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October 1, 1993

## Review of State and County Regulatory Responsibilities for Geothermal Development

### INTRODUCTION

This review was conducted by the Department of Business, Economic Development & Tourism (DBEDT) for the purpose of better defining the roles and responsibilities of the state and county agencies having regulatory oversight for geothermal development. The objective of the review was to clarify the regulatory functions of each agency involved in permitting, monitoring, and enforcing geothermal operations. These agencies include the Department of Land and Natural Resources (DLNR), Department of Health (DOH), Department of Labor and Industrial Relations (DLIR), and the County of Hawaii (COH). Also addressed within the report are the roles of the Department of Business, Economic Development & Tourism (DBEDT), the Hawaii County Civil Defense Agency (HCCDA), and the relationship of the Public Utilities Commission (PUC) to commercial development of geothermal resources.

### BACKGROUND

Associated with the development of geothermal resources are the many complex state and county land use, environmental, and related laws that regulate all geothermal exploration and development projects. These laws and rules can be classified into two general categories: permitted land uses, and regulation of geothermal exploration and development activity. There are also a number of administrative permits/approvals issued by the County of Hawaii for related activities such as grubbing/grading, building, electrical, and plumbing. A list of required permits and approvals and the legal authority for each is shown on Attachment 1.

### PERMITTED LAND USES

The authorization and approval of any proposed geothermal development activity is currently subject to four levels of land use control. They are as follows: 1) designation and regulation of Geothermal Resource Subzones (GRS); 2) granting of Geothermal Resource Mining Leases (GRML); 3) issuance of Conservation District Use Permits (CDUP); and 4) issuance of Geothermal Resource Permits (GRP). The hierarchical relationship of permits and approvals applicable to geothermal development activity is shown on Attachment 2.

## **Geothermal Resource Subzones**

In 1983, the State Legislature enacted the Geothermal Resource Subzone Act (Act 296, SLH 1983), authorizing the Board of Land and Natural Resources (BLNR) to designate geothermal resource subzones statewide. The statute provides that geothermal development activities (for electrical generation purposes) can only take place within such designated subzones. Currently, there are two areas on the island of Hawaii and one on the island of Maui designated as geothermal resource subzones by the BLNR, the Kilauea Lower East Rift GRS (11,294 acres), the Kilauea Middle East Rift GRS (9,014 acres), and the Haleakala Southwest Rift GRS (4,108 acres), respectively.

It should be noted that the Legislature also designated three existing geothermal resource mining leases as GRS areas for the duration of these leases. These "grandfathered" subzone areas include: GRML R-2 (816 acres) issued to Puna Geothermal Venture; GRML R-3 (777 acres) issued to Barnwell Geothermal Corporation; and S-4602 (4 acres) issued to the Natural Energy Laboratory of Hawaii Authority. In total, 26,013 acres have been designated statewide as Geothermal Resource Subzones.

The designation of a GRS serves as the first level of authorization relating to the siting and approval of geothermal development activity.

## **Geothermal Resource Mining Leases**

Geothermal Resource Mining Leases are issued by the BLNR, and convey to the lessee exclusive rights to drill, discover, develop, operate, utilize and sell geothermal resources. The mining lease sets forth the terms and conditions under which permitted geothermal development activities will be conducted. To date, six state geothermal resource mining leases have been issued for a total leased area of approximately 14,069 acres.

A requirement of the mining lease is the submission of a Plan of Operations containing all pertinent information/data which the BLNR may require to evaluate the proposed utilization of geothermal resources and the preservation of the environment. The Plan of Operations must be approved by the BLNR prior to commencement of geothermal development activity.

## **Conservation District Use Permits**

Geothermal development within a GRS is administered by the BLNR for projects that lie within the Conservation District, and the COH for activities located within Urban, Rural, and Agricultural Districts. A Conservation District Use Permit (CDUP) is required for geothermal development activities on lands within the Conservation District. Generally, application for a CDUP requires the preparation of an Environmental Assessment (EA), and if the proposed action is determined to have potentially significant environmental impacts, an Environmental Impact Statement (EIS) must be prepared.

