planning Commission to determine whether the Special Permit should be terminated in the event of a failure to meet conditions should be applicable to all conditions. Although Thermal Power intends to comply with all of the conditions of the Special Permit, it does not feel that it or the Commission should be subject to legal actions by third parties asserting that the permit is void because of an alleged violation of a condition. Such decisions should be made by the Planning Commission and not by a court unfamiliar with the intent of the Planning Commission in imposing such conditions. We would like to assure the Commission that we will continue to be responsible operators.

THERMAL POWER COMPANY

Special Use Permit No. 468

Attachment List

- A. Compliance with Conditions of Special Use Permit No. 468
- B. Metes and Bounds Descriptions
- C. Location Map
- D. Air and Meteorological Monitoring Sites
- E. Emergency Response Plan
- F. Abatement System Design
- G. Permit Filing Fee

THERMAL POWER COMPANY

Attachment A

Compliance With Conditions of Special Use Permit No. 468

The currently applicable conditions of Special Use Permit No. 468 (SP 468) are all addressed through the existing programs voluntarily initiated by Thermal Power Company during past activities. The compliance programs for meeting all the conditions of SP 468 in coordination with the attached application are described below.

Condition 1: Responsibility For Compliance

Thermal Power Company (TPC), as Operator for the Puna Geothermal Venture, takes responsibility for complying with all of the stated conditions of approval. In the event that this responsibility is transferred to a successor or assigned to another party, TPC will notify the County Planning Department.

Condition 2: Grading and Grubbing Prerequisites

The activities connected with the contemplated replacement well will take place on the existing private roads and the KS-1 well pad. Consequently, no grubbing or grading is planned at this time. For the County's information, a metes and bounds description and a map showing the boundaries of the existing well pad, proposed wellhead location and access roads, are provided as Attachments B and C. In preparation for drilling the existing Kapoho State 1 (KS-1) well TPC conducted an archaeological reconnaissance survey of the area which was submitted to the County Planning Department. Another copy of the survey report is provided as Attachment D for the Planning Department's information.

If any grading and grubbing off of the existing pads and roads becomes necessary, TPC will update this information. All requirements of the County grading ordinance will be complied with during any grading activities.

Condition 3: Noise Monitoring Plan

The noise monitoring program is implemented during any drilling or testing activities on the TPC property. During the drilling and testing for the replacement well, the noise monitoring and abatement program will consist of the following:

- a) As requested under Condition 10, a public phone number (808) 961-2184 is available for complaints or comments at any time. This service is checked daily except during drilling and testing activities when the number is checked on a much more frequent basis. All calls will be

logged. Comparison can be made with the meteorological data and the record of operations described under Conditions 9 and 6, respectively.

- b) Ongoing meteorological data collected near the existing KS-1 pad and northeast of KS-1. The existing meteorological monitoring equipment and data is described in response to Condition 4.
- c) Noise monitoring will be conducted during the drilling and testing operations at the locations shown on Attachment E. In the event that TPC receives any complaint about the noise levels, TPC or its representatives will respond by spot monitoring at the residential location involved in order to ensure compliance with Condition 12.

Condition 4: Air Quality Monitoring Program

Thermal Power Company has been operating an air quality monitoring system in the Puna geothermal area for the last two years. This information provides background data for meteorology and H₂S levels in the area and has shown that the emissions from the past Thermal Power activities have been well within the Department of Health draft Ambient Air Quality Standard for H₂S.

The total air monitoring system which includes both the Thermal Power and HGP programs, consists of a combination of Colortech cards and continuous H₂S analyzers. An independent study of the system was conducted by Woodward-Clyde which determined that the system met the Environmental Protection Agency's stipulations for Quality Assurance and Quality Control. A network of 30 to 40 Colormetric tabs is collected weekly. Three continuous H₂S analyzers are currently in operation: one southwest of the Lanipuna 6 proposed well site, one about 1.75 miles northeast of HGP (station 36) and one about 1.25 miles southwest of HGP (station 16). The KS 1 drill site and station 36 are also instrumented with 10-meter meteorological towers and measure wind speed, wind direction, and temperature. Station 36 also monitors relative humidity, precipitation, standard deviation of horizontal wind direction, and solar radiation.

The H₂S and meteorological data are reduced to 1-hour averages. The period of record for station 16 is June 1, 1981 to present. The period of record for the drill site is July 20, 1981 to present. The period of record for station 36 is May 16, 1981 to present (meteorology) and June 1, 1981 to present (H₂S).

Condition 5: Emergency Response Plan

TPC's Emergency Response Plan has already been reviewed and approved by the Hawaii County Civil Defense Agency. An updated copy is provided for the Planning Department's records as Attachment F. A copy of the upgraded plan has also been sent to Hawaii County Civil Defense Agency.

Condition 6: Operations Record

A permanent operations record will be maintained during all drilling and testing on the TPC wells. Similar records will be kept for the emission monitoring systems described previously to record performance testing, calibration and maintenance of the continuous H₂S monitors. Emission measurements from the monitoring equipment are currently compiled into tables using the units which correspond to the applicable regulations.

Condition 7: Best Available Control Technology

Best Available Control Technology (BACT) is defined by the U. S. Environmental Protection Agency and the Hawaii State Department of Health as being those methods, equipment, or systems capable of the maximum degree of control taking into account economics, availability, environmental impacts and site-specific applications. During well drilling and testing in the Puna area, TPC has utilized the best available methods of controlling noise and hydrogen sulfide (H_2S). These methods are based on TPC's 20 years of experience with The Geysers geothermal field in California and were modified in the field to address the specific characteristics of the Hawaii geothermal resource.

BACT for drilling in Hawaii concerns the choice of drilling method and accompanying abatement. Drilling using mud is a quieter method compared to drilling with air. Unlike air drilling, mud drilling does not have air emissions. In addition to the choice of the quieter drilling technique, TPC has installed noise shields on the WRI drilling rig, and enclosed the associated equipment in sound containment chambers with inlet and exhaust mufflers.

BACT for testing geothermal wells is based on the relatively short abatement period required and that the characteristics of the resource are unknown initially. When the wells in Hawaii are first opened the unusually abrasive particles in the initial flow may require limited vertical venting to avoid cutting through the steam pipes and abatement systems. After a short period of cleanout venting the well, the steam can be redirected horizontally and the H_2S abated with caustic-peroxide treatment and noise will be controlled with the use of an underground rock muffler. Attachment G is a sketch showing the abatement system's design.

The abatement methods used by TPC were able to reduce noise and H_2S emissions to well within the County noise guidelines and the Department of Health's draft standard for hydrogen sulfide. The drilling and testing activities described in the attached application will utilize these proven control methods.

Condition 8: Open Venting Prerequisites

TPC is attempting to modify the steam collection and test abatement equipment to address the problem of abrasive particles in the initial flow of the Hawaii geothermal wells. The modified equipment will be tested during the flow test of the replacement well. If successful, the modifications will remove the need for vertical venting. Prior to any possibility of planned vertical venting, TPC will request approval from the County Planning Department with the exception of emergency actions. TPC will notify the Planning Department as soon as possible if emergency procedures become necessary.

Condition 9: Meteorological Monitoring Program

Continuous meteorological monitoring stations have been operated by TPC on TPC's property in the Puna geothermal area for the last two and one-half years. TPC has voluntarily made this raw data available to the County Planning Department. During our activities on the wells, TPC will continue to collect meteorological data and will provide this data to the Planning Department in a summarized format. Although not required for compliance, TPC will provide the summarized data for the last 6 months of 1983 during the 1st quarter of 1984.

Condition 10: Community Contact and Response Plan

The established telephone number for use by local individuals for any contact or complaint is (808) 961-2184. During any drilling or testing activity on the TPC site, a TPC employee or representative will be available to respond as necessary on a 24 hour basis.

Condition 11: Bi-annual Status Report

TPC interprets Condition 11 as a requirement to provide this information to cover activities after the date of the permit extension. However, for the County's information the status report for January 1984 would consist largely of information already provided to the County Planning Department. A description of the work undertaken by TPC in the last three years was provided as part of the original request for an extension of SP 468. Descriptions of the proposed work for the next 6 month period were provided in both the extension requests and the attached application for modification of SP 468. As a continuation of our voluntary monitoring programs, the summarized results of the environmental monitoring activities will be provided in the 1st quarter of 1984. No complaints about TPC activities or wells were made during the last six months.

As discussed in the request to extend SP 468, the currently proposed work will allow TPC to obtain data on the capability of the Puna Geothermal Resource to support 25 MW of electric power generation. The data required includes the mass flow and verified chemical characteristics of the resource. Testing is the final phase of the exploration and evaluation program. When the resource testing is completed TPC will be able to determine the technical capabilities of the wells and apply for development permits if the wells prove to be viable.

Condition 12: Noise Guidelines

Prior to drilling the KS-1 well, TPC performed a noise study to assist the Planning Department in developing noise guidelines for the County. The noise abatement methods developed in the field by TPC successfully complied with the County's noise guidelines during previous drilling and testing activities. The methods included installing noise shields on the WRI drilling rig and constructing a new rock muffler for use during testing. TPC will continue to comply with the noise guidelines as specified in Condition 12.

Conditions 13 and 14: Disposal Plan Approval

The proposed disposal site for the sump contents and any other waste materials from drilling will be provided to the State Department of Health (DOH) for their review and approval.

Condition 15: Revegetation Plan Approval

All denuded land on and around the drillsite will be revegetated to meet the State and County permit requirements. The proposed revegetation plan will be provided for the County's review in connection with any plan to abandon or convert the exploratory wells into development or another beneficial use.

Condition 16: Information and Site Access

The County Planning Department may contact (1) Nicki Norman, (415) 765-0446 or at home (415) 644-0552, or (2) Rebecca Beemer (415) 765-0626 or at home (415) 798-7421 or (3) Thermal Power offices (808) 944-5545 to obtain necessary information on the TPC activities or wells. When required, Ms. Norman or Ms. Beemer will arrange access to the site for government representatives or consultants. Due to insurance provisions and safety concerns, all visitors will be accompanied by a TPC employee or authorized agent.

Condition 17: Outdoor Lighting Ordinance

TPC is in compliance with requirements of Chapter 14, Article 9 of the Hawaii County Code relating to outdoor lighting.

Condition 18: Effective Term

TPC will notify the Planning Department upon the successful completion of the exploration program. We understand that the SP 468 is valid until that time or until October 15, 1986, whichever occurs sooner.

Condition 19: Compliance With All Other Applicable Requirements

TPC will continue to comply with all other applicable rules, regulations and permit requirements.

NAN/tti
1/10/84

ROAD AND UTILITY EASEMENT

to

"KAPOHO STATE 1"

Geothermal Well Site

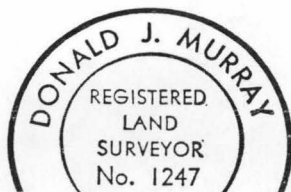
Within L.P. 8177 and R.P. 4497

L.C. Aw. 8559 Apana 5 to C. Kanaina

Kapoho, Puna, Hawaii

Beginning at a point at the northwest corner of this parcel of land and on the easterly side of the Pohoiki Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,223.20 feet North and 8,563.44 feet East and running by azimuths measured clockwise from true South:

- | | | |
|-----|--------------|---|
| 1. | 284° 01' | 146.45 feet; |
| 2. | 249° 13' | 85.26 feet; |
| 3. | 243° 34' | 101.26 feet; |
| 4. | 242° 05' | 163.01 feet; |
| 5. | 247° 24' | 440.08 feet; |
| 6. | 242° 42' | 248.58 feet; |
| 7. | 237° 18' | 77.82 feet; |
| 8. | 228° 12' | 117.13 feet; |
| 9. | 332° 58' 20" | 31.02 feet along "Kapoho State 1" Easement to a pipe; |
| 10. | 48° 12' | 111.60 feet; |
| 11. | 57° 18' | 81.63 feet; |
| 12. | 62° 42' | 251.22 feet; |
| 13. | 67° 24' | 439.92 feet; |
| 14. | 62° 05' | 162.01 feet; |
| 15. | 63° 34' | 103.12 feet; |
| 16. | 69° 13' | 86.74 feet; |
| 17. | 57° 22' 20" | 157.28 feet to a point at the easterly side of the Pohoiki Road; thence along the easterly side of Pohoiki Road along a curve to the left having a radius of 182.00 feet, the chord azimuth and distance being: |
| 18. | 172° 12' 58" | 149.70 feet to the point of beginning and containing an area of 47,896 Square Feet or 1.0995 Acres. |



MURRAY, SMITH & ASSOCIATES, LTD.

EASEMENT

"KAPOHO STATE 1"

Geothermal Well Site
Within L.P. 8177 and R.P. 4497
L.C. Aw. 8559 Apana 5 to C. Kanaina
Kapoho, Puna, Hawaii

Beginning at a point at a pipe at the west corner of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Kaliu" being 8,982.83 feet North and 9,677.70 feet East and running by azimuths measured clockwise from true South:

- | | |
|-----------------|--|
| 1. 242° 58' 20" | 250.00 feet to a pipe; |
| 2. 332° 58' 20" | 300.00 feet to a pipe; |
| 3. 62° 58' 20" | 250.00 feet to a pipe; |
| 4. 152° 58' 20" | 300.00 feet to the point of beginning
and containing an area of
75,000 Square Feet or 1.7218
Acres. |



MURRAY, SMITH & ASSOCIATES, LTD.

By Donald James Murray
Donald James Murray
Registered Surveyor

Hilo, Hawaii
July 9, 1981

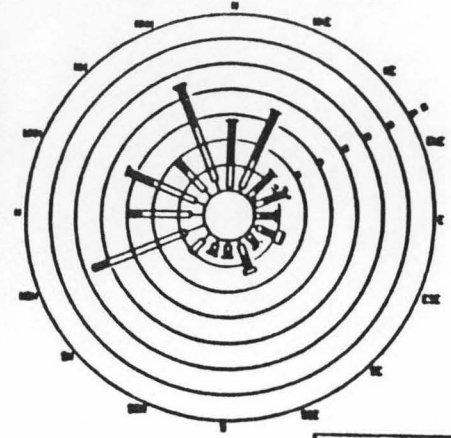
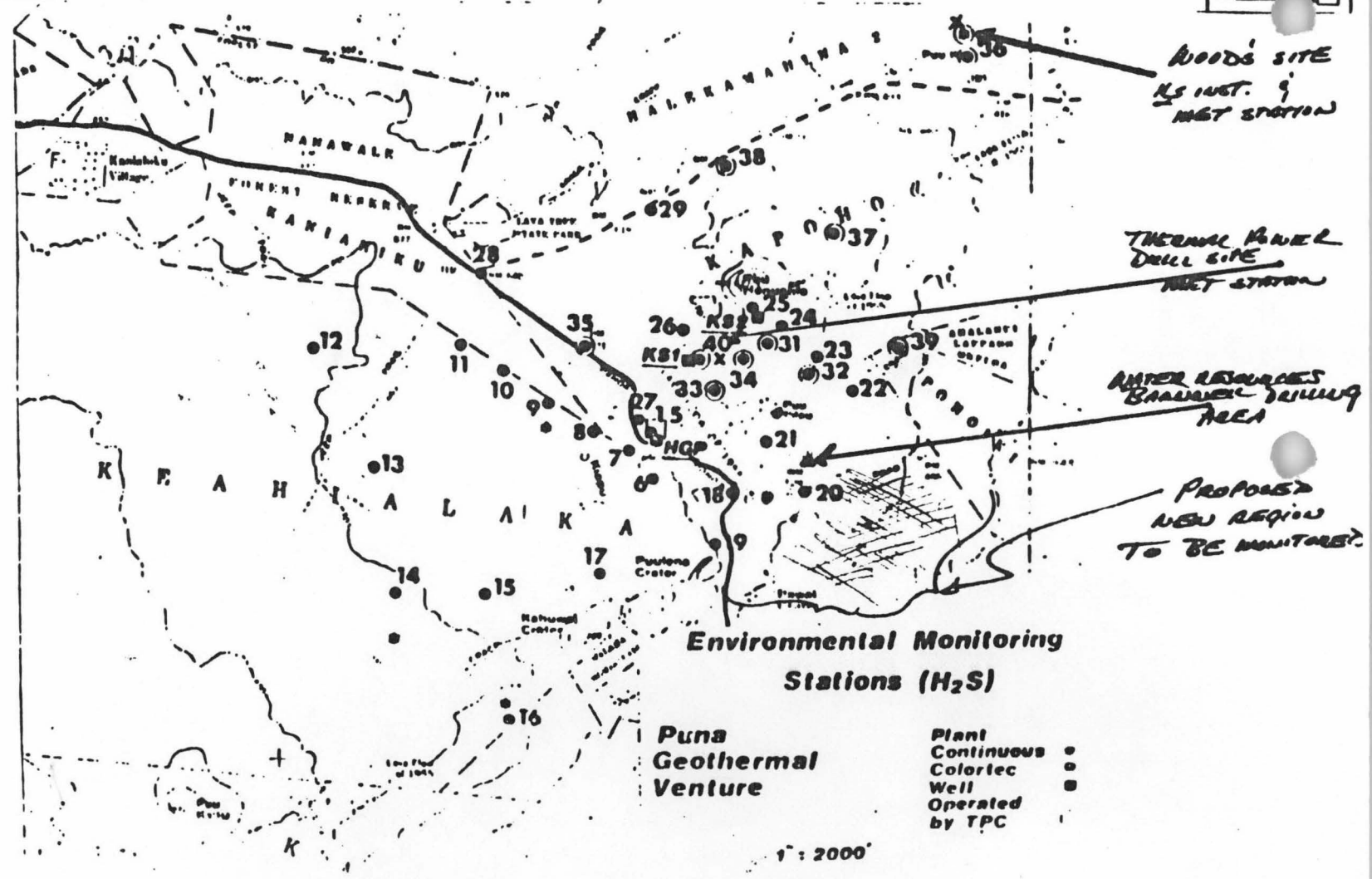


DIAGRAM 1'



PUNA GEOTHERMAL VENTURE

Revised - 10/21/83

Thermal Power Company - Operator
Amfac and Dillingham

GEOTHERMAL EMERGENCY RESPONSE PLAN

COMMUNICATION - NOTIFICATION

Site personnel at the Kapoho State 1 and 2 wellsites include one or two guards at all times and brief daily visits to each wellhead by a technical person (pressure monitor) recording wellhead shut-in pressures. The pressure monitor also reports immediately, by telephone to Thermal Power Company (TPC) - Operator in San Francisco, any abnormal noise, odor, leakage or other condition of the wellhead and wellsite.

