SCOPING MEETING SUMMARY
Honolulu, Oahu, 14 March 1992, 2 PM

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10 June 1992

OVERVIEW

The meeting began with presentations by the facilitator, Mr. Spiegel, and Dr. Lewis, the representative from DOE. The facilitator introduced those on the podium. He then described the general structure of the meeting and its purpose: to hear the issues and concerns of those present regarding the proposed Hawaiian Geothermal Project. He described his role as assuring the impartiality and fairness of the meeting. Dr. Lewis of DOE further defined the scope of the project, introduced members of the EIS team, and briefly described the EIS process.

Ninety percent of those presenting expressed concern about the potential impacts of the HGP to the environment. They asked that the EIS investigate the impacts of the HGP on quality of air, water and soils, flora and fauna, land, socioeconomics, religion and culture. Seventy percent of the commenters want the EIS to investigate the impacts of all components of the HGP (*e.g.* generation facilities, pipes, roads, drill pads, transmission corridors, and cable) on terrestrial ecosystems (*e.g.* the rainforest), threatened and endangered species, species diversity, species used for ritual or medicinal purposes, and climate stability. The EIS should address the effects of segmentation of habitat, introduction of exotic species, acid rain, herbicides, and enhanced fire danger. It should consider the entire Kilauea East Rift Zone when studying the impacts of HGP on the ecology of the Puna District. Of importance is the interrelationship between the lava, the biota of the region, and the regeneration that occurs following an eruption. DOE should examine the impacts of the network of roads that would be constructed for the HGP. Roads may serve as barriers that segment habitats, prevent regeneration and natural spread of biota, or serve as conduits for introduction of exotic species or for mobilization of herbicides. They may enhance the potential for logging or collecting of endangered native species.

The EIS should determine the impacts of the HGP on marine life, particularly threatened and endangered species such as the humpback whale. It should address the effects of emf. In particular, the EIS should establish whether the clearing of land for HGP increase the problems of silting in the near-shore ocean.

Ninety percent of the presenters requested that the EIS address long- and short-term socioeconomic impacts of the HGP. Sixty percent want the EIS to provide a detailed economic analysis of the costs (to the consumer, rate payer and non-user) of the HGP, including the cable, from inception (planning) through decommissioning, to determine both feasibility and impacts to economic systems. The EIS should investigate the effects of the

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presence of transmission lines making large regions of the State less desirable for living in terms of property values, cost of living, *etc.* [p. b. This impact would affect all residents of Hawai'i, not just those on Hawai'i, Maui, Moloka'i and Oahu.] The EIS should analyze the economic impacts of failures once geothermal energy provides a significant proportion of Hawai'i's energy needs, including the costs of developing backup power supply on Oahu. One commenter asked who would be responsible for the consequences of lower property values or property condemnation associated with the HGP and suggested that the developer(s) should be bonded. Fifty percent want the EIS to identify what the benefits of HGP are and who would benefit from development of the HGP.

The EIS should address the consequences of the HGP or its failure on social entities, including the social consequences that a resulting increased cost of living due to HGP could have in Hawai'i. Fifty percent of the presenters stated that the EIS should consider the issue of respect for Native Hawaiian culture and religious values. The EIS should note that drilling for geothermal development on Kilauea is a desecration of Pele, that, in the process of constructing the HGP, sacred sites may be desecrated, and that forms of Native Hawaiian worship may be insulted. The EIS should address the impacts of HGP on Native Hawaiian culture, religion, and religious practices, including hunting and gathering of herbs used for medicinal and ritual purposes. One commenter recommended that, in order to understand impacts to Native Hawaiian cultural practices, studies should be designed by trained anthropologists, and should involve personal interviews with practitioners, Hawaiian kupunas, and Hula dancers.

Seventy percent of the presenters want the EIS to carefully define the full extent of the HGP, including a reasonable description of the project itself (including resource evaluation, a reasonable estimate of the number of wells and the acreage required to support them for the lifetime of the plant); the reliability of the resource and HGP (including the generation facility; the transmission line/submarine cable, and associated infrastructure); mitigation measures in case of failure and after decommissioning; and reasonably foreseeable future uses of the geothermal energy derived from the HGP. Forty percent of the presenters remarked about whether or not the HGP will achieve the goals of the State for the project: to alleviate Hawai'i's dependence on imported fossil fuels and to develop indigenous, cost-effective, energy-supply options for the State.

Seventy percent of the presenters asked that the EIS investigate completely alternatives to the proposed action (including no action), their associated environment and cultural impacts and costs. The EIS should consider as potential energy supply options: wind, solar, biomass, off-grid technologies, oil, coal, and gas, as well as energy efficiency. These should be considered within the framework of integrated resource planning and least-cost planning of supply- and demand-side energy options as this may provide a lower-cost energy supply than

geothermal in terms of both economic and environmental cost. With respect to alternative levels of geothermal development, one commenter noted that if a low level of development is successful, then it would not be economical, or politically astute, to limit development to that low level.