The BLNR may grant a CDUP for geothermal development if the applicant demonstrates that:

- "a) The desired uses would not have unreasonable adverse health, environmental, or socio-economic effects on residents or surrounding property; and
- "b) The desired uses would not unreasonably burden public agencies to provide roads and streets, sewers, water, drainage, and police roads and streets, sewers, water, drainage, and police and fire protection; or
- "c) There are reasonable measures available to mitigate the unreasonable adverse effects or burdens referred to in paragraphs (a) and (b)."

If approval is given, the recommended measures for mitigating negative environmental impacts are usually incorporated as conditions within the CDUP.

### **Geothermal Resource Permits**

For geothermal development activity located within urban, rural, or agricultural districts on the Big Island, authority rests with the County of Hawaii Planning Commission. If such activities are proposed within these districts and are not permitted uses under the County General Plan and zoning ordinances, then an application for a Geothermal Resource Permit (GRP) must be submitted.

The GRP application process requires substantially the same type of information required for review/approval of a CDUP. In addition, the criteria used by the Planning Commission in approving a GRP is also similar to that used by the BLNR for issuance of a CDUP. However, application for a GRP does not automatically trigger preparation of an EA and, as such, an EIS may not be required by the county in its decision-making process.

## REGULATION OF GEOTHERMAL ACTIVITY

### **Agency Responsibilities**

The Department of Land & Natural Resources has the responsibility and authority for regulation of geothermal resource subzones and management of the geothermal resource. DLNR's responsibilities include, but is not limited to, regulation of well construction and operation to prevent waste, conserve resources, and for safety and protection of the environment. Applications for geothermal exploration and development, well drilling, modification of geothermal wells, and well abandonment must be reviewed and approved by DLNR, including the monitoring of associated activities covered under the geothermal Plan of Operations. In addition, DLNR enforces the conditions set forth within Conservation District Use Permits (CDUP) issued by the Board of Land and Natural Resources for use of such lands for geothermal purposes.

The Department of Health has the authority and major responsibility for pollution control in the state, covering air and water quality, protection of drinking water supplies, and solid waste management. Generally, these functions include regulation of emissions affecting air quality, noise, underground injection of fluids, solid and hazardous waste disposal, and associated activities which could have potential adverse impacts on the environment or human health.

The Department of Labor and Industrial Relations (DLIR) has broad responsibility for the health and safety of employees both during the construction and operation of wells and power plants, and with specific regulatory oversight related to pressure vessels and boilers.

The County of Hawaii (COH) through its Planning Department has considerable responsibility and authority for enforcement of the conditions of Geothermal Resource Permits (GRP) issued by the Planning Commission for non-conservation lands. The Hawaii County Civil Defense Agency has accountability for planning and executing emergency response procedures. The county's Public Works Department has responsibility for approval and enforcement of grading, grubbing and stockpiling, building, electrical and plumbing permits. Although they are not directly involved in the regulation of geothermal activities, the County Police and Fire Departments have overall public safety responsibilities.

Although the Department of Business, Economic Development & Tourism (DBEDT) has no specific regulatory authority, the statutory function and responsibility of its Director as the Energy Resources Coordinator is to plan and coordinate energy programs within the state. Towards that end, DBEDT facilitates the commercial development of Hawaii's geothermal resources as a priority strategy to achieve increased energy diversification for the Big Island. DBEDT formulates plans and programs for the optimum utilization of Hawaii's geothermal energy resources which include developing and recommending programs to encourage private and public exploration and research of geothermal resources.

### **Scope of Duties**

DLNR monitors and regulates operations relative to management of the geothermal resource, the design and drilling of geothermal production and injection wells, and the operation of production wells and steam gathering systems pursuant to the approved Plan of Operations for each mining lease. DLNR staff inspects operations as appropriate and are on-site during critical well drilling activity.

For geothermal projects authorized on conservation lands, DLNR maintains overall regulatory responsibility for monitoring operations relative to the permitted land uses and for enforcing CDUP conditions, and is designated as the lead agency responsible for primary regulation of the geothermal power plant during normal operation. DLNR, through its Division of Water and Land Development, is also designated as the lead agency responsible for overall coordination and inter-agency communication for geothermal projects authorized on conservation lands.