Absent any active operations when TPC personnel are present on the wellsites, the guards, pressure monitor or any person witnessing any emergency situation should telephone call collect only the first TPC representative reachable in the following sequence:

W. L. D'Olier	Bus.	(415) 765-0449
	Res.	(415) 982-5630
J. M. Denton	Bus.	(808) 944-5545
	Res.	(808) 377-5605
R. L. Beemer	Bus.	(415) 765-0626
	Res.	(415) 798-7421
N. A. Norman	Bus.	(415) 765-0446
	Res.	(415) 664-0552
R. J. Bowden	Bus.	Hilo Mobil Operator Unit 576
	Res.	(505) 327-6419
R. T. Pittenger	Bus.	(415) 765-0467
	Res.	(415) 939-3124

IMMEDIATE EMERGENCY RESPONSE

Thermal - Operator will immediately:

GUIDES

TASKS:

- | | |
|-------------------------------|---|
| Pink Page | 1. Assess the emergency. |
| Yellow Pages | 2. Assess the potential for off-site impact and notify Civil Defense of any potential. |
| Yellow Pages | 3. First person reached notify Beemer or Norman to alert all other TPC key staff persons. |
| Map | 4. Determine and initiate <u>response action</u> . |
| Yellow Page | 5. Denton notify management committee representatives. |
| Yellow and Green Pages | 6. Manage all PGV persons in <u>response action</u> . |

Priority and judgement in any uncertain circumstances must favor public safety and an early alert of the County Civil Defense office through the County Police Department. The attached Emergency Telephone Call Sheet reflects this priority. If Harry Kim is unavailable, the Chief of Police and Civil Defense District Officer, Arthur Hoke, will be contacted directly. Because Civil Defense will take control of the situation if the emergency threatens public health or safety, one of two alternate emergency plans described on the next two pages will follow the immediate emergency response.

ALTERNATE EMERGENCY PLANS

PLAN A: If any emergency situation threatens public health or safety.

1. Civil Defense will establish a command post for the use of all public safety officials and for liaison with Thermal Power management and technical personnel.
2. Personnel on site will provide assessment of the problem and response action for Civil Defense.
3. Civil Defense will coordinate release of information to the public concerning any public hazard (i.e., outside the private hazard site).
4. Thermal Power Project Manager will be available on a continuous 24 hour basis to provide liaison with Civil Defense and provide continuous update on conditions relevant to the hazard to the public.
5. Thermal Power Project Manager will determine and coordinate the assistance actions that can best be provided by Amfac and Dillingham.
6. I. Lee, TPC-Operations-SFO, will coordinate with C. Nakamura in Honolulu office on exact schedules and logistics for all persons involved in the response action. All SFO response team members will advise I. Lee of changes in location and specific travel plans.
7. If Project Manager is not available, TPC-Operations-SFO will manage all activities in addition to directing the immediate response action at the wellsite until an appropriate TPC manager arrives on the scene.

ALTERNATE EMERGENCY PLANS

PLAN B: If the emergency does not threaten public health or safety.

1. Thermal Power Project Manager will proceed to site ASAP after alerting key TPC staff persons. After on-site inspection, he will notify the Management Committee representatives, and appropriate State and County agencies of the problem and anticipated duration and coordinate public and media contacts.
2. Steps five through seven of the Plan A procedures will be followed.
3. Upon Operator's judgement, or factors indicating an emergency event of more than 36-hour duration, an emergency control center, appropriate to the best management of the circumstances, will be opened by the Operator at a location and telephone number announced by radio, television and the Operator's Hilo telephone answering service.

EMERGENCY CONTACT LIST

Contact Numbers
Work/Home

County/State

Civil Defense	(808) 935-0031
Planning Department	(808) 961-8288
Police Department	(808) 961-2211
Fire Department	(808) 961-6022
DLNR, Tagamori	(808) 548-7619
DOH, M. Koizumi	(808) 548-4139

Key TPC Staff

SFO Response Team:

W. L. D'Olier	(415) 765-0449/(415) 982-5630
R. L. Beemer	(415) 765-0626/(415) 798-7421
R. T. Pittenger	(415) 765-0467/(415) 939-3124
R. K. Burbank	(415) 765-0474/(415) 798-7421
V. A. Harris	(415) 765-0490
I. Lee	(415) 765-0412/(415) 588-0414

Hawaii Response Team:

J. M. Denton	(808) 944-5545/(808) 377-5605
R. J. Bowden	Mobil #576/(505) 327-6419
J. L. Iovenitti	(415) 765-0451/(415) 798-8449
N. A. Norman	(415) 765-0446/(415) 664-0552
C. Nakamura	(808) 944-5545/(808) 262-7154

Other

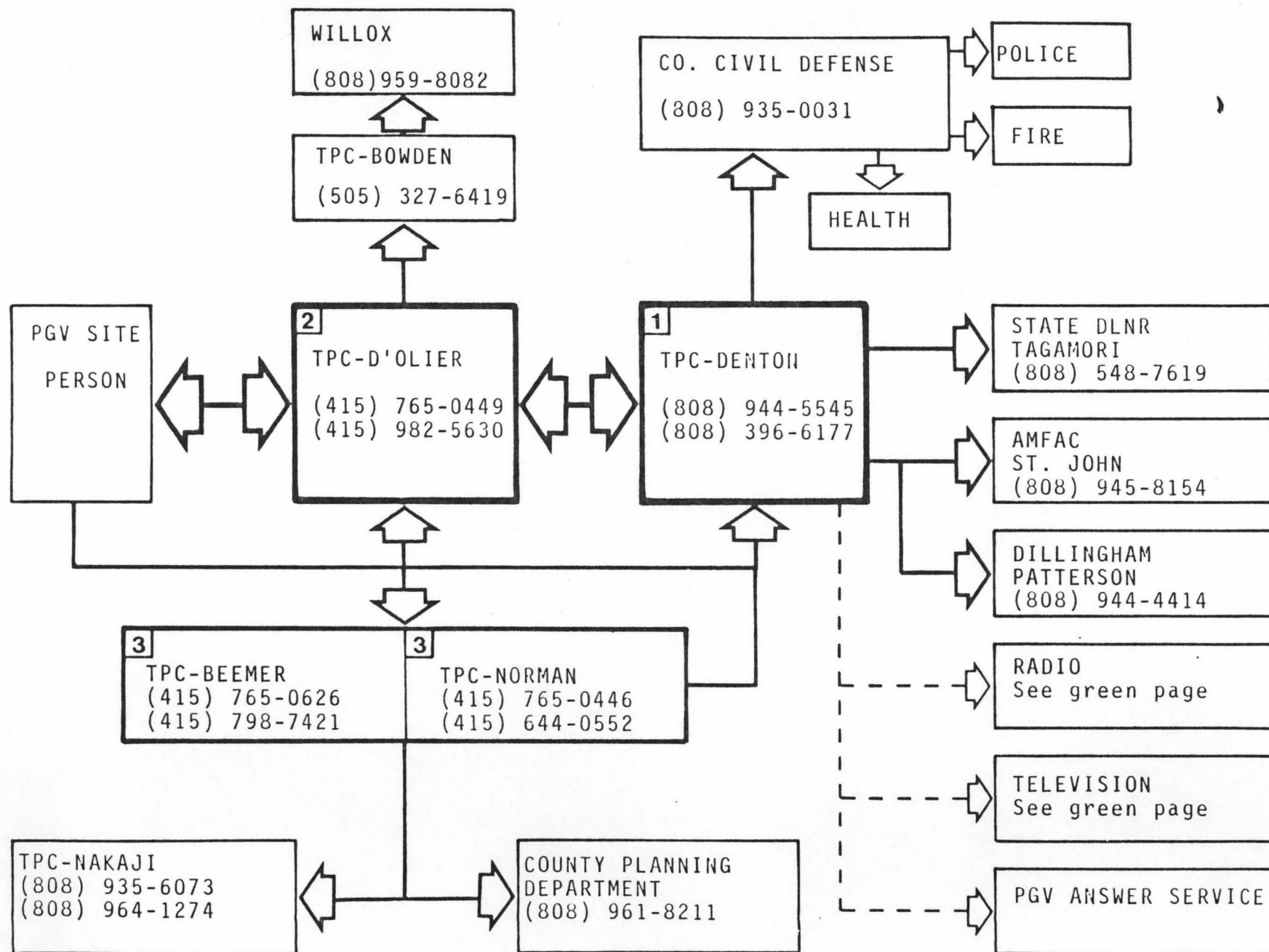
HGP-A Plant	(808) 965-7779
Robert Kochy	(808) 965-7646
Wellsite Guard	Mobil #594
Guard Office	(808) 935-1910
A. Nakaji	(808) 935-6073/(808) 964-1275
D. Hess, Leilani Comm. Assoc.	(808) 935-3716/(808) 965-9745

Management Committee Representatives

R. A. Patterson - Dillingham	(808) 944-4414
Neil Field (PR)	(808) 944-4545
John Hogan (Legal)	(808) 944-4364
G. E. St. John - Amfac	(808) 945-8154
J. T. Humme - Amfac	(808) 966-7073
Bob Ozaki (PR)	(808) 945-8163
Chet Richardson (Legal)	(808) 945-8371

(Y)

PUNA GEOTHERMAL VENTURE - CALL SHEET RESPONSIBILITIES



QUESTIONS TO IDENTIFY EMERGENCY SITUATION

1. General physical description of situation? location? size?
2. Any fire on site? off site?
3. Any steam escaping? general or localized release point? volume?
4. Any H_2S gas odor?
5. Can you hear spoken words on site?
6. Can you see? lights operational?
7. Is emergency supply area intact?
8. Any associated volcanic or seismic activity? lava flow?

MEDIA LIST

BIG ISLAND

Mr. Hugh Clark
(808) 936-3916
Honolulu Advertiser
P. O. Box 1956
Hilo, Hawaii 96720

Mr. Llewellyn Stone Thompson
(808) 935-1012
Honolulu Star Bulletin
P. O. Box 81
Hilo, Hawaii 96720

Mr. Gene Tao/Bill O'Rear
(808) 935-662
Hawaii Tribune Herald
355 Kinoole Street
Hilo, Hawaii 96720

Mr. Joe Ruble
(808) 329-9311 or 935-9131
West Hawaii Today
P. O. Box 306
Hilo, Hawaii 96720

Ms. Lehua Pekelo
(808) 935-5461
KPUA
58 Manolana Place
Hilo, Hawaii 96720

Mr. Ken Hupp
(808) 935-0091
KHLO Radio
400 Hualani Street
Hilo, Hawaii 96720

Mr. Kiyoshi Okubo
(808) 935-6778
Hilo Times
P. O. Box 306
Hilo, Hawaii 96720

Mr. Bill Carnett
(808) 935-6858
KIPA
P. O. Box 1602
Hilo, Hawaii 96720

HONOLULU

Ms. Sandy Carney
(808) 537-3991
KITV
1290 Ala Moana Boulevard
Honolulu, Hawaii 96814

Ms. Stephanie Salazar
University of Hawaii, Hilo
c/o Dr. David Miller
English Department

Ms. Isabel McClendon
(808) 597-7170
Graw-Hill World News
541 Ekekela Place
Honolulu, Hawaii 96817

Mr. Scott Stone
(808) 737-3923
Cox Newspapers
3217 Collins Street
Honolulu, Hawaii 96815

Mr. Jay Hartwell
(808) 525-8034
Honolulu Advertiser

Barbara Hastings
(News release drop)
Honolulu Advertiser

Harry Whitten
Honolulu Star Bulletin

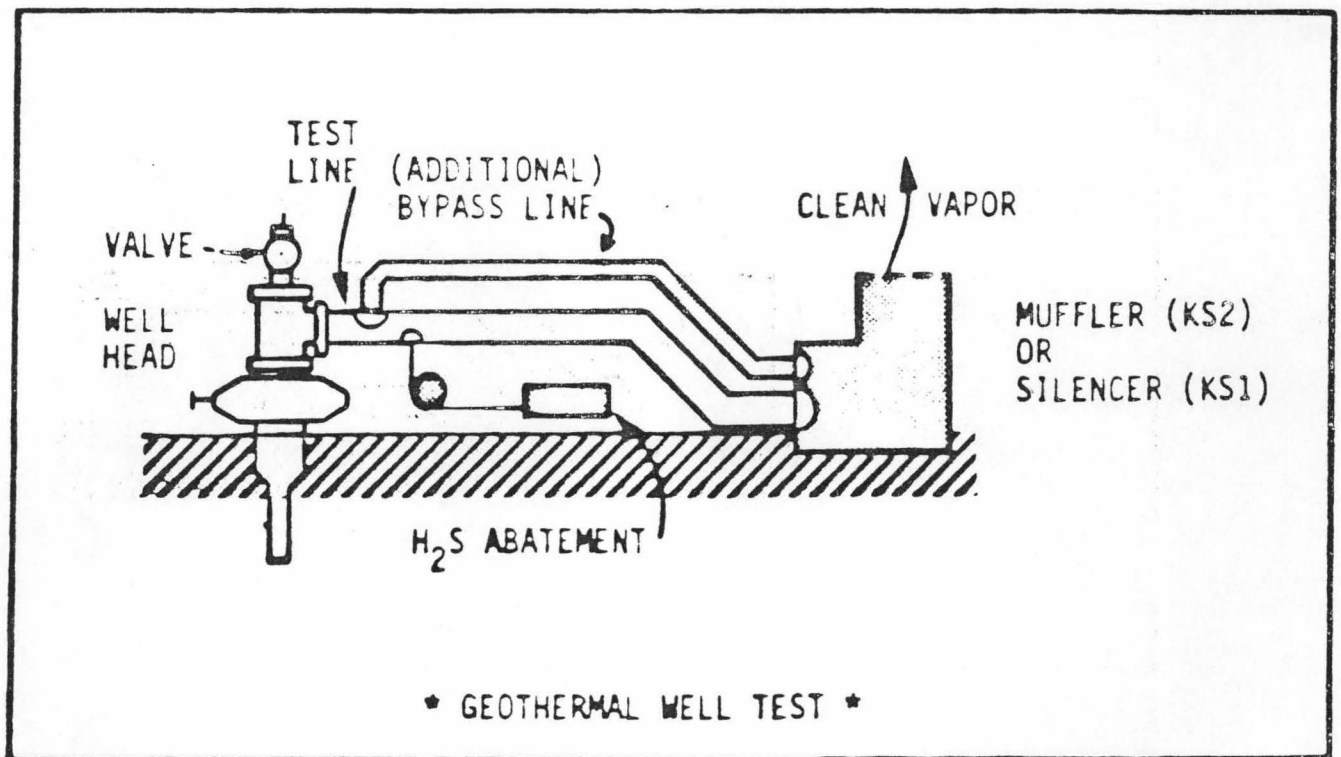
NEWSPAPER DEADLINES

Advertiser: 8:00 p.m. for next day a.m.