Seventy percent of the speakers expressed concerns about competing land-uses. The EIS should consider the propriety of geothermal development in a residential neighborhood, of using Hawaiian homelands for the HGP, and the land exchange (and land-use designation change) that has occurred between Campbell Estate and the Wao Kele o Puna rainforest (public lands held in trust for Native Hawaiians). The EIS should examine how the possibility of geothermal development has influenced land ownership and land-use decisions. One commenter noted that there are already long waiting lists for resettlement of those lands and using some for the HGP may exacerbate the situation.

Sixty percent of those present expressed political concerns including lack of faith and trust in government, lack of expertise and purpose in regulatory matters, dislike of political climate, lack of interest by government for citizen, notably Native Hawaiian, insufficient public review, and inadequate distribution of information by government. The EIS should address the international implications of setting a precedent for permitting the cutting of U.S. rainforests while exhorting other nations to stop clearing theirs.

MEETING SUMMARY

Speigel Presentation - Attachment A

DOE Project/Process Description - Attachment B

Process Discussions

Public Awareness. One person noted that in order to perform an appropriate environmental review, there must be open communication between those performing the review and the public. How will this be facilitated? What role will the counties and State have in this process? Dr. Lewis replied that part of the role of cooperating agencies is to help in early identification of issues and concerns and to enhance public awareness. DOE has asked for that help from its cooperating agencies and noted that cooperating agency agreements were being developed with the Counties of Maui and Hawai'i. In describing the NEPA environmental review process, he mentioned the notification and scoping procedures. He went on to describe the public and cooperating agency review process. He stated a DOE commitment to fulfilling NEPA obligations.

Project Definition. Concerning the definition of phase 3, Dr. Lewis explained that the wells drilled for that portion of the HGP will be exploratory-size wells, not production wells, and that some of the input to phase 3 will come from the results of HGP(A) and the private developers. He also clarified that due to the federal court injunction that there can be no federal funding for phase 3 until the federal HGP EIS has been prepared.

He noted that the EIS is bound to examine the cable part of the HGP by the federal district court decision.

Prior Activities. Concerning the examination of prior and on-going geothermal development activities in the Puna district, the EIS will examine those activities as a background data base. The preparers of the EIS are aware of best available control technologies and abatement technologies. The issue of abatement will be seriously considered in the EIS. He also stated that the geothermal fluids and emissions must be fully characterized by qualified analysts.

Alternatives. Dr. Lewis clarified that the EIS would look at all reasonably foreseeable alternatives, both within geothermal and also looking outside of geothermal, and applications and environmental consequences of those alternatives. For example, this EIS will examine different scales of geothermal development, the contribution which can be derived from demand-side management, and use of integrated resource planning, as well as other energy supply options.

He also noted that reasonably foreseeable alternatives to the cable project will also be studied including cable routes, transmission techniques, island-based substations and tie points to the islands.

Social Impacts. Dr. Lewis noted that the EIS would examine social impacts of the HGP. He indicated that they would be covered explicitly and within the IRP process as externalities.

Native Hawaiian Concerns. Dr. Lewis clarified the issue of DOE interaction with Native Hawaiian groups, in consideration of the fact that they do not have sovereignty. He noted that he had already spoken with the Office of Hawaiian Homelands and the Office of Hawaiian Affairs. Both these groups had suggested that the best approach would be to interface with Native Hawaiian groups directly. He requested that the speaker place her groups on the mailing list and that they would be kept fully informed. He hoped to establish a link for further communication.

PRESENTERS Alphabetically, alphanumeric following name indicates number of presentation at Honolulu, Oahu.

Dr. J.M. Anthony, Hawai'i La'i"eu Lawai Association, Inc. and Hui Malama'aina'o Laie	O1
Wally Bachman, Citizens Advocating Responsible Education	O9
Edith Bowles	O6
Scott A.K. Derrickson, Energy Advisor to Sierra Club of Hawai'i	O5
David Goldsmith, Oahu Rainforest Action Group	O4
Lela M. Hubbard, Na Loa Ikaika	O7
Robert Kai Irwin	O8
Annie Szvetcz, Rainforest Action Network	O2
Donald Thomas	O10
Patricia Tummons, Environment Hawaii	O3

PRESENTATIONS

1. PURPOSE OF PROJECT

Forty percent of the presenters suggested that the EIS establish whether the HGP will achieve the goals of the State for the HGP: to alleviate Hawai'i's dependence on imported fossil fuels, and to develop indigenous, cost-effective, energy-supply options for the State. One commenter believes that development of geothermal energy will result in lowering Hawai'i's dependence on imported oil, which is currently at 90%. Another commenter noted that current studies say that unless the State's dependence on means of transportation based on importation of crude oil is reduced, the State's dependence on imported oil could not be reduced by geothermal development [Ref. BHP Petroleum Report].

2. PROPOSED ACTION

Seventy percent of the presenters want the EIS to carefully define the full extent of the HGP, including a

reasonable description of the project itself (including resource evaluation, a reasonable estimate of the number of wells and the acreage required to support them for the lifetime of the plant). The EIS should discuss the reliability of the resource and all segments of the project defined in the proposed action (including the generation facility, the transmission line/submarine cable, and associated infrastructure). The EIS should define mitigation measures for all segments under normal operations, in case of failure, and after decommissioning. It should address the impacts of reasonably