DLNR also assists DOH by periodically monitoring injection wells and promptly notifies DOH of any observed non-compliance of permitted injection well operations. However, enforcement of the Underground Injection Control (UIC) Permit conditions is the responsibility of DOH personnel.

DOH monitors and enforces permit conditions concerning air quality, noise, underground injection, solid and hazardous waste disposal, and other activities that could have an impact on the environment or human health. To perform these duties, DOH has qualified personnel on duty during critical operations such as well cleanout, flow testing, and power plant start-up operations. Only periodic field monitoring and inspection are performed during normal power plant operations. Notwithstanding their individual areas of expertise, DOH personnel are, to the extent practical, cross-trained and equipped to effectively monitor air quality, noise, and UIC permit conditions.

DLIR regulates and permits the installation/operation of pressure vessels in conformance with accepted standards/codes and is responsible for inspection and certification of pressure vessel operations on a bi-annual basis. DLIR through its Division of Occupational Safety and Health conducts periodic inspections of project operations, as needed, to evaluate and make recommendations regarding worker health and safety.

COH monitors and coordinates operations relative to geothermal projects authorized on non-conservation lands. For geothermal projects permitted under any GRP, COH assumes overall regulatory responsibility for monitoring operations related to the permitted land uses and for enforcing GRP conditions, and is designated as the lead agency responsible for primary regulation of the power plant during normal operation. COH is responsible for monitoring noise during normal power plant operations and for enforcing noise conditions set forth within the GRP. COH's representatives inspect project operations as needed, and are on-site during significant geothermal operations.

COH, through the Office of the Mayor, is designated as the lead agency responsible for overall coordination and inter-agency communication for geothermal projects authorized on non-conservation lands. With respect to geothermal operations, the role of the Hawaii County Civil Defense Agency is limited to executing the procedures specified in the approved Emergency Response Plan (ERP). The exercise of authority of the Civil Defense Administrator is confined to emergency situations, as defined in the ERP, and does not apply to routine drilling and power plant operations.

For geothermal projects that are situated on both conservation and non-conservation land use districts, respective CDUP and GRP will be required. Currently, it is our understanding that the location of the power plant facility will determine which agency is responsible for overall coordination and inter-agency communication. As such, DLNR is designated as the lead agency for power plants located on conservation lands and conversely, COH the lead agency for power plants on non-conservation lands.

Each agency's on-site regulatory staff responsible for monitoring and regulating geothermal operations may be required to consult with that agency's professional/technical staff before making decisions pursuant to any notification

of unscheduled field changes (e.g. Sundry Notices) by the developer/operator. However, on-site regulatory staff are delegated appropriate authority to take immediate enforcement or corrective actions to minimize any potential impacts. On-site approval of any Sundry Notice must be followed as soon as possible by formal written notification from the developer/operator to the authorizing agency.

DBEDT directs the state's energy management activities, including the advancement of alternate energy resource utilization, and implements state policy pertaining to geothermal development. DBEDT also facilitates interagency coordination and communication between state and county geothermal regulatory agencies. The department administers geothermal energy demonstration and commercialization projects and resource assessment programs, including the formulation of short- and long-range plans for development of geothermal energy systems and the analyses and evaluation of our geothermal energy resources.

### **Inter-agency Coordination and Communication**

DLNR, DOH and COH currently provide for effective communication within and between the respective regulatory agencies during all geothermal operations, including the coordinated reporting of significant events to DBEDT and other appropriate state and county agencies.

The involved agencies are required to promptly notify COH of any observed conditions during all phases of geothermal operations which might warrant execution of evacuation procedures prescribed under the ERP. Notification requirements for evacuation are defined in the approved ERP and emergency procedures are executed under the authority of HCCDA.

In most cases, the COH, through the Office of the Mayor, serves as the lead agency for communications with the public for geothermal activities authorized under any Geothermal Resource Permit. This designation, however, does not preclude any state or other county agency from communicating with the public in disseminating non-proprietary information. Currently, the COH provides for inter-agency communication for geothermal operations permitted on non-conservation lands, including the daily reporting of significant events to DBEDT and other appropriate state and county agencies.