Star Bulletin: 9:30 a.m. for late that day.

Hawaii Tribune Herald: 10:00 a.m. for that day's paper.

ATTACHMENT F



THERMAL POWER COMPANY, DILLINGHAM, PUNA SUGAR - JOINT ACCOUNT

San Francisco, Ca.

CHECK
NUMBER

2370

VOUCHER NUMBER	INVOICE NUMBER	INVOICE DATE	INVOICE AMOUNT	DISCOUNT TAKEN	AMOUNT
	CR122183	12/21/83	\$100.00		\$100.00
VENDOR NUMBER HF		PAYMENT DATE 1/10/84			

DETACH BEFORE DEPOSITING

THERMAL
POWER COMPANY,
DILLINGHAM,
PUNA SUGAR,
JOINT ACCOUNT601 California St.
San Francisco, Ca. 94108
(415) 981-5700CHASE MANHATTAN BANK
SYRACUSE, NEW YORK50-937
213

2370

DATE

1/10/84

AMOUNT

\$100.00

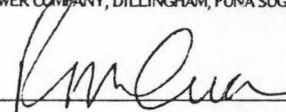
The sum of 100dollar's 00cts

PAY TO THE ORDER OF

HAWAII COUNTY PLANNING COMMISSION

Two Signatures Required For Amounts in Excess of
Two Thousand, Five Hundred Dollars

THERMAL POWER COMPANY, DILLINGHAM, PUNA SUGAR - JOINT ACCOUNT



⑈002370⑈ ⑆021309379⑆ 601 20080621⑈

① real -
Conf. file?

FEB 29 1984

Mr. W.L. D'Olier
Vice President
Geothermal Exploration
Thermal Power Company
601 California Street
San Francisco, California 94108

Dear Mr. D'Olier:

We acknowledge receipt of your application for a permit to drill a replacement well, Kapoho State 1-A under State Geothermal Mining Lease R-2.

Your application for a permit is under review and will be processed shortly.

Very truly yours,

/s/ SUSUMU ONO

SUSUMU ONO
Chairperson of the Board

RTC:NI:ko

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF LAND MANAGEMENT
P. O. BOX 621
HONOLULU, HAWAII 96809

DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

June 24, 1981

Thermal Power Company
601 California Street
San Francisco, California 94108

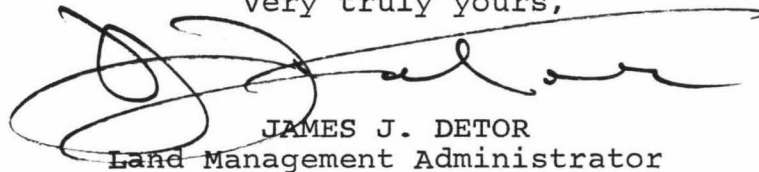
Attn.: Ms. Jayne Iffla

Gentlemen:

Subject: Geothermal Resources Mining Lease
No. R-2

This will confirm our telephone discussion of
this morning in which I informed you that your Well
Indemnity Bond No. 567 7792 is acceptable.

Very truly yours,



JAMES J. DETOR
Land Management Administrator

cc: Mr. R. Higashi
Mr. G. Taguchi
DOWALD

RECEIVED
JUN 29 1981
TPC



THERMAL POWER
COMPANY

31 March 1981

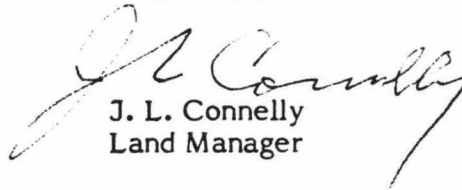
Mr. James Detor
State of Hawaii
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Re: Geothermal Drilling Bond

Dear Mr. Detor:

Pursuant to Rule 9.4(a) of Regulation 8, we attach blanket drilling bond in the principal sum of \$250,000, being Bond No. 567 7792, issued by National Fire Insurance Company of Hartford, as Surety, and Thermal Power Company, as Principal.

Very truly yours,


J. L. Connelly
Land Manager

JLC/ikl
Attachment

cc: Ralph Patterson
Jere Denton



THERMAL POWER
COMPANY

31 March 1981

Mr. Ralph Patterson
Dillingham Corporation
P.O. Box 3468
Honolulu, Hawaii 96801

Re: Blanket Drilling Bond

Dear Ralph:

Attached is the blanket drilling bond in the sum of \$250,000 as required by Rule 9.4 of the Regulations, together with transmittal letter to the DLNR.

The notarization of the signature of Kazu Hiramoto is not correct. The certificate should show Kazu Hiramoto as Senior Vice President of Frank B. Hall & Co. of Hawaii, Inc., in the fifth line.

Will you please have Mr. Hiramoto's signature renotarized and then send the bond to the DLNR.

Very truly yours,


J. L. Connelly
Land Manager

JLC/ikl
Attachment

**National Fire Insurance Company
of Hartford**



Offices/Chicago, Illinois

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men by these Presents, That the NATIONAL FIRE INSURANCE COMPANY OF HARTFORD, a corporation duly organized and existing under the laws of the State of Connecticut, and having its general administrative office in the City of Chicago, and State of Illinois, does hereby make, constitute and appoint Pamela L. Jacobs, C. G. Grasso, Stanley C. Lynn,
Maria Chavarria, Individually

of Los Angeles, California

its true and lawful Attorney-in-Fact with full power and authority hereby conferred to sign, seal and execute in its behalf bonds, undertakings and other obligatory instruments of similar nature as follows:

Without Limitations

and to bind the NATIONAL FIRE INSURANCE COMPANY OF HARTFORD thereby as fully and to the same extent as if such instruments were signed by the duly authorized officers of NATIONAL FIRE INSURANCE COMPANY OF HARTFORD and all the acts of said Attorney, pursuant to the authority hereby given are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the following Resolution duly adopted on February 21, 1955 by the Board of Directors of the Company.

RESOLVED: That the President, an Executive Vice President or any Vice President of the Corporation may, from time to time, appoint, by written certificates, Attorneys-in-Fact to act in behalf of the Corporation in the execution of policies of insurance, bonds, undertakings and other obligatory instruments of like nature. Such Attorneys-in-Fact, subject to the limitations set forth in their respective certificates of authority, shall have full power to bind the Corporation by their signature and execution of any such instrument and to attach the seal of the Corporation thereto. The President, an Executive Vice President, any Vice President or the Board of Directors may at any time revoke all power and authority previously given to any Attorney-in-Fact.

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Company at a meeting duly called and held on the 14th day of May, 1964.

RESOLVED: That the signature of the President, an Executive Vice President or a Vice President and the seal of the Corporation may be affixed by facsimile on any power of attorney granted pursuant to the Resolution adopted by this Board of Directors on February 21, 1955 and the signature of a Secretary or an Assistant Secretary and the seal of the Corporation may be affixed by facsimile to any certificate of any such power and any such power or certificate bearing such facsimile signature and seal shall be valid and binding on the Corporation. Any such power so executed and sealed and certified by certificate so executed and sealed, shall, with respect to any bond or undertaking to which it is attached, continue to be valid and binding on the Corporation.

In Witness Whereof, the NATIONAL FIRE INSURANCE COMPANY OF HARTFORD has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed this 19th day of March, 19 79.



NATIONAL FIRE INSURANCE COMPANY OF HARTFORD

R. J. Wall

Vice President.

State of Illinois, County of Cook, ss:

On this 19th day of March, 19 79, before me personally came
R. J. Wall to me known, who, being by me duly sworn, did depose and say: that he resides in the Village of
Western Springs, State of Illinois; that he is a Vice-President of the NATIONAL FIRE INSURANCE COMPANY OF HART-
FORD, the corporation described in and which executed the above instrument; that he knows the seal of said Corporation; that the
seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors
of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed
of said corporation.



Irene Bieniewski

Notary Public.

My Commission Expires October 10, 1982

CERTIFICATE

T. F. Doyle

I, T. F. Doyle, Assistant Secretary of the NATIONAL FIRE INSURANCE COMPANY OF HARTFORD, do hereby certify that the Power of Attorney herein above set forth is still in force, and further certify that the Resolutions of the Board of Directors, set forth in said Power of Attorney are still in force. In testimony whereof I have hereunto subscribed by name and affixed the seal of the said Company this 17th day of March, 19 81.



T. F. Doyle

Assistant Secretary.

HAWAII INSURANCE DIVISION

NOTICE OF APPOINTMENT OF GENERAL AGENT
TO THE INSURANCE COMMISSIONER OF THE STATE OF HAWAII:

The undersigned Insurer, as provided in the Hawaii Insurance Law, hereby appoints the General Agent named below to transact, on behalf of the Insurer, the following classes of insurance:

(Cross out classes of insurance NOT wanted)

(1) ~~Life~~ (3) Casualty (5) Marine (7) Surety
(2) Disability (4) Fire (6) Motor Vehicle (8) ~~Auto~~

Frank B. Hall & Co. of Hawaii, Inc. of 230 Dillingham Bldg., Honolulu, Hawaii 96813
Name of General Agent Business Address

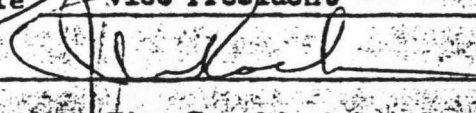
Further, the undersigned Insurer hereby certifies to having made a direct agency appointment of the above General Agent, and that such appointment shall remain in effect continuously until terminated in accordance with the applicable provisions of the Hawaii Insurance Law.

Dated at Chicago, Illinois on May 4, 1972

National Fire Insurance Company of Hartford
Full and exact name of Insurer (typed)

By 

Title Vice President

By 

Title Vice President

The undersigned General Agent hereby consents to the direct general agency appointment as set forth above.

Dated at Honolulu, Hawaii, on May 10, 1972

Frank B. Hall & Co. of Hawaii, Inc.
Full and exact name of General Agent (typed)*

By 
Signature of Designated Representative

* John Doe, dba ABC Insurance Agency; John Doe & Richard Roe, dba XYZ Insurance Agency; Aloha Insurance Agency of Hawaii, Ltd., etc.

NOTE: Two executed copies of this Notice must be filed with the Insurance Division.

DO NOT WRITE BELOW THIS LINE

CANCELLED License No. 539 EFFECTIVE 5/11/72

STATE OF HAWAII
Insurance Division

General Agent's License

No 539

KNOW ALL MEN BY THESE PRESENTS THAT

Name FRANK B. HALL & CO. OF HAWAII, INC.

Classes of Insurance) *LIFE, DISABILITY, CASUALTY, FIRE *
Authorized) *MARINE, MOTOR VEHICLE, SURETY *

Issue Date JANUARY 1, 1968

having complied with the requirements of the laws, is hereby licensed to transact the above-named classes of insurance. This license is valid until terminated by surrender, revocation, or failure to extend. A new license will not be issued upon extension. This license shall remain in the possession of the licensee named herein until termination, at which time it must be delivered to the Commissioner.

Designated Representatives

Peter A. Dillingham - L, D, MV

R. L. Mannon - L, D, C, F, M, MV, S

Jack Wolfe - D, C, F, MV, S, M

Kazuyuki Hiramoto - L, D, C, F, M, MV, S

Abraham D. Garcia - D, C, F, M, MV, S

Henry H. McNeill, Jr. - All

GIVEN UNDER MY HAND AND SEAL at Honolulu, Hawaii

Mike N. Tolucaga

Acting

INSURANCE COMMISSIONER

By Gladys W. Gomes

DIVISION OF WATER AND LAND DEVELOPMENT

From: rtf Date: 2/2 File in: _____

To: Initial

show 2/6 Robert T. Chuck

Takeo Fujii

James Yoshimoto

Manabu Tagomori

George Morimoto

Herbert Morimatsu

George Miyashiro

Harold Sakai

Leslie Asari

Albert Ching

George Matsumoto

Daniel Lum

Paul Matsuo

Noboru Kaneshiro

Edwin Sakoda

See Me

Take action by

Route to your branch

Review & comment

Draft reply by

For information

Xerox distributed

Acknowledge receipt

File

Jane Sakai

Doris Hamada

Lorraine Nanbu

Jean Starot

Elsie Yonamine

Kay Oshiro

Land Mgt tested first gave us the original to take lead

1. Loc. of 1A? — Distance and direct from KS-1
2. Ok regmt of lease — Bd action? Plan of opns.
3. Design diff w/ KS-1 and why?
4. Deposit ok
5. Size of water tank for safety in killing well

ma → Acknowledge receipt only or do we issue permit?



Leilani Community Association
P O BOX 361 - PAHOA HAWAII 96720

February 20, 1975

Hawaii County Planning Commission
Chairman Roy Kagawa and Members
25 Aupuni St.
Hilo, HI 96720

Subject: SPECIAL USE PERMIT 468; THERMAL POWER COMPANY

The Leilani Community Association (Board of Directors) is in total support of the concept of responsible geothermal development as a positive and much needed step towards energy independence and the economic well-being of Hawaii.

Although we are the community which has, thus far, been most impacted by geothermal exploration activities we are firm in our belief that development can occur with very acceptable types and levels of impacts, provided those involved, act in a responsible manner.

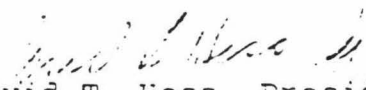
Thermal Power Company has been our neighbor for several years and, over that period, we have come to believe that they have always acted in good faith; in an honest and open manner. It is through a company such as Thermal Power that we feel Hawaii's resources must be developed---responsibly, and with integrity.

It is unfortunate that over the past few years certain individuals have represented Leilani Community Association as being opposed to geothermal exploration and development, when those individuals did not represent our position, nor have the authority to speak in our behalf. It is also unfortunate that, at times, our own words have been misinterpreted making us appear to be "anti"s". It is also unfortunate that even the media has been caught in reporting such misinformation as "the Leilani Estates' residents" suit when referring to the Puna Speaks suit, when the fact of the matter is that a) no one contacted me to confirm the facts, b) there is only one person involved in the suit who lives in Leilani (and he is not a property owner, merely a renter), and c) there is no philosophical commonality between Puna Speaks and Leilani Community Association. It is also unfortunate that a certain amount of public perception and opinion has been influenced by this kind of misinformation.

The Leilani Community Association (Board of Directors) has never been opposed to geothermal activities, nor are we at this time opposed to them. The Leilani Community Association (Board of Directors) is in favor of this growing industry, reflected by the responsible approach being taken by Thermal Power Company.

The approval of TPC's request to amend SP468 may result in a certain degree of impacts to our subdivision, vis-a-vis noise or odor. However, we feel it imperative to allow TPC to continue with their exploratory phase as quickly as possible, and that the conditions for impact control imposed by the Special Use Permit, combined with the integrity of Thermal Power Company will be more than adequate to prevent unreasonable impacts from occurring. It is for these reasons which we, who have been most impacted by all previous geothermal activities, convey our support for the activities of TPC and for their present request. We strongly encourage you to approve the request, and express our sense of urgency and weight in this matter.

Yours very truly,


David T. Hess, President
Leilani Community Association

CC: Board of Directors



NANA WALE COMMUNITY ASSOCIATION, INC.

PAHOA, HAWAII 96778 • TELEPHONE (808) 965-8080

Dedicated to keep Nanawale the Big Island's most beautiful community.

February 21, 1984

Hawaii County Planning Commission
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

The Board of Directors Of Nanawale Community Association have recently passed a motion in support of the continued development of geothermal exploration activities being conducted by Thermal Power in the Kopoho area.