For geothermal activities authorized under any Conservation District Use Permit, DLNR through its Division of Water and Land Management serves as the lead agency for communication with the public, and is responsible for inter-agency communication for geothermal operations permitted on conservation lands.

COH is currently responsible for all notification, communication, and coordination between the HCCDA, County Fire Department, County Police Department, and other county response agencies. The notification and reporting of significant events by DOH/DLNR to the Office of the Mayor (or the county's designated on-site representative) currently fulfills all county communication requirements. In the event of an evacuation, however, the ERP notification requirements will take precedence. In the event that communication cannot be made with the Office of the Mayor or COH's on-site representative, alternate notification of the Hawaii County Fire Department's dispatch operator may fulfill notification requirements.

Presently, if a state/county agency observes or becomes aware of actual or potential permit non-compliance, notification is given to the appropriate permit issuing agency for follow-up investigation. This notification is usually given to agency personnel who are regularly on- or near-site, or is reported to the agency's designated alternate contact.

COH, DOH, and DLNR are responsible for providing appropriate personnel on-site during critical operations in which Hydrogen Sulfide (H<sub>2</sub>S) may be emitted such as well cleanout, flow testing, and power plant start-up operations. COH, DOH, and DLNR on-site staff are responsible for communicating with their respective agencies according to each agency's internal communication procedures.

During critical operations, DOH on-site personnel are responsible for communicating with DOH field monitoring personnel as to planned or actual start-up of operations, available H<sub>2</sub>S measurements, and likely effect of wind on the direction of emissions. DOH also advises the designated lead agency of any changes to the monitoring schedule for noise and air quality compliance.

State and county agencies currently provide for the timely exchange of H<sub>2</sub>S monitoring data measured during well cleanout, flow testing, plant start-up operations, and during any abnormal condition. During normal operations, non-proprietary monitoring data is provided upon request to any state or county agency. However, certain information obtained by the Department of Land and Natural Resources, in particular relating to the extent and nature of the geothermal resource, is proprietary as provided by law and cannot be publicly released.

Should an incident, upset condition, or accident result in levels of H<sub>2</sub>S emissions that endanger public health, safety, or welfare, the communication and notification procedures of the ERP supersedes and are immediately implemented by the appropriate response agencies. In addition to specified permit and ERP notification requirements, COH's field representative is responsible for advising the Hawaii County Civil Defense Agency of the times, concentrations, and direction of any resulting emissions, and for updating the county administration as to the project operations.

All regulatory agencies responding to any complaint or incident normally file a written report, regardless of whether a violation occurred. If required, a copy of the report is distributed to the other agencies. However, as a general rule, these reports are for internal use only, and the identity of the complainant cannot be released to protect the privacy of the individual. State/county agencies currently refer all matters outside of their jurisdiction and/or permit requirements to the responsible regulatory agency.

#### PUBLIC UTILITIES COMMISSION

The Public Utilities Commission (PUC) has no specific regulatory responsibility for monitoring and enforcement of geothermal development activities. The PUC's involvement with respect to such activity relates to oversight and standards for small power production and the purchase of electrical energy/capacity from a qualifying facility (QF) by the electric utility.

The federal and state governments each view the production, transmission, and sale of electric energy as fundamental public interest concerns and therefore generally regulate these activities as public utilities under the Federal Power Act and the Hawaii public utilities law.

However, certain aspects of the generation and sale of electricity have been exempted from such regulation. At the federal level, the Public Utility Regulatory Policies Act of 1978 (PURPA) seeks to encourage the development of alternate energy resources by exempting qualifying cogenerators and small power producers generating electricity from renewable energy resources from certain requirements of typical utility regulation.

The Hawaii public utilities law is administered by the PUC which generally regulates every party who owns, controls, operates or manages any plant equipment, directly or indirectly for public use, for the production, conveyance, transmission, delivery or furnishing of electrical power to a public utility for resale to the public. The law provides an exemption from PUC regulation for producers of geothermal steam or electric energy generated from geothermal steam. It also authorizes the PUC to direct those public utilities supplying energy to the public to arrange for and acquire electric energy generated from non-fossil fuel sources in order to reduce fossil fuel generation of electricity.