As Nanawale Estates is in close proximity to the areas of present wells KS#1 and KS #2 and there have been no adverse effects from the drillings, we have no objection to the continuation this process. In fact the Board feels that there could be a great advantage to the residents of Nanawale Estates to have geothermal power available for them at a lower cost than that presently available for them at a lower cost than that presently available.

As the KS#1 well is presently inoperable because of an obstruction in its bore string, we understand that an application for the drilling of a third well to replace KS#1 well is being made by Thermal Power Company. Our Board of Directors wish to go on record to support this application so long as it is conducted in compliance with the environmental and other conditions of the existing permit.

Mr. John Giesen of our Executive Board and Mr. Jim Kennedy Vice President of our Board Of Directors are our representatives on the Puna Council Board. Mr. Giesen heads their Geothermal Committee with Mr. Kennedy as alternate. Any communication to Nanawale Community Association referring to Geothermal developments should be directed to Mr. Giesen.

We will be looking for an approval for the drilling of this requested third so that the exploratory program can be completed.

Sincerely,
Nanawale Community Association, Inc.
Board of Directors

cc: Albert Nakaji

John Giesen *Linda Wilson*
Edna M. Price *William B. Price*
C. L. Walden
James J. Kennedy
Theresa N. Kennedy

PUNA COMMUNITY COUNCIL

PAHOA, HAWAII

96778

March 15, 1984

PAHOA CATHOLIC CHURCH

PAHOA FILIPINO ASSN.

PAHOA SCHOOL P.T.S.A

PAHOA NIKKEI JIN KAI

PUNA HUI O HANA

PUNA LIONS CLUB

PARADISE HUI HANA LIKE

BIG ISLAND PAPAYA
GROWERS ASSN.

HAWAIIAN BEACHES
HUI KAHAKAI

LEILANI ESTATES

NANAWALI ESTATES

PAHOA BOOSTERS CLUB

KALAPANA COMMUNITY
ASSN

Hawaii County Planning Commission
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: SPECIAL USE PERMIT 468 REQUEST FOR
AMENDMENT BY THERMAL POWER COMPANY

The Puna Community Council hereby supports the subject request which would allow the drilling of two successful geothermal wells. It is our understanding that this change in language will allow Thermal Power Company to drill a replacement well for their Kapoho State #1 well, which is obstructed, and enable them to continue with their exploration of the resource.

The Puna Community Council is the umbrella organization under which many (if not most) of the Lower Puna community and civic organizations assemble. As such, we represent the majority of the bona fide residents of Puna, certainly the majority of those who reside in close proximity to the current Thermal Power Company project site. Further, since the Council was established in 1972, we have had the opportunity to experience, first hand, the physical manifestations of geothermal activities from the drilling of the first shallow test holes to the presently operating powerplant at the Hawaii Geothermal Project Abbott well-site. In short, we represent the people who have lived with Hawaii geothermal exploration and development, and we base our testimony on experience rather than on speculation, hearsay, or innuendo.

We have found Thermal Power Company to be credible in their representations to us, and they have lived up to their word in terms of operating in a responsible and trustworthy manner. They are a company of integrity and, based on past experience, we see no reason to doubt their credibility as certain other individuals have chosen to do (apparently, without good reason).

The original language in Special Use Permit 468 allowed Thermal Power Company to drill and test two wells, based on the assumption that both of those wells would prove to be successful, enabling an adequate

test program to be conducted. The justification for two wells was deemed to be reasonable, by virtue of the fact that the request was approved. The request now being made is consistent with the spirit and intent of the original language, but is necessary due to changes in conditions which could have not been foreseen.

It is because of the consistency with the original spirit of Special Use Permit 468, and because of Thermal Power Company's responsible attitude and approach that the Puna Community Council has decided to support their request for amendment. We strongly urge you to approve the changes being requested, and to do all that within your perview and jurisdiction to allow Thermal Power Company to continue with their exploration efforts in as expeditious a manner as possible.

Yours very truly,

James A. Warren
President

A handwritten signature in cursive script that reads "James A. Warren". The signature is written in dark ink and is positioned below the typed name and title.

DRILLING PERMITS

KS 1

DRAFT

02/18/81	submitted application
03/19/81	application approved
12/09/81	submitted completion reports
01/21/82	state acknowledged receipt of report
03/11/82	requested first 180-day permit extension
03/25/82	extension approved
03/29/82	filed supplementary to application requesting casing and completion improvements with well program detail dated 3/26/82 attached
04/13/82	supplementary application approved
09/15/82	second 180-day extension requested
09/20/82	extension approved
02/28/83	third 180-day extension requested
03/18/83	extension approved
04/07/83	submitted proposed remedial for KS1 program

KS 2

11/30/81	submitted application
01/08/82	application approved
03/15/82	application to drill deeper
03/24/82	approved
08/11/82	completion report submitted
12/14/82	application for remedial work along with casing lap repair and clean out proposal attached
12/21/82	approved

KS 1A

01/30/84	submitted application along with proposed drilling and completion program
02/08/84	submitted drill site plan and vertical section to supplement application
03/28/84	application approved

Plan of Operations

01/23/81	submitted to BLNR dated 1/13/81
02/02/81	revised plan of operations
03/19/81	approved POP dated 1/13/81
12/01/81	final revision of POP

SUP #468 (COUNTY)

08/20/80	application submitted
10/15/80	application approved
03/04/81	request for amendments to SUP
03/31/81	submitted attachments for amendment application
05/12/81	approved
11/30/81	notified CPC of slight change in location of KS2
08/11/83	requested 3 year permit extension
11/16/83	letter to county clarifying 8/11 extension request
11/28/83	approved time extension
01/13/84	response to compliance with condition 11
01/16/84	request for amendment on condition 1
03/27/84	approved request for amendment
06/28/84	submitted biannual report

KAPOHO STATE 1 WELL ACTIVITY SUMMARY

Drilling and Completion

- o Spud and Completion Dates: 1 September to 12 November 1981.
 - Total Depth: 7290'
 - Drilling Days: 65
- o Casing
 - 30" 0-28' KB¹ (cemented)
 - 20" 0-71' KB (cemented)
 - 13-3/8" 0-900' KB (cemented)
 - 9-5/8" 0-4072' KB (cemented)
- o Liner
 - 7" perforated 3898-7216' KB (standing in 8-1/2" wellbore).
- o Lost Circulation Zone(s) (Amount)

101-129'	(intermittent)	1190-1250'	(90 bbls/hr)
190-239'	(total)	4950'	(9 bbls/hr)
258-271'	(total)	5140'	(7 bbls/hr)
321-420'	(total)	5813'	(9 bbls/hr)
440-480'	(total)	7125'	(30 bbls/hr)
1100-1150'	(48 bbls/hr)	7280-7290'	(240 bbls/hr)
- o A limited suite of wellbore geophysical wireline surveys were run to nominally 4077'.
- o Interim Rig Test

Three short duration (less than 6 hours) rig tests were conducted on 14, 15 and 20 October 1981 at a total depth of 4905', open-hole interval: 4072-4905'. Flow of hot fluid to the surface did occur but stable flow was not achieved. Maximum flowing wellhead pressure (FWHP) and flowing wellhead temperature (FWHT) of 811 psig and 512°F were measured. Particulate matter was produced at the surface which bridged the well and killed the flow.
- o Completion Rig Test (Test Series 1)

A 3-hour rig completion test was conducted on 10 November 1981. Maximum FWHP and FWHT were 1129 psig and 567°F.

¹ All measurements are relative to the Kelly Bushing.

Bottomhole Temperature Survey

Static survey run on 4 December 1981, 22 days after completion, between 4000-6400' at 200' stations showed a maximum temperature of 643°F. The very low gradient of 0.79°F/100 ft. for this interval is suggestive of interzonal flow.

Test Series #2

A short test initiated on 16 December 1981 was designed to measure flowing capacity vs. wellhead pressure. Severe erosion of valves on the test line by particulate matter in the produced fluid, and high FWHP (1454 psig maximum) and flow capacity exceeding the equipment design terminated the test after 45 minutes. During this test, a distinctively, audible "thump" emanated from the well.

Casing Problem Suggestion and Wellbore Evaluation

In early January, it was suggested that "an abnormality in casing or cement" may exist based on the temperature, pressures and presence of a gas cap during the recent flow test. A wellbore evaluation was conducted on 1-2 and 20 February, and casing leaks were determined to exist 900-940' and 1040-1080'.

Remedial Problem #1

The remedial work program was initiated on 14 April 1982 and completed 12 May after (1) running a solid 7" N-80, 26 pound, buttress casing from 0-1898' to secure the wellbore interval from external cold groundwater, (2) leaving a 237' fish consisting of a mill, sub, drill collars and drill pipe inside the 7" liner from 4807-4570', and (3) changing the 600-series gates to 900-series. The mill became stuck at 4807' while attempting to clean bridges in the liner. During the operation, the 9-5/8" casing was found jammed into the expansion spool. This event could be interpreted to be related to the "thump" observed during Test Series #2 (above).

Test Series #3

A 3-day flow test was conducted on 4-6 August 1982 to evaluate well performance with a fish in the wellbore and to clean up the wellbore prior to utilizing the separator system in the scheduled Test Series #4. Mass flow calculations using the James' Method indicated an average total mass flow of 250,000 lbs/hr with an inlet steam fraction of 22%. Liquid flow over the weir, however, was only about 3000-6200 lbs/hr. This discrepancy is attributed to the mechanical test set-up and the inapplicability of the James' Method. It was observed that the well substantially "dried up" during the testing. Stabilized flow was not achieved since testing was restricted to daylight hours only because noise levels from the twin cyclone silencer exceeded nighttime environmental limits. Note that this type of system (cyclone silencer) is designed for a liquid-dominated resource.

Test Series #4

A separator test was conducted on 11-28 August 1982 to provide unequivocal data with respect to the steam fraction in the produced fluid. The silencer was modified to reduce nighttime noise levels but a chemical emission control problem ensued resulting in a temporary shut-down of the test to install a rock muffler. Test data indicates that the well produces nearly 100% steam at a FWHP of 120

psig with a mass flow rate of 72,000 lbs/hr. Flow enthalpy is approximately 1185 Btu/lb. Noncondensable gas content is low at about 0.2%.

3" Line Leak

At approximately 3 a.m. Saturday, 2 October 1982, a pipe to flange well failed just upstream of a 3" gate on the expansion spool that was barely cracked open to admit pressure to a ½" pressure line leading to surface pressure gauges. The well flowed uncontrolled for about 38 hours. The event was safely terminated without injury to any person or further damage to any wellhead equipment. Both outside tampering and purely mechanical equipment failure were considered as two possible causes for the incident. Plans were made to replace the expansion spool with a single machined component. Subsequent analysis by the FBI on sections of the broken ½" line revealed that failure was due to severe bending, thus vandalism is considered to be very likely. Inspection of the spool, however, did also reveal cracks at the welded outlet joints. Note that the flow from the well was virtually 100% steam during the incident.

Expansion Spool Changed

While the expansion spool was being changed on 2 November 1982, Mr. W. L. Godare conducted an inspection of all wellhead components and prepared a failure potential analysis for both Kapoho State 1 and 2. In summary, cracks were found at each joint in the spool outlets, the internal bores of the master valves and expansion spool did not show any evidence of pitting or erosion, the packing seals in the spool were completely ruined, 5 of the 8 cap screws holding the centralizer were broken, and recommendations were made to change components when the well is placed on production. At the completion of this operation, the Kapoho State 1 wellhead was considered to be sound.

High Shut-in Pressures

As a consequence of the interzonal flow, a gas cap was forming in the well. By mid November 1982, the shut-in wellhead pressure on Kapoho State 1 exceeded the previous maximum of 1050 psig. Calculations by Mr. H. Dykstra suggested a maximum WHP of about 1425 psig could be expected based on the pressure at the first producing horizon below the shoe of the 9-5/8" casing and a calculated gas gradient. Mr. Godare conducted a wellhead failure analysis due to excessive WHP and recommend that, "Even though the lowest pressure rate in the wellhead assembly is 2160 psi and the wellhead is considered to be in good condition ... (occasional) ... bleeding ... (the well) ... is ... recommend(ed) ..."

On 29 November, the gas cap was bled specifically to reduce WHP. Previous bleed operations were related to some other well operation. Pressure was only reduced to 1105 psig. On 14 December, the wellhead maximum shut-in pressure of 1430 psig was reached. The well was bled again slightly, to change a relief valve and WHP stabilized by 24 December at about 1400 psig.

"Running-Faucet" Sound at Wellhead

On 6 January 1983, a 7 psig decrease in WHP was recorded along with a "running faucet" type sound emanating from the wellhead. Surface conditions at the wellhead were stable prior to this. Two interpretations were developed for this

sound; fluid was exiting the wellbore either from a shallow casing leak or at the first production zone below the casing. The bottom 900-series gate was first reported to be hot to the touch on 25 January. On 27 January, a temperature/pressure survey was programmed. However, upon opening the bottom 900-series gate, the WHP started to increase. Within 2 hours of this event, however, the WHP was determined to be decreasing. Stabilization occurred at approximately the pre-excursion level of 1380 psig. Cold water was pumped into the wellbore but the WHP could not be lowered below about 1100 psig. A casing leak was interpreted to exist.

Wellbore Evaluation

On 17-18 February 1983, controlled temperature/pressure surveys were conducted. At approximately 670', a casing leak was recorded.

Remedial Program #2 and Wellbore Evaluation

The second remedial program designed to recover the fish and squeeze cement the leak commenced on 5 April 1983. Initial pumping of cold water down the wellbore did not significantly lower the WHP. Combination of pumping lost circulation material to plug a shallow leak, and flowing the well to allow a water kill, also did not prove successful. Drill pipe was stripped into the well during a flow mode but encountered an obstruction at 227'. Hole had to be swedged and then milled from 233-625'. Drill pipe was run to 3673' and a water kill proceeded. Three cement plugs were unsuccessfully attempted. Cold water flows were postulated to be entering the wellbore at the 670' break. With well condition secured (wellhead), a wellbore TV camera was run to a 700' and Dia-Log's minimum ID caliper and casing profile caliper logs were run to 1857' to evaluate the 7" casing sleeve. Two additional cement plugs were eventually set at 2153' and 2147', respectively. Top of cement is at 1750'.

Review of Dia-Log caliper logs is interpreted as severely damaged, probably parted casing from 226-233', split casing from 362-363', and possible gaps at numerous collars (buttress coupling recess). The casing leak at about 670' appears as a collar gap on these logs. Most of the Dia-Log interpretations have been verified with the TV camera recording.

JLI/ikl/crn

KAPOHO STATE 2 WELL ACTIVITY SUMMARY

Drilling and Completion

- o Spud and Completion Dates: 19 January to 2 April 1982.
 - Total Depth: 8005'
 - Drilling Days: 56
- o Casing
 - 30" 0-28' KB¹ (cemented)
 - 20" 0-68' KB (cemented)
 - 13-3/8" 0-1313' KB (cemented)
 - 9-5/8" 0-4209' KB (cemented)
- o Liner
 - 7" perforated: 3981-7891' KB (standing in 8-3/4" wellbore).
- o Lost Circulation Zone(s) (Amount)

321-1320' (total)	2624'	(5 bbls/hr)
1390' (60 bbls)	4028'	(10 bbls)
1495' (20 bbls)	5921'	(50 bbls/hr)
1540-1580' (?)	6400'	(16-34 bbls/hr)
1654' (24 bbls)	6780'	(60 bbls/hr)
2145' (80 bbls/hr)	6950'	(50 bbls/hr)
2185' (30 bbls)	7210-7213'	(280 bbls/hr)
2435' (12 bbls)		
- o A limited suite of geophysical wireline logs were run.

Completion Rig Test (Test Series #1)

A rig test March 30-31, 1982 required approximately 33 hours of air lifting through 4" drill pipe (between 615-1820') to initiate flow. Test was terminated after flowing for 1 hour and 15 minutes because of erosion in the flow line by particulate matter associated with the producing fluid. Stabilized flow conditions were not achieved. Maximum FWHP and FWHT were 455 psig and 457°F.

Temperature/Pressure Surveys

As one of the means to assess wellbore conditions, temperature/pressure surveys were run immediately after completion, and both prior to and after Test Series 2. Maximum temperature, 670°F and pressure, 2300 psig, were measured at the bottom (6905' and 6500', respectively) of the 24 April 1982 survey. These surveys suggest both interzonal flow and the presence of two-phase flow.

¹All measurements are relative to the Kelly Bushing.

Test Series #2

The second flow test, conducted on 20 April - 1 May 1982, was designed to clean up the flow, achieve stabilize flow and measure well performance at several different orifices. Seventeen individual flow periods took place. However, throughout the duration of testing, (1) stabilized flow was not achieved, (2) the well continued to produce particulate matter, and (3) a bridge was present in the wellbore at a depth of about 6914'. Maximum FWHP and FWHT were 1333 psig and 583°F.

Loss of Temperature/Pressure Tools and Wireline

On 6 May 1982, during a routine temperature/pressure survey under shut-in conditions at a depth of 6200', the wireline parted at a depth of about 2000'. Approximately 4200' of wireline and the survey tools were dropped in the hole. The wireline used was standard 0.092" carbon plow steel. Prior to this, 10 wireline temperature/pressure and sinker bar surveys were successfully conducted with the loss of only the bottom 100-1000' of wire due to embrittlement. This last survey was made with a new spool of wire. The shallow break was and still is an enigma.

Fishing Operation

On 11 May, a fishing operation was conducted. Upon pulling out of the hole at the depth of 3400', the wireline broke at 2400', leaving 1000' of wireline, the fishing tools and previous tools and wire in the hole. The repeated loss of wireline resulted in a temporary deferment of all logging and testing operations until this material problem was resolved.

Material Testing and Wellbore Surveys

The lack of wellbore flowing and/or static surveys were becoming an obstacle in analyzing well performance. With the loss of 0.092" carbon-steel wireline in Kapoho State 2, an extensive investigation was conducted for the appropriate type of wireline to use in this geothermal environment. After discussions with metallurgists from the steel industry, oil and geothermal companies, and national laboratories, and field personnel from Union's Philippines and Imperial Valley, CA, geothermal operations, Sanicro-28 stainless steel was chosen for service. On 24 August 1982 during Test Series 4, Sanicro-28 was run successfully into and out of the KS-1 wellbore, but the entire length of run into the well wire was found to have been embrittled. No further surveys were conducted and a study was undertaken by both metallurgists from the manufacturer and Dr. D. Douglas, a UCLA engineering professor and a Thermal consultant. Analysis indicated that Type 310 stainless steel with moderate tensile strength would be the most cost-effective material to use.

Shut-in Wellhead Pressure Monitoring

With the realization of interzonal flow and the consequent formation of a gas cap, daily shut-in wellhead pressure monitoring was initiated.

Test Series #3

The third series of testing was conducted between 3-15 June 1982 with a four-fold objective (1) to clean the wellbore of tools and wire, (2) to break the bridge below 6900', (3) to clean up the fluid flow and (4) to characterize the well's flow performance. During the test a relatively small amount of metal debris was produced. No wellbore surveys were conducted so that the status of the bridges could not be ascertained. Production of particulate matter was demonstrably reduced and the wellflow was considered clean. Distorted lip pressure and flowing wellhead pressure data caused by mineral precipitates from the reaction of the abatement chemicals with the produced geothermal fluid building up in the lip pressure port and discharge line, precluded accurate determination of well performance. The field observation that the flow became wetter near the end of the test was made.

"Running-Faucet" Sound at Wellhead

Around 20-23 June 1982, a running-faucet sound was emanating from the Kapoho State 2 wellhead. A wellbore evaluation program was designed utilizing the geophysical wireline logging cable and tools.

Wellbore Evaluation

On 14 July 1982, while pumping cold water into the wellbore, a temperature survey was conducted. A casing leak was detected at approximately 1040-1050'.

Test Series #4

A flow test utilizing a separator system was conducted on 28 July - 2 August 1982. Steam fraction, enthalpy and flow rate were accurately measured and found to vary significantly with wellhead pressure. The well produced a steam/water mixture at FWHP less than 145 psig, and a fluid with a 92-96% steam fraction at FWHP greater than 145 psig. A 100% steam flow rate of 33,000 lbs/hr was measured at a FWHP of 173 psig.

Casing Leak Evaluation/Metallurgical Testing

On 25 January 1983, temperature/pressure surveys were conducted to evaluate the wellbore and test the recommended 310 stainless steel wireline. The operation was successful with the survey reaching a total depth of about 4800'. It confirmed only one casing leak, as previously indicated. No embrittlement of the wireline was observed in the field and discussions with Dr. Douglas indicated that additional study was not warranted at this time.

Remedial Program

Review of the casing collar log and casing tally logs indicated a 4-foot gap at the 9-5/8" casing tieback between 1093-1097'. A remedial program designed to cement squeeze the leak and to clear the wellbore of any bridges was initiated on 2 March 1983. A cement plug was set at 1434' (top 1291') and six cement squeezes proceeded, all unsuccessfully. Cement squeezing was considered non-workable at this time; the cement plug was drilled out; and drill pipe was run to about 3976' where an obstruction was encountered interpreted to be wireline junk at the top

of the 7" liner (3981'). The casing from 3727' to 1202' was pressure tested and found integral. A wireline spear was run to 3977' with no recovery. Drilling on junk, spearing and milling to 4119' took place. The hole was worked to a maximum depth of 4645'. Pulled out of hole, ran in and could not mill by 4396'. Substantial amounts of drill cuttings came out of hole at this depth, but no wireline debris was recovered. A cement plug was emplaced at 3175' pending further evaluation. Operation was terminated on 29 March 1983.

Wellbore Casing Evaluation

On 15 April 1983, Dia-log caliper logs were run to a depth of about 2976' to determine the condition of the 9-5/8" casing. Interpretation of these logs suggests minor pitting and/or erosion, a small hole at 975', the 4-foot gap at the tieback (as previously determined) and probable incorrect logging of a float collar on the casing records (1092' in records vs. 1052' on log). Logging engineer rated logged casing interval to be in generally fair to good condition.

JLI/ikl/crn

16 January 1984

Hawaii County Planning Commission

**REQUEST FOR AMENDMENT TO SPECIAL USE PERMIT #468
EXPLORATORY GEOTHERMAL WELL
DRILLING AND EVALUATION**

On October 15, 1980 the Hawaii County Planning Commission granted Thermal Power Company (Thermal Power), a Special Use Permit #468 (SP #468) for geothermal exploration and evaluation in Kapoho, Puna, Hawaii. On November 28, 1983, a time extension of SP #468 was granted, subject to a number of additional conditions. For the past three years Thermal Power has been voluntarily conducting our activities to address the concerns covered by the new conditions. We will continue to perform all activities to comply with the conditions of SP #468. Attachment A describes our compliance program.

The original application and SP #468 granted by the County Planning Commission, had a specific intent. As summarized in the County Planning Commission's findings for SP #468: "The purpose of the subject application is to determine and define the existence and potential size of a geothermal resource, in commercial quantities, at this particular location". The original application proposed to drill two exploratory wells which in conjunction with the HGP-A well would provide the information necessary to make a determination about the Puna geothermal resource. The request for two wells was reflected in Condition 1 of the original SP #468 which approved drilling two wells. Although exploratory wells have to be "successful" in terms of tapping a geothermal resource and in terms of well adequacy in order to generate data for a resource evaluation, Condition 1 merely referred to two wells without any explicit reference to whether the wells were "successful". Other permits issued by the Commission define successful wells.

After completing the two wells (to the extent such wells could be completed) and conducting a lengthy technical review of the data to identify remaining information needs, Thermal Power has determined that a successful replacement well, (KS 1-A) is essential to adequately complete the collection of the information needed for evaluation of the resource. Thermal Power is requesting that Condition 1 of SP #468, as awarded October 15, 1980, be modified to describe a successful well. Specifically, it is requested that Condition 1 be modified to read: "That a maximum of two successful wells be permitted for drilling. Successful, for purposes of this condition is defined as a well capable of

producing 100,000 pounds of steam per hour." This will permit the drilling of KS 1-A. Wells drilled under Condition 1 are still exploratory in nature as the resource evaluation is dependent on the information to be obtained. We understand that approval by the Planning Commission will not constitute approval of a development project.

There are two major reasons why we have determined specifically that KS 1-A is needed to complete the resource evaluation:

- 1.) The data obtained from Kapoho State #1 well (KS-1) and Kapoho State #2 well (KS-2) is distinctly different from the resource in the HGP-A well. This difference raises questions about the reservoir which can only be addressed through additional data.
- 2.) The KS-1 well has an obstruction left in the hole from the drilling program. The drilling procedures for the replacement well have been substantially changed to avoid any further difficulties of this type. The obstruction consists of part of a drill string which was lost in the hole. It has been determined by well drilling experts that the obstructions in KS-1 cannot be removed. By reducing the flow from the well, the obstruction prevents an adequate assessment of the well's long term productive potential. Long-term flow tests are necessary to provide the reservoir stability data required by the Hawaiian Electric Company's Request for Proposal to evaluate the potential size and uses of the resource.

Thermal Power understands that the County would like to minimize the impacts of exploratory drilling and testing activities while still obtaining the information necessary to complete the evaluation of the Puna geothermal resource. The proposed modifications to Condition 1 will not alter the reasons for which the permit was originally proposed or subsequently approved. The evaluation of the potential energy resource is the purpose of the three year program in which our joint venture has invested over \$10 million to date. In cooperation with the County Planning Commission's goal of exploring the alternative energy potential of the Big Island while minimizing any impacts to the community, Thermal Power has voluntarily and consistently provided the best available abatement and monitoring methods, and upon the County's request has provided information to assist with the County's development of regulatory controls. Throughout our past activities, Thermal Power has notified and coordinated with the community. We will continue to be responsible operators while completing our evaluation of Hawaii's geothermal resource.

Activity Description

The additional exploratory well specifically contemplated would be located on the existing well pad at KS-1. No land will be disturbed in connection with the replacement well. Drilling operations are scheduled for 24 hours per day, 7 days per week for approximately 10 weeks. Modification of the noise abatement equipment in the field during previous drilling efforts has resulted in a noise abatement program which will meet the County's noise guidelines, as specifically

Page Three

required in SP #468. No air emissions are associated with the mud drilling method. Entry to the KS-1 well pad will utilize existing private roads. Traffic on the existing roads will not be opened to the public and will be kept to a minimum with an average of 10 employees on site during any working period.

Some brief (1-4 hour) flow testing of the well might be required to evaluate the well while drilling. After the well is completed, long-term flow tests would be conducted. The tests may consist of flowing the replacement well and the KS-2 well alternatively. The data from the flow tests will allow Thermal Power to determine the chemical and physical characteristics of the resource's stabilized flow. Flow testing will include abatement to minimize noise and odor.

During all activities on the site Thermal Power will continue our monitoring programs as described in Attachment A, Compliance with Conditions of SP #468. Over the last two and one-half years the monitoring data has shown that the abatement methods used by Thermal Power during drilling and testing programs are successfully reducing H₂S emissions below the proposed air quality standard being developed by the Hawaii State Department of Health.

Archaeological and environmental baseline studies were previously conducted by Thermal Power for the KS-1 and KS-2 well pads and road areas. These studies supported the conclusions of the previous Environmental Baseline Study done in 1977 in connection with the HGP-A well. No rare or endangered species have been found in the exploratory area and no archaeological sites have been discovered. Thermal Power is currently conducting expanded environmental and archaeological studies in a one mile radius of the existing wellsites. If at any one time during operations under the amended permit, any archaeological sites or rare and endangered species are discovered, appropriate County and State officials will be notified and every effort will be made to avoid any adverse disturbance.

In addition to the conditions for SP #468, Thermal Power Company will be complying with all the requirements of Chapter 184 H.R.S. the State Department of Land and Natural Resources relative to drilling for geothermal resources in Hawaii. These regulations cover all aspects of drilling operations. As a courtesy to the community Thermal Power plans to continue to notify residents as directed by the Planning Department prior to initiating the drilling and subsequent testing activities.

Additionally, we request the deletion of the sentence on page 7 of the Planning Commission's letter of November 28, 1983 which reads: "Should any of the foregoing conditions not be met, the permit shall be automatically void." The language found in Special Permit #468 authorizing the Planning Commission to determine whether the Special Permit should be terminated in the event of a failure to meet conditions should be applicable to all conditions. Although Thermal Power intends to comply with all of the conditions of the Special Permit, it does not feel that it or the Commission should be subject to legal actions by third parties asserting that the permit is void because of an alleged violation of a condition. Such decisions should be made by the Planning Commission and not by a court unfamiliar with the intent of the Planning Commission in imposing such conditions. We would like to assure the Commission that we will continue to be responsible operators.

NAN/crn-1/13/84

THERMAL POWER COMPANY

Attachment A

Compliance With Conditions of Special Use Permit No. 468

The currently applicable conditions of Special Use Permit No. 468 (SP 468) are all addressed through the existing programs voluntarily initiated by Thermal Power Company during past activities. The compliance programs for meeting all the conditions of SP 468 in coordination with the attached application are described below.

Condition 1: Responsibility For Compliance

Thermal Power Company (TPC), as Operator for the Puna Geothermal Venture, takes responsibility for complying with all of the stated conditions of approval. In the event that this responsibility is transferred to a successor or assigned to another party, TPC will notify the County Planning Department.

Condition 2: Grading and Grubbing Prerequisites

The activities connected with the contemplated replacement well will take place on the existing private roads and the KS-1 well pad. Consequently, no grubbing or grading is planned at this time. For the County's information, a metes and bounds description and a map showing the boundaries of the existing well pad, proposed wellhead location and access roads, are provided as Attachments B and C. In preparation for drilling the existing Kapoho State 1 (KS-1) well TPC conducted an archaeological reconnaissance survey of the area which was submitted to the County Planning Department. Another copy of the survey report is provided as Attachment D for the Planning Department's information.

If any grading and grubbing off of the existing pads and roads becomes necessary, TPC will update this information. All requirements of the County grading ordinance will be complied with during any grading activities.

Condition 3: Noise Monitoring Plan

The noise monitoring program is implemented during any drilling or testing activities on the TPC property. During the drilling and testing for the replacement well, the noise monitoring and abatement program will consist of the following:

- a) As requested under Condition 10, a public phone number (808) 961-2184 is available for complaints or comments at any time. This service is checked daily except during drilling and testing activities when the number is checked on a much more frequent basis. All calls will be

logged. Comparison can be made with the meteorological data and the record of operations described under Conditions 9 and 6, respectively.

- b) Ongoing meteorological data collected near the existing KS-1 pad and northeast of KS-1. The existing meteorological monitoring equipment and data is described in response to Condition 4.
- c) Noise monitoring will be conducted during the drilling and testing operations at the locations shown on Attachment E. In the event that TPC receives any complaint about the noise levels, TPC or its representatives will respond by spot monitoring at the residential location involved in order to ensure compliance with Condition 12.

Condition 4: Air Quality Monitoring Program

Thermal Power Company has been operating an air quality monitoring system in the Puna geothermal area for the last two years. This information provides background data for meteorology and H₂S levels in the area and has shown that the emissions from the past Thermal Power activities have been well within the Department of Health draft Ambient Air Quality Standard for H₂S.

The total air monitoring system which includes both the Thermal Power and HGP programs, consists of a combination of Colortech cards and continuous H₂S analyzers. An independent study of the system was conducted by Woodward-Clyde which determined that the system met the Environmental Protection Agency's stipulations for Quality Assurance and Quality Control. A network of 30 to 40 Colormetric tabs is collected weekly. Three continuous H₂S analyzers are currently in operation: one southwest of the Lanipuna 6 proposed well site, one about 1.75 miles northeast of HGP (station 36) and one about 1.25 miles southwest of HGP (station 16). The KS 1 drill site and station 36 are also instrumented with 10-meter meteorological towers and measure wind speed, wind direction, and temperature. Station 36 also monitors relative humidity, precipitation, standard deviation of horizontal wind direction, and solar radiation.

The H₂S and meteorological data are reduced to 1-hour averages. The period of record for station 16 is June 1, 1981 to present. The period of record for the drill site is July 20, 1981 to present. The period of record for station 36 is May 16, 1981 to present (meteorology) and June 1, 1981 to present (H₂S).

Condition 5: Emergency Response Plan

TPC's Emergency Response Plan has already been reviewed and approved by the Hawaii County Civil Defense Agency. An updated copy is provided for the Planning Department's records as Attachment F. A copy of the upgraded plan has also been sent to Hawaii County Civil Defense Agency.