Under PURPA, electric utilities must purchase electric energy from QFs. The rate or purchase price of electricity by a utility from a QF must be "just and reasonable" to the utility's consumers and in the public interest, must not discriminate against QFs and cannot exceed the utility's "incremental cost" of alternate electric energy. This "incremental cost" is also referred to as "avoided cost."

The law further provides that the rate for purchase paid by the utility to the alternate energy producer shall be as agreed between them and approved by the PUC. Should the parties be unable to agree, the PUC shall establish the purchase price. The rate shall be just and reasonable and shall not be less than 100% of the cost avoided by the utility when the utility purchases the electricity rather than produces the electrical energy itself.

In short, the PUC has jurisdiction over the agreement between the public utility and the producer of non-fossil fuel generated electricity. If geothermal energy development, transmission and interconnection costs are to be passed on to the utility (e.g. HELCO), the PUC must review and approve the power purchase contract between the geothermal energy producer and the utility.

## **SUMMARY OF FINDINGS**

The development of alternative energy resources for the residents of the Big Island must be coupled with prudent regulatory attention and enforcement. Regardless of the type of resource or technology, community concerns over public health, safety, and welfare resulting from such development, must be recognized and properly addressed.



Much of the concern surrounding geothermal projects involves the multitude of permits associated with exploration and development of the resource. We believe that these concerns, however, can be mitigated by clearly identifying the roles and duties of state and county agencies responsible for geothermal development. The environmental, health, and economic interests of island residents, and communities nearby such projects, can be successfully safeguarded through appropriate government oversight of all geothermal development.

In addition to clarifying the roles and responsibilities of the above agencies, our findings have also identified the following actions which are being implemented to augment current state and county regulatory efforts:

### Cross Training

Cross training of regulatory personnel can improve effectiveness, therefore the COH, DOH, and DLNR are reviewing their on-site monitoring and enforcement functions to consider cross-training personnel in basic monitoring procedures and the use of pertinent equipment. DBEDT has initiated steps toward implementing a program to hire training consultants that would be available for all affected agencies.

State and county regulatory agencies are assisting, whenever possible, other agencies' designated on-site personnel. A goal is to train cooperating agency staff to recognize and report any observed permit violation to the agency having proper jurisdiction. Any enforcement action resulting from such violation, however, is the responsibility of the permit issuing agency.

Cross training also allows COH, DOH, and DLNR to develop a coordinated monitoring program for each phase of any permitted geothermal project. The monitoring program will be able to specify the amount, duration, and type of coverage that will be required for each phase of any geothermal project, such as well field development, power plant construction, well cleanout and testing, plant start-up, and normal plant operations.

### Memorandum of Agreement

This analysis has shown that a Memorandum of Agreement (MOA) detailing the elements of a plan for agency cooperation in geothermal regulation benefits both state and county agencies. The objectives of such a MOA would be to avoid omissions and redundancies related to inter-agency communication and regulation of geothermal operations, and to encourage the efficient use of government resources allocated to monitoring and enforcement functions. The MOA would clarify and clearly establish the respective roles and responsibilities of the state and county regulatory agencies. The MOA could also serve as the basis for coordinating the cross-training discussed above. DBEDT has drafted such a MOA which is presently being reviewed by the affected agencies.

### Third-Party Monitoring

Lastly, a mechanism to finance third-party monitoring can assist in defraying the relatively high monitoring costs currently borne by the regulatory agencies. Conceivably, a portion of geothermal royalties payable to the state/county could be used for this purpose and future developers could be required by permit to contribute to this resource base.

Geothermal developers, as a permit condition, could be required to set aside funds for use by the regulatory agencies (e.g. DOH) to contract private technical consultants to monitor and to report results to both the regulators and the developer.

Potential benefits of this approach include: a) assignment of some of the monitoring costs to the developer; b) avoidance of potential bias or allegiance problems by having the government agency, rather than the developer, hire the third-party monitoring consultant; and c) reduction in the number of agency field personnel required for monitoring. Third-party monitoring could also streamline monitoring operations and centralize data collection and reporting. Use of third-party monitoring is under active consideration by the affected agencies.