Condition 6: Operations Record

A permanent operations record will be maintained during all drilling and testing on the TPC wells. Similar records will be kept for the emission monitoring systems described previously to record performance testing, calibration and maintenance of the continuous H₂S monitors. Emission measurements from the monitoring equipment are currently compiled into tables using the units which correspond to the applicable regulations.

Condition 7: Best Available Control Technology

Best Available Control Technology (BACT) is defined by the U. S. Environmental Protection Agency and the Hawaii State Department of Health as being those methods, equipment, or systems capable of the maximum degree of control taking into account economics, availability, environmental impacts and site-specific applications. During well drilling and testing in the Puna area, TPC has utilized the best available methods of controlling noise and hydrogen sulfide (H_2S). These methods are based on TPC's 20 years of experience with The Geysers geothermal field in California and were modified in the field to address the specific characteristics of the Hawaii geothermal resource.

BACT for drilling in Hawaii concerns the choice of drilling method and accompanying abatement. Drilling using mud is a quieter method compared to drilling with air. Unlike air drilling, mud drilling does not have air emissions. In addition to the choice of the quieter drilling technique, TPC has installed noise shields on the WRI drilling rig, and enclosed the associated equipment in sound containment chambers with inlet and exhaust mufflers.

BACT for testing geothermal wells is based on the relatively short abatement period required and that the characteristics of the resource are unknown initially. When the wells in Hawaii are first opened the unusually abrasive particles in the initial flow may require limited vertical venting to avoid cutting through the steam pipes and abatement systems. After a short period of cleanout venting the well, the steam can be redirected horizontally and the H_2S abated with caustic-peroxide treatment and noise will be controlled with the use of an underground rock muffler. Attachment G is a sketch showing the abatement system's design.

The abatement methods used by TPC were able to reduce noise and H_2S emissions to well within the County noise guidelines and the Department of Health's draft standard for hydrogen sulfide. The drilling and testing activities described in the attached application will utilize these proven control methods.

Condition 8: Open Venting Prerequisites

TPC is attempting to modify the steam collection and test abatement equipment to address the problem of abrasive particles in the initial flow of the Hawaii geothermal wells. The modified equipment will be tested during the flow test of the replacement well. If successful, the modifications will remove the need for vertical venting. Prior to any possibility of planned vertical venting, TPC will request approval from the County Planning Department with the exception of emergency actions. TPC will notify the Planning Department as soon as possible if emergency procedures become necessary.

Condition 9: Meteorological Monitoring Program

Continuous meteorological monitoring stations have been operated by TPC on TPC's property in the Puna geothermal area for the last two and one-half years. TPC has voluntarily made this raw data available to the County Planning Department. During our activities on the wells, TPC will continue to collect meteorological data and will provide this data to the Planning Department in a summarized format. Although not required for compliance, TPC will provide the summarized data for the last 6 months of 1983 during the 1st quarter of 1984.

Condition 10: Community Contact and Response Plan

The established telephone number for use by local individuals for any contact or complaint is (808) 961-2184. During any drilling or testing activity on the TPC site, a TPC employee or representative will be available to respond as necessary on a 24 hour basis.

Condition 11: Bi-annual Status Report

TPC interprets Condition 11 as a requirement to provide this information to cover activities after the date of the permit extension. However, for the County's information the status report for January 1984 would consist largely of information already provided to the County Planning Department. A description of the work undertaken by TPC in the last three years was provided as part of the original request for an extension of SP 468. Descriptions of the proposed work for the next 6 month period were provided in both the extension requests and the attached application for modification of SP 468. As a continuation of our voluntary monitoring programs, the summarized results of the environmental monitoring activities will be provided in the 1st quarter of 1984. No complaints about TPC activities or wells were made during the last six months.

As discussed in the request to extend SP 468, the currently proposed work will allow TPC to obtain data on the capability of the Puna Geothermal Resource to support 25 MW of electric power generation. The data required includes the mass flow and verified chemical characteristics of the resource. Testing is the final phase of the exploration and evaluation program. When the resource testing is completed TPC will be able to determine the technical capabilities of the wells and apply for development permits if the wells prove to be viable.

Condition 12: Noise Guidelines

Prior to drilling the KS-1 well, TPC performed a noise study to assist the Planning Department in developing noise guidelines for the County. The noise abatement methods developed in the field by TPC successfully complied with the County's noise guidelines during previous drilling and testing activities. The methods included installing noise shields on the WRI drilling rig and constructing a new rock muffler for use during testing. TPC will continue to comply with the noise guidelines as specified in Condition 12.

Conditions 13 and 14: Disposal Plan Approval

The proposed disposal site for the sump contents and any other waste materials from drilling will be provided to the State Department of Health (DOH) for their review and approval.

Condition 15: Revegetation Plan Approval

All denuded land on and around the drillsite will be revegetated to meet the State and County permit requirements. The proposed revegetation plan will be provided for the County's review in connection with any plan to abandon or convert the exploratory wells into development or another beneficial use.

Condition 16: Information and Site Access

The County Planning Department may contact (1) Nicki Norman, (415) 765-0446 or at home (415) 644-0552, or (2) Rebecca Beemer (415) 765-0626 or at home (415) 798-7421 or (3) Thermal Power offices (808) 944-5545 to obtain necessary information on the TPC activities or wells. When required, Ms. Norman or Ms. Beemer will arrange access to the site for government representatives or consultants. Due to insurance provisions and safety concerns, all visitors will be accompanied by a TPC employee or authorized agent.

Condition 17: Outdoor Lighting Ordinance

TPC is in compliance with requirements of Chapter 14, Article 9 of the Hawaii County Code relating to outdoor lighting.

Condition 18: Effective Term

TPC will notify the Planning Department upon the successful completion of the exploration program. We understand that the SP 468 is valid until that time or until October 15, 1986, whichever occurs sooner.

Condition 19: Compliance With All Other Applicable Requirements

TPC will continue to comply with all other applicable rules, regulations and permit requirements.

NAN/tti
1/10/84

Mr
sent to Sus
10/17/82

KS-1-4

FOR YOUR INFORMATION

Oct 15, 1982

Sus

For your information, attached are a few photographs of Kapoho State No. 1 geothermal well.

A staff report is being prepared to document the event for the record.

J. Tagami for R1C

Division of Water and Land Development
Department of Land and Natural Resources
State of Hawaii

Uncontrolled Flow

of

Kapoho State No. 1
Geothermal Well

October 2-3, 1982

Chronology of Events

October 2, 1982

Approximately

- 4:00 am Mr. Jere Denton, Thermal Power Co., called Manabu Tagomori at home to report that Kapoho State No. 1 is flowing uncontrolled. Flow began at 2:55 am. No further information was available but the Joint Venture (Thermal Power, AMFAC, and Dillingham) will be sending representatives to Puna on the first flight out of Honolulu.
- 6:00 am State team headed by Mr. Susumu Ono mobilized and left Honolulu for Puna. Team members besides Mr. Ono included Mr. Melvin Koizumi, Deputy Director, Dept. of Health; Messrs. Manabu Tagomori, Dan Lum, and Edwin Sakoda of DOWALD.
- 6:45 am State team met with Joint Venture representatives at the Hilo Airport for a short briefing by Mr. Jere Denton prior to visiting the well site.
- 8:00 am Well inspected and flow determined by Joint Venture to be in stable condition (not getting worse) and confined to cell.
- 9:30 am State and Joint Venture representatives met at the State Office Building in Hilo to map out steps to be taken to stop the flow and to inform the public. The Health Department offices were used as the communication center.
- 12:00 noon Joint Venture representatives issued a press release through the local media.
- 3:00 pm Governor Ariyoshi visited site and was briefed by Susumu Ono, Jere Denton (Thermal Power Co.), Ralph Patterson (Dillingham), and George St. John and John Humme (AMFAC). Flow remained in stable condition.
- 7:00 pm State, County, and Joint Venture representatives met for an update report. Attempts by Thermal Power Co. to stop the flow were terminated for the day.

October 3, 1982

- 8:00 am Work on fabricating special equipment was underway at the adjacent Kapoho State No. 2 site.
- 10:00 am A by-pass piping was hooked up to the well. About 85% of steam funneled through piping. Steam yet too great in cell to get a good look at the flow point.

October 3, 1982 (continued)

12:00 noon Helicopter brought in to fan steam in certain direction to allow workmen to open main valves.

2:00 pm Succeeded in venting steam through main valves; the break located. A 3-inch valve broke-off and flow was discharging through the stem.

3:00 pm Attempt to weld a plug in the 3-inch opening failed.

5:20 pm The 3-inch valve was retrieved from the cell floor and reinstalled in place. Valve closed and the main valves were then closed, shutting down the uncontrolled flow of Kapoho State No. 1 which flowed for $38\frac{1}{2}$ hours.

WATER RESOURCES & FLOOD CONTROL BRANCH
Division of Water and Land Development

FROM: Ed DATE: 10/22/85 FILE IN: _____

TO: INITIAL: PLEASE: REMARKS:

<input checked="" type="checkbox"/>	<u>V</u>	T. FUJII	<input type="checkbox"/>	See Me
<input checked="" type="checkbox"/>	<u>D</u>	D. Lum	<input type="checkbox"/>	Call
<u>LAST</u>	<u>E</u>	E. Sakoda	<input type="checkbox"/>	Review & Comment
<input checked="" type="checkbox"/>	<u>D</u>	D. Nakano	<input type="checkbox"/>	Take Action
<input type="checkbox"/>	<u>J</u>	J. Menor	<input type="checkbox"/>	Investigate & Report
<input checked="" type="checkbox"/>	<u>M</u>	M. Ohye	<input type="checkbox"/>	Draft Reply
_____	_____	_____	<input type="checkbox"/>	Acknowledge Receipt
_____	_____	_____	<input type="checkbox"/>	Type Draft
_____	_____	_____	<input type="checkbox"/>	Type Final cc: _____
_____	_____	_____	<input type="checkbox"/>	Xerox _____ copies
_____	_____	_____	<input checked="" type="checkbox"/>	File
_____	_____	S. Samuels	<input type="checkbox"/>	Mail

More photos attached.

_____	_____	W. Koyanagi
_____	_____	D. Hamada
_____	_____	K. Oshiro
<input checked="" type="checkbox"/>	<u>M</u>	M. Tagomori
_____	<u>H</u>	H. Sakai
_____	<u>H</u>	H. Morimatsu
_____	<u>J</u>	J. Sato
_____	_____	_____

FOR YOUR:

<input type="checkbox"/>	Approval
<input type="checkbox"/>	Signature
<input checked="" type="checkbox"/>	Information

October 22, 1985

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda & Mitchell Ohye

SUBJECT: Free-Venting of Kapoho State 1A

On October 14, 1985, Mitch and I observed the free-venting of Kapoho State 1A.

Free-venting commenced at approximately 0800 hours and continued for almost four hours. At approximately 1150 hours, the steam was diverted to a ten-inch line which led to the separator and rock muffler (see attached photos for more details).

Noise levels were taken as follows:

0930 hours	115 - 118 Decibels	approximately 50 ft. away from the well.
	70 - 75 "	at gate near road
	70 - 75 "	at HGP-A Visitor Center

The noise level upon diversion through the rock muffler was essentially at or slightly below the background noise of construction activity at the site. The noise from the system could not be heard when a tractor at the site was operating. No noise could be heard from the gate.


ED SAKODA


MITCHELL OHYE

ES/MO/ko
Attach.

October 22, 1985

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda & Mitchell Ohye

SUBJECT: Free-Venting of Kapoho State 1A

On October 14, 1985, Mitch and I observed the free-venting of Kapoho State 1A.

Free-venting commenced at approximately 0800 hours and continued for almost four hours. At approximately 1150 hours, the steam was diverted to a ten-inch line which led to the separator and rock muffler (see attached photos for more details).

Noise levels were taken as follows:

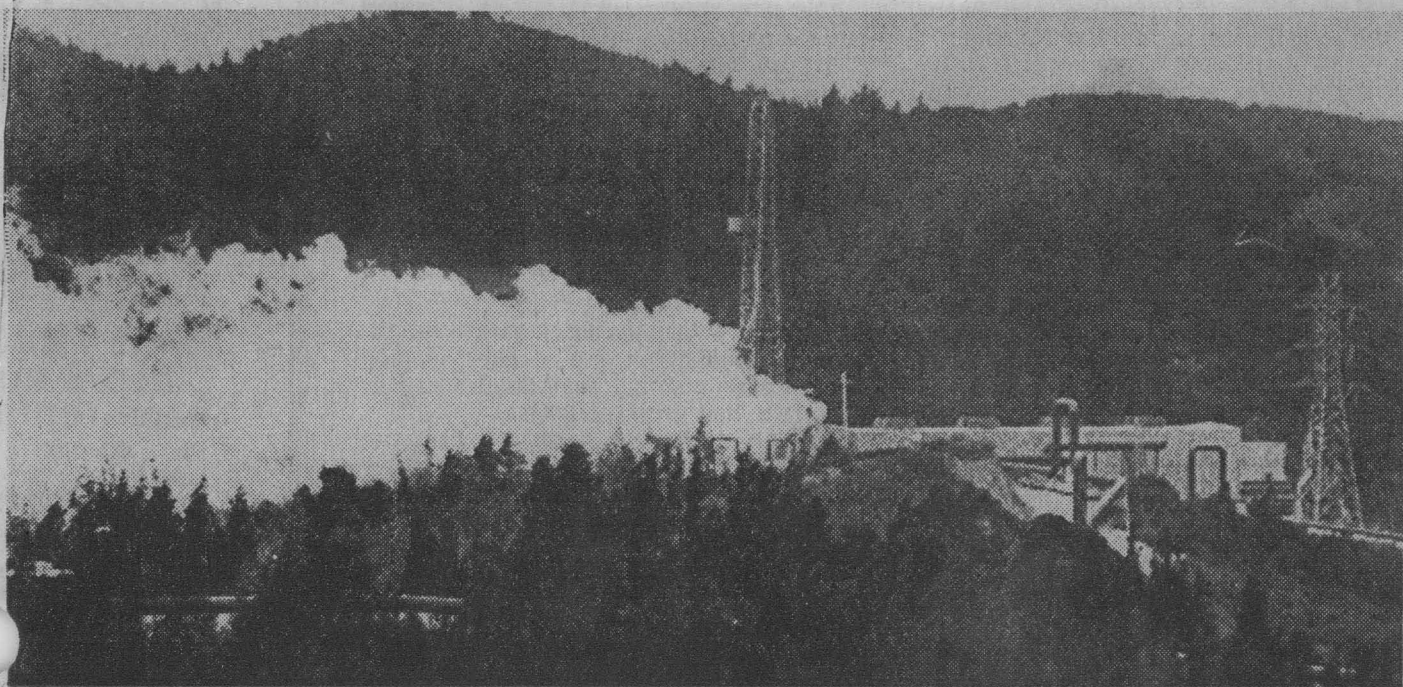
0930 hours	115 - 118 Decibels	approximately 50 ft. away from the well.
	70 - 75 "	at gate near road
	70 - 75 "	at HGP-A Visitor Center

The noise level upon diversion through the rock muffler was essentially at or slightly below the background noise of construction activity at the site. The noise from the system could not be heard when a tractor at the site was operating. No noise could be heard from the gate.

Ed Sakoda
ED SAKODA

Mitchell K. Ohye
MITCHELL OHYE

ES/MO/ko
Attach.



UPI photo

Steam billows from the California geothermal well.

Worker killed in geothermal accident

MIDDLETOWN, Calif. — The scalded body of a construction worker knocked into a steam-filled pit at a geothermal project was recovered by crews in protective suits.

The body of Lloyd McKay, 43, was retrieved yesterday by workers who dug a trench to reach him.

McKay and two others were working on a platform above the Northern California Power Agency's steam-pressurized well Tuesday when a cap blew off the wellhead and crashed into the rig.

Steam spewed into the air and McKay was knocked into the shallow pit below the wellhead and trapped.

Herb Price also plunged into the wellhead cellar but was dragged to safety by fellow workers. He suffered serious injuries.

The third worker, who was not identified, suffered only minor injuries and was not hospitalized.

"The men were working on the steam well at the 13th unit at the geyser's geothermal reserve NCAP rig

No. 1 when there was a blowout at 7:57 p.m.," a Sonoma County sheriff's spokesman said.

Mel Boeger, manager for public affairs for Shell Oil's western region, said: "The men were removing a thing called the blowout preventer, a series of valves that serves as a drilling safety device.

"They were loosening bolts when the accident occurred. They had been doing remedial work on the casing of one of about 20 wells at the site when the blowout preventer apparently fell into the cellar, knocking the two men in."

McKay and Price were scalded by steam released when the crashing blowout preventer knocked off a 3-inch valve at the wellhead.

Twelve municipal power districts own the geyser's geothermal reserve NCPA rig No. 1. The plant is to go on line in April, producing 110 megawatts for the NCPA cities.

ALV. 10/8/82 ✓

Geothermal developer to seek delay in state permit hearings

Backers of a proposal to drill as many as 90 geothermal wells near Hawaii Volcanoes National Park are expected to ask today for a delay in state hearings on the matter.

Because the wells are planned for land zoned for conservation use, the developers have applied for approval from the state Board of Land and Natural Resources. The board is set to begin hearings today on the Kahauale'a Geothermal Project, a joint plan by Campbell Estate (which owns the land involved) and True-Mid Pacific Geothermal Venture.

However, The Advertiser has learned the Big Island project's developers intend to ask for a continuance of the hearings.

The developers have asked

the land board for a special-use permit. Opponents contend the land board does not have jurisdiction; the proper channel, they say, is to apply to the state Land Use Commission for a change of the conservation district status.

Opponents have filed suit against the project on that ground. They also say the environmental impact statement is not adequate.

From the beginning, the Campbell consortium has held that it needs to apply for both exploration and development permits from the state from the outset in order to determine the economic feasibility of the project. Other geothermal prospectors on the Big Island have exploration permits, but not development permits.

10/5/82

THERMAL POWER COMPANY
SITE EMERGENCY PLAN DURING DRILLING OF KS 1A

PREPARED FOR:

AUGUST 1985

CHANGE 1

EMERGENCY NOTIFICATION

Site personnel at the Honuaula drill site include one or two guards at all times and brief regular visits to each wellhead by a technical consultant, who reports immediately, by telephone to Thermal Power Company (TPC), any noise, odor, leakage of other abnormal condition of the wellhead and wellsite.

Unless Thermal Power employee or contractor personnel are present on the wellsites, the guards, technical consultant or any other person witnessing any emergency situation should telephone call collect the first Thermal/PGV representative reachable in the following sequence:

RALPH A. PATTERSON Project Manager	Bus. Res.	(808) 524-8940 (808) 262-5651	Honolulu Kailua, Oahu
RICHARD T. PITTENGER VP, Operations	Bus. Res.	(415) 765-0302 (415) 939-3124	San Francisco, CA Walnut Creek, CA
WILLIAM L. D'OLIER VP, Exploration	Bus. Res.	(707) 576-7040 (707) 578-7677	Santa Rosa, CA Santa Rosa, CA
R. (BUDDY) BOWDEN Drilling Supervisor	Bus. Bus. Res.	Hilo Mobile Oper. (707) 576-7022 (505) 327-6419	Unit 576 or Santa Rosa, CA Farmington, NM
MAURICE A. RICHARD Sr. Engineer	Bus. Res.	(415) 765-0306 (415) 838-2684	San Francisco, CA Walnut Creek, CA
John T. Humme Amfac Energy	Bus. Res.	(808) 966-7073 (808) 935-5000	Keaau Hilo
GEORGE S. ST. JOHN Amfac Energy	Bus. Res.	(808) 945-8154 (808) 623-8935	Honolulu Mililani, Oahu
GREGG W. ROBERTSON Dillingham Geothermal	Bus.	(415) 362-1501	San Francisco, CA

7/29/85
Yellow

-1-

CH 1

EMERGENCY RESPONSE PLAN

Thermal Power Company (TPC) is the managing partner, or "operator", of the PUNA GEOTHERMAL VENTURE (PGV). Dillingham Geothermal, Inc. and Amfac Energy, Inc. are the other members of the venture.

As a result of the well leak incident in October 1982 and in response to the requirement of condition #5 of Special Use Permit #4681, issued by the Planning Commission, County of Hawaii, this Emergency Response Plan has been developed for approval by the Hawaii County Civil Defense Agency. The plan is designed for use when the wellsites are not being used for drilling, testing or other field operations and no TPC staff or field operations consultants are present on the Big Island or in the event of an emergency when operations are being conducted. In this event the on-scene TPC manager will take initial charge of the notification procedure and the immediate operational steps to deal with the emergency.

Thermal Power Company maintains a project management office in Honolulu; Amfac has Honolulu offices with knowledge of the geothermal project and the ability to marshal management resources to deal with possible emergencies. In addition, Thermal Power has a small office space and a telephone in Hilo for administrative and logistical functions. The telephone number is (808) 961-3531. Thermal, Dillingham and Amfac also have employees or consultants that reside on the Big Island, although their level of geothermal knowledge varies and they should thus be considered as secondary resources unless specifically identified in this plan.

It is impossible to predict what kind of emergency may occur, or of what severity such events may prove to be. It is important, however, that this plan be used to notify the responsible management of the companies so that the problem can be assessed quickly and then the proper mitigating steps can be taken.

Comments, corrections or changes to the plan should be addressed to:

Project Manager
Thermal Power Company
220 South King Street Suite 1750
Honolulu, Hawaii 96813
(808) 524-8940

USE OF THE PLAN

This plan has been assembled for ease of use in situations where information may be scarce, confusion rampant and communications difficult. The following pages are arranged so that the person that finds himself "in charge" even by virtue of there being no one else around that is connected

7/29/85

-2-

CH-1

with Thermal Power or others in a management or knowledgeable position, can at least evaluate and notify those persons and organizations that can best deal with the problem.

The steps to be taken in an emergency, after the immediate threats to life of people that are on the scene have been dealt with, are:

- 1) Evaluate the emergency and answer the questions in the guide on the pink page (page 5 of this plan).
- 2) Determine the possibility of a threat to the general health or safety of the public; if a threat is believed to exist, begin to carry out Plan A (yellow page 6 of this plan).

If no general threat to health and safety is thought to exist, begin to carry out Plan B (Yellow page 6 of this plan).

- 3) LAfter primary notification, continue to notify the responsible Thermal Power personnel on pink page (page 1 of this plan). Notify others on the list, or have someone else do so, as soon as feasible.
- 4) Manage all PGV personnel on the scene until the arrival of one of the managers on the primary notification list.

WEATHER

Although severe weather is rare on the Big Island, wind and rain storms are possible, and the island gets the occasional hurricane or its fringes. The recorded weather report for Hilo can be heard at either (808) 935-8555 or (808) 961-5582.

ERUPTIONS

The Hawaii Volcano Observatory has established an informational telephone recording for eruption reports. This number is (808) 967-7977. Civil Defense is the best source of evacuation and/or volcano damage reports.

7/29/85

-3-

CH-1

IMMEDIATE EMERGENCY RESPONSE

The first person contacted, or on-scene, will use the following guides:

GUIDES	PAGE #	TASKS
Pink Page	5	Assess the emergency.
Yellow Page	6	Determine the threat to public safety and act as directed under Plan A or Plan B. Initiate <u>response action</u> .
Yellow Page	1	Contact Thermal/PGV personnel.
Map		
Yellow Page	8	Notify the rest of the emergency contact list.
Appendices		A Fire and medical evaluation plan. B LSite electrical diagram. C Area map. D Media contact list. E Plan Distribution.

Priority and judgement in any uncertain circumstances must favor public safety and an early alert of the County Civil Defense office through the County Police Department. The attached Emergency Notification list reflects this priority. If Civil Defense is unavailable, the Chief of Police will be contacted directly.. Because Civil Defense will take control of the situation if the emergency threatens public health or safety, one or two alternate emergency plans described on page 6 will follow the assessment of the emergency.

7/29/85

-4-

CH-1

QUESTIONS TO ASSESS THE EMERGENCY

1. General physical description of situation? location? size?
2. Any personnel injuries?
3. Any fire on site? off site? Any idea of cause? (oil, brush, etc.)
4. Any steam escaping? general or localized release point? where? volume?
5. Any H₂S gas odor?
6. Is noise level too high to hear spoken words on site?
7. Any associated volcanic or seismic activity? lava flow?
8. Can you see? lights operational?
9. Rig or other equipment on site? damaged?

MAP with labels.

7/29/85
PINK

-5-

CH-1

ALTERNATE EMERGENCY PLANS

PLAN A: If any emergency situation threatens public health or safety.

1. Civil Defense will establish a command post for the use of all public safety officials and for liaison with Thermal Power management and technical personnel.
2. Personnel on site will provide assessment of the probable response action for Civil Defense.
3. Civil Defense will coordinate release of information to the public concerning any public hazard (i.e., outside the private site).
4. Thermal Power Project Manager will be available on a 24-hour basis to provide liaison with Civil Defense and provide updates on conditions relevant to the hazard to the public.
5. Thermal Power Project Manager will determine and coordinate the assistance actions that can best be provided by Amfac and Dillingham.
6. TPC-San Francisco will coordinate with C. Nakamura in the Honolulu office on exact schedules and logistics for all persons involved in the response action. All SFO response team members will advise R. T. Pittenger of changes in location and specific travel plans.
7. If Project Manager is not available, TPC-Operations-SFO (R. T. Pittenger) will manage all activities in addition to directing the immediate response action at the wellsite until an appropriate TPC manager arrives on the scene.

PLAN B: If the emergency does not threaten public health or safety.

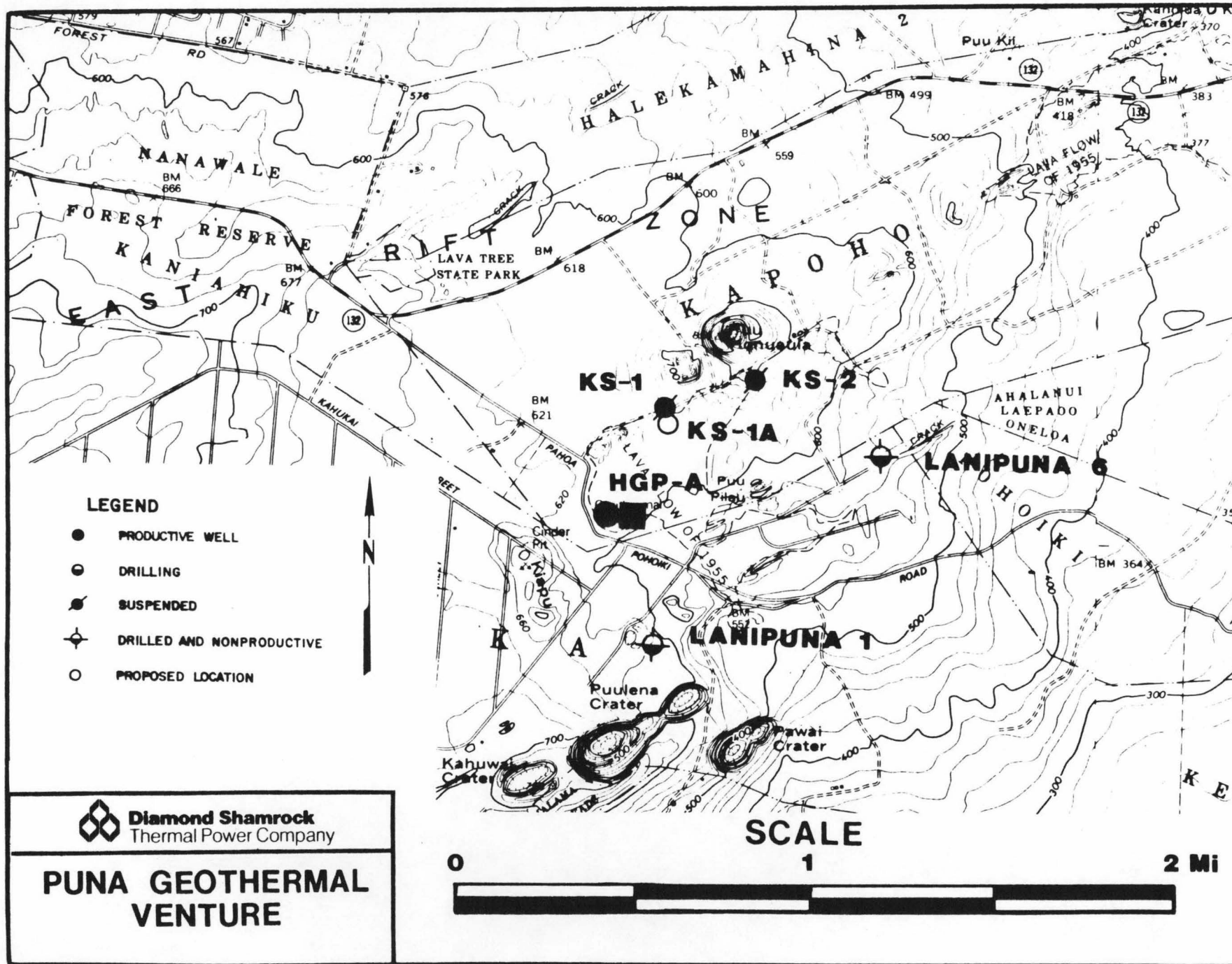
1. Thermal Power Project Manager will proceed to site ASAP after alerting key TPC staff persons. After initial evaluation, he will notify the Management Committee representatives, and appropriate State and County agencies of the problem and anticipated duration and coordinate public and media contacts.
2. Steps five through seven of the Plan A procedures will be followed.
3. Upon Thermal Power's judgement, or factors indicating an emergency event of more than 36-hour duration, an emergency control center, appropriate to the best management of the circumstances, will be established at a location and telephone number announced by radio, television and the Hilo telephone answering service.

7/29/85
YELLOW

EMERGENCY CONTACT LIST

COUNTY/STATE	Contact Numbers Work/Home
<u>Civil Defense</u>	(808) 935-0031/Call 935-3311 after hours and holidays
<u>Police Department</u>	(808) 935-3311 (Emergency) (808) 966-9388 (Keeau Police Station) (808) 961-2211 (Hilo Police Station)
<u>Fire Department</u> (Ambulance/Paramedic Rescue)	(808) 961-6022
Planning Department DLNR, Manabu Tagomori DOH, Mel Koizumi	(808) 961-8288 (808) 548- 7619 <i>1533/(808) 988-6541</i> (808) 548-4139
Key TPC Staff	
<u>Hawaii</u> Ralph A. Patterson Colleen R. Nakamura Albert A. Nakaji Robert Kochy	(808) 524-8940/(808) 262-5651 (808) 524-8940/(808) 262-7154 (808) 935-6073/(808) 964-1275 (808) 965-7646
<u>California</u> William L. D'Olier Richard T. Pittenger R. (Buddy) Bowden	(707) 576-7040/(707) 578-7677 (415) 765-0302/(415) 939-3124 Hilo Mobile #576/(505)327-6419
<u>Misc. Numbers</u> HGP-A Plant Guard Office D. Hess, Leilani Com. Assn.	(808) 965-7779 (808) 935-1910 (808) 935-3716/(808) 965-9745
Contractors	
WRI (Water Resources Int'l. Willocks Construction	(808) 839-7720 (808) 959-8082
<u>Other</u>	
Hilo/Big Island Weather Volcano report (recording)	(808) 935-8555/961-5582 (808) 967-7977

7/29/85
YELLOW



PUNA GEOTHERMAL VENTURE

EMERGENCY FIRE AND MEDICAL EVALUATION PLAN

- I. This plan outlines procedures to be followed and delineates responsibilities in the event of fire or personal injury or illness requiring immediate medical attention. The information contained herein applies to all Thermal Power Company employees as well as all contractor employees, although contractors are responsible for maintaining adequate first aid material and trained personnel.

At present, development, and therefore application of this plan, is limited to Honuaula drill site at Pohoiki, Puna, County of Hawaii and the immediate area around the site. It does not apply to the HGP-A site except as an emergency incident there might affect the Honuaula site.

Fire calls, and ambulances/paramedic/rescue calls should all be made to the Fire Department emergency number, 961-6022. Fire fighting equipment is stationed at Keaau, with an additional fire truck at Pahoa and a pumper truck and volunteer fire squad at Leilani Estates. MedEvac units are stationed at Keaau and Hilo, Helicopter service is available but used primarily for transport and not immediate medical treatment.