In summary, enforcement actions resulting from any violation should remain the responsibility of the permit issuing agency, and state and county agencies should continue to refer all matters outside of their jurisdiction to the appropriate permitting agency. Through the actions above, routine monitoring and enforcement will be enhanced.

No recommendations are made as to the functions of the Department of Labor and Industrial Relations, Hawaii County Civil Defense Agency or the Public Utilities Commission. Based on our findings, it is our opinion that the current role and responsibility of these agencies are sufficiently explicit and clearly established for their intended purposes.

## REFERENCES

County of Hawaii, Planning Commission, Geothermal Resource Permit No. 2, issued to Puna Geothermal Venture.

Hawaii Administrative Rules, Title 6, Chapter 74, Standards for Small Power Production and Cogeneration in the State of Hawaii.

Hawaii Administrative Rules, Title 11, Chapter 59, Ambient Air Quality Standards.

Hawaii Administrative Rules, Title 11, Chapter 60, Air Pollution Control.

Hawaii Administrative Rules, Title 13, Chapter 2, Conservation Districts.

Hawaii Administrative Rules, Title 13, Chapter 183, Rules on Leasing and Drilling of Geothermal Resources.

Hawaii Administrative Rules, Title 13, Chapter 184, Designation and Regulation of Geothermal Resource Subzones.

Hawaii Revised Statutes, Chapter 205, Land Use Commission, as amended by Act 296, Session Laws of Hawaii 1983.

MCM Planning, Environmental Review, 500 MW Geothermal Development, Puna District, Island of Hawaii, March 1989. Prepared for the Department of Business and Economic Development.

State of Hawaii, Department of Land and Natural Resources, Geothermal Resources Development, State of Hawaii, March 1984.

State of Hawaii, Department of Planning and Economic Development, Geothermal Development and Applications in Hawaii, 1985.

State of Hawaii, Department of Planning and Economic Development, Geothermal Resource Subzone Designations in Hawaii, June 1986.

Sumida, G.A., et al, Alternative Approaches to the Legal, Institutional and Financial Aspects of Developing an Inter-Island Electrical Transmission Cable System, April 1986.

Attachment 1

APPLICABLE REVIEWS, PERMITS, AND/OR APPROVALS

AGENCY AND PERMIT

LEGISLATION OR REGULATION

State Permits

Department of Health

Underground Injection Control  
Permit: Approval to Construct  
and Permit to Operate

40 CFR Part 144 through 147,  
Federal Regulations; Chapter  
340E, HRS; DOH Administrative  
Rules, Title 11, Chapter 23

Authority to Construct and  
Permit to Operate

Clean Air Act (42 USC); Chapter  
342B, HRS; DOH Administrative  
Rules, Title 11, Chapters 59  
and 60

Department of Land and Natural Resources

Conservation District Use Permit

Chapter 183, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 2

Geothermal Exploration Permit

Chapters 174C and 182, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 183

Geothermal Well Drilling Permit

Chapters 174C and 182, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 183

Geothermal Well Modification  
Permit

Chapters 174C and 182, HRS; DLNR  
Administrative Rules; Title 13,  
Chapter 183

Geothermal Well Abandonment Permit

Chapters 174C and 182, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 183

Geothermal Resource Mining Lease

Chapter 182, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 183

Geothermal Plan of Operations

Chapter 182, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 183

Geothermal Resource Subzones

Chapter 205, HRS; DLNR  
Administrative Rules, Title 13,  
Chapter 184

**AGENCY AND PERMIT**

**Hawaii County Permits**

Geothermal Resource Permit

Grading, Grubbing and Stockpiling Permit

Building Permit

Electrical Permit

Plumbing Permit

**LEGISLATION OR REGULATION**

Chapter 205, HRS; Hawaii County, Planning Commission, Rule 12

Hawaii County Code, 1983, Chapter 10, Articles 2 and 3

Hawaii County Code, 1983, Chapter 5 and Chapter 14, Article 9

Hawaii County Code, 1983, Chapter 9, Article 5, Division 1

Hawaii County Code, 1983, Chapter 17, Article 2

Attachment 2

**HIERARCHICAL RELATIONSHIP OF PERMITS/APPROVALS**