The nearest hospital is in Hilo, reached by private vehicle, ambulance or helicopter. Coordination is through the Fire Department.

Emergency situations, such as the 1981 incident, are coordinated through the Civil Defense Agency.

II. PROCEDURE AT SCENE OF INCIDENT:

A. In the Event of Fire

1. Contact the Fire Department (see Emergency Contact List-Yellow Page #8).
 - a. Identify yourself. Give phone number you are calling from.
 - b. State location and severity of fire. Give pertinent access information.
 - c. Take steps to prevent spread of the fire or damage to equipment, as reasonable, by moving equipment, etc.
 - d. Render first aid as feasible.
 - e. Evacuate all personnel.

7/29/85

Appendix A - Page 1

CH-1

B. In a Medical Emergency

1. Take reasonable steps to prevent further injury.
2. Render first aid.
3. Send someone to notify Civil Defense, the Puna Police or the County Fire Department/Ambulance. (All these numbers are on the Emergency Contact List - Yello Page #8).
4. Evacuate unnecessary personnel.
5. Contact the Thermal Power/PGV management list (yello, Page #8).

On-Site Facilities

Facilities at the Honuaula Drill Site consist of well pad lights, county water supply through a 2½ inch plastic line, with valves at #1 drill pad and at the #2 drill pad, an intrusion alarm, and portable toilet.

Lighting

The electrical lighting and alarm system is diagrammed on the following page.

Shelter and Storage

A house trailer and a metal storage shed are located on the #1 drill pad. Electrical service to the trailer is available when the drilling rig is on site.

Keys

A set of keys to the various gates, the electrical panel at the front gate, the trailer and storage shed, is in the guard's possession. A complete set of keys is also at Al Nakaji's office at 614 Kilauea Avenue Suite #1, Hilo (808) 935-6073.

Miscellaneous

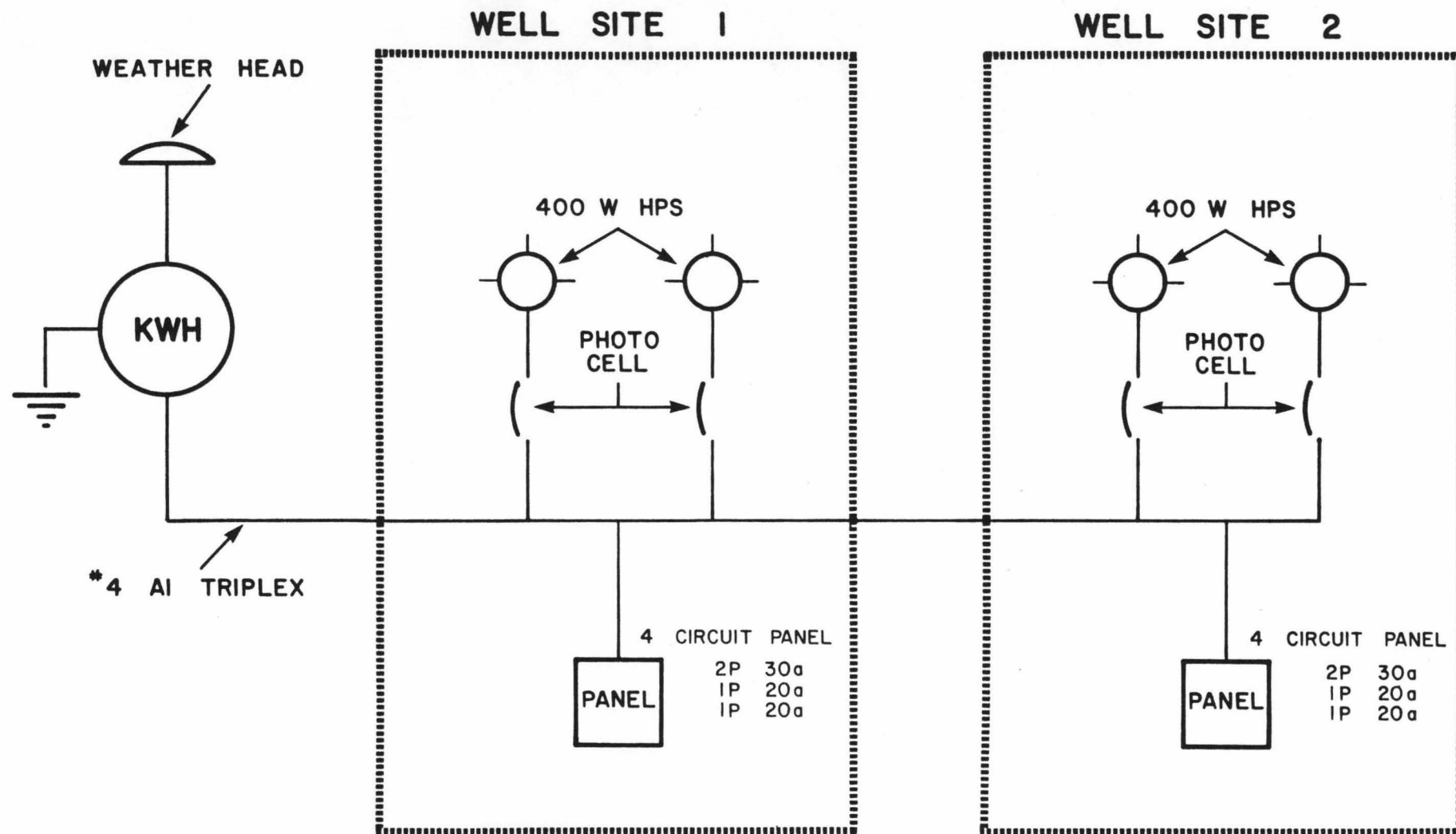
Configuration drawings of the #1 and #2 well heads are included on the following pages. At the present time, both KS-1 and KS-2 wells are suspended with deep (at 1750-2250 feet in KS-1 and at 2994-3225 feet in KS-2) cement plugs to isolate the upper well bores from the geothermal resource zones.

There is a telephone and some limited emergency equipment at the HGP-A power plant near the Honuaula drill site. There is either a guard or an operator at the power plant at all times.

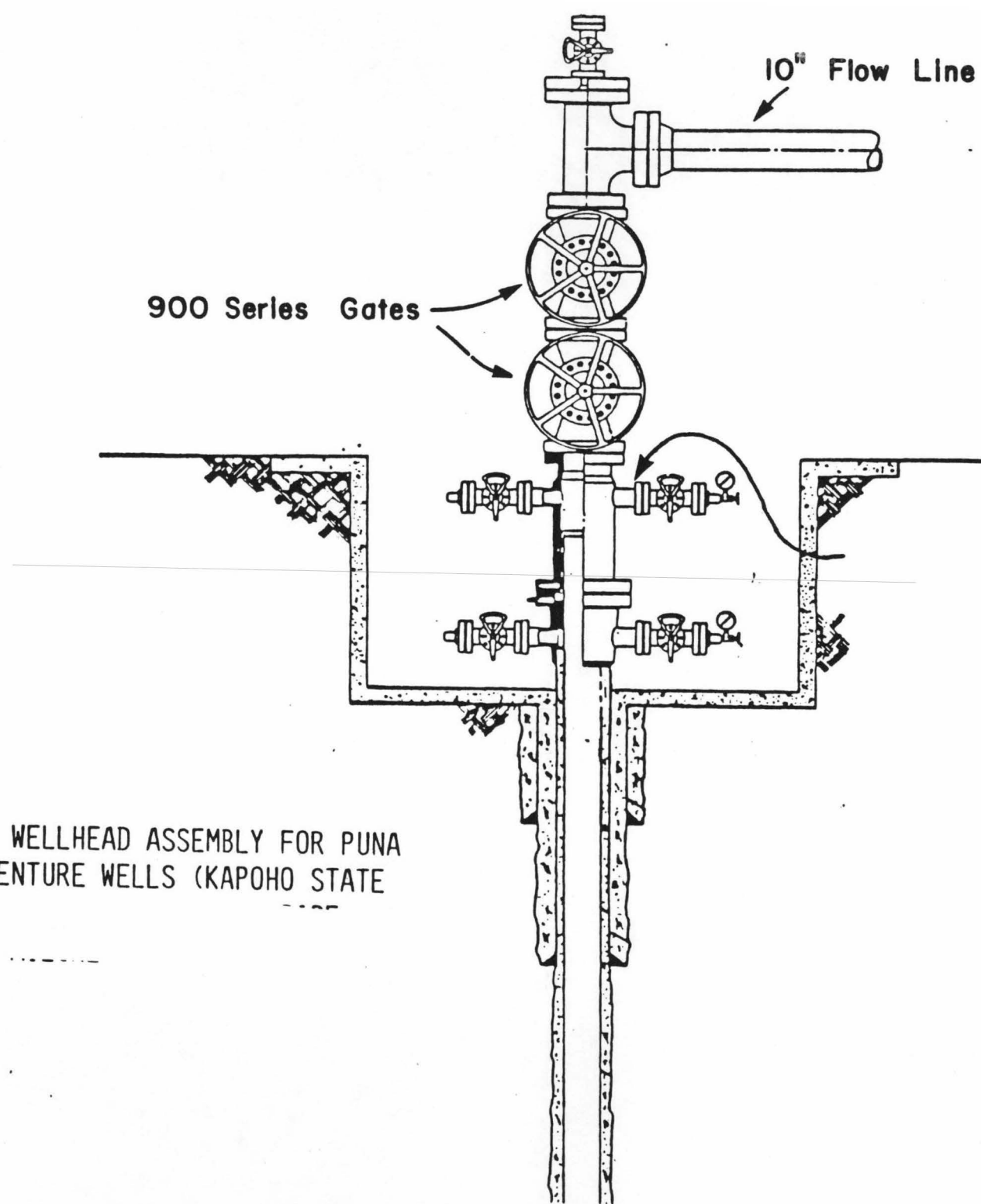
A policy statement on notification requirements of the Toxic Substances Control Act is included on the following pages.

6/17/85

Appendix B - Page 1



Kapoho State Well Site Lighting System



SCHEMATIC OF WELLHEAD ASSEMBLY FOR PUNA
GEOTHERMAL VENTURE WELLS (KAPOHO STATE
1 AND 2).

POLICY ON THE NOTIFICATION OF SUBSTANTIAL RISK
UNDER SECTION 8(e) OF THE TOXIC SUBSTANCES CONTROL ACT

The Toxic Substances Control Act (TSCA) requires under Section 8(e) that any person who obtains information that reasonably supports a conclusion that any chemical substance or mixture presents a substantial risk to health or the environment should report this to the EPA.

To comply with these requirements, the Corporate Policy of Diamond Shamrock is as follows:

1. Employees who acquire information which may suggest a substantial risk to health or the environment should inform the Corporate Medical Director, Health and Environmental Affairs Department (H.E.A.D.). This action should be taken as soon as such information is received, without awaiting a final report, conclusions, or results of subsequent or confirmatory studies.
2. The Corporate Medical Director will inform and consult with appropriate Environmental Affairs, Legal and management personnel.
3. The Corporate Medical Director will coordinate all reports to the EPA. Any reporting to the EPA will be done in consultation with appropriate operating company management.
4. Copies of reports of all toxicological studies and all investigatory studies made relating to health or environmental concerns shall be sent to the Corporate Medical Director for evaluation in regard to TSCA §8(e) reporting and for filing with other health and environmental information.
5. The person bringing the information to the attention of the Corporate Medical Director will be informed of the corporate decision on filing a notice of substantial risk.
6. Failure to comply with the provisions of this policy could lead to Federal penalties under TSCA.

August 28, 1984

Doc: LawReg/8e

MEDIA LIST

BIG ISLAND

Mr. Hugh Clark
(808) 936-3916
Honolulu Advertiser
P. O. Box 1956
Hilo, Hawaii 96720

Mr. Rod Thompson
(808) 935-1012
Honolulu Star Bulletin
P. O. Box 81
Hilo, Hawaii 96720

Mr. Gene Tao
(808) 935-6621
Hawaii Tribune Herald
355 Kinooles Street
Hilo, Hawaii 96720

Mr. Joe Ruble
(808) 935-5524
KKBG
913 Kanoelehua
Hilo, Hawaii 96720

News Director
(808) 935-5464
KPUA
1145 Kilauea Avenue
Hilo, Hawaii 96720

KGMB-CH 9
Neighbor Island Bureau
(808) 969-9999
Attention: Randy Obata
Box 10699
Hilo, Hawaii 96721

Newspaper Deadlines:

Advertiser: 8:00 p.m. for next day a.m.
Hon. Star Bulletin: 9:30 a.m. for late that day
Hawaii Tribune Herald: 10:00 a.m. for that day's paper

Honolulu

News Director
KITV
(808) 537-3991
1290 Ala Moana Blvd.
Honolulu, Hawaii 96814

Mr. Jay Hartwell
(808) 737-3923
Cox Newspapers
3217 Collins Street
Honolulu, Hawaii 96813

Mr. Russ Roberts
(808) 935-1952
KHLO Radio
1650 Kalaniana'ole
Hilo, Hawaii 96720

Mr. Bill Carnett
(808) 935-6858
KIPA
688 Kinooles Street
Hilo, Hawaii 96720

Mr. Kiyoshi Okubo
(808) 935-6678
Hilo Times
P.O. Box 306
Hilo, Hawaii 96720

PUNA GEOTHERMAL VENTURE
EMERGENCY PLAN

DISTRIBUTION

Master Plan.....Honolulu
R. A. Patterson.....Honolulu
R. T. Pittenger.....San Francisco
W. L. D'Olier.....Santa Rosa
R. C. (Buddy) Bowden.....Farmington
M. A. Richard.....San Francisco
J. T. Humme.....Keaau
G. E. St. John.....Honolulu
Civil Defense (2).....Hilo
Planning Department (2).....Hilo
Police Department.....Keaau
Thermal Power.....Honolulu
A. A. Nakaji.....Hilo
R. Kochy.....Pahoa
HGP-A.....Pahoa
DLNR (M. Tagomori).....Honolulu
DOH (M. Koizumi).....Honolulu
Willocks Construction.....Hilo
WRI.....Hilo

RECEIVED

THERMAL POWER COMPANY

85 AUG 13 A10: 33

TO: Distribution

DIV. OF WATER &
LAND DEVELOPMENT DATE:

7 August 1985

FROM: R. A. Patterson

R. A. Patterson

SUBJECT: Emergency Response Plan - Change 1

The relocation of the Honolulu office of Thermal Power Company, plus some errata found in the first edition, has necessitated a change to the Emergency Response Plan. Some additions have been made on severe weather and eruptions.

Please replace the pages in your copy(s) of the plan as shown below. Retain all pages not replaced.

<u>Old Page</u>	<u>New Page</u>	
Title	Title	CH-1
1	1	CH-1
2	2	CH-1
3	3	CH-1
4	4	CH-1
6	6	CH-1
7	---	
8	7	CH-1
A-1	A-1	CH-1
<u>Media List</u>	Media List	CH-1

Destroy the old pages removed.

If there are any questions or if you discover any errors, please contact me at the new Honolulu office.

RAP/crn



Diamond Shamrock
Thermal Power Company

Ralph A. Patterson, Jr.
Hawaii Project Manager

TO: Distribution

FROM: R. A. Patterson

DATE: 26 June 1985

SUBJECT: **PGV Emergency Response Plan**

The Emergency Plan for the Puna Geothermal Venture's project at the Honuaula, Puna, as required by the Hawaii County Special Use Permit #468, is forwarded.

Approval of the plan was received from the County Civil Defense Agency on May 16, 1985.

Changes and corrections to the plan will be issued as required. Please forward corrections to Thermal Power Company at the address below.

RAP/crn

Distribution:

Bowden	Willocks	DOH-Koizumi
D'Olier	WRI	BLNR-Tagomori
Pittenger	Kochy	Civil Defense
Richard	HGP-A	Planning Dept.
Humme	Kochy	Police Dept.
St. John	Nakaji	

RECEIVED

85 JUL 2 P 2: 57

DIV. OF WATER &
LAND DEVELOPMENT

524-8940

Thermal Power Company

A subsidiary of Diamond Shamrock, 1600 Kapiolani Boulevard, Suite 808, Honolulu, Hawaii 96814
Phone 808 944-5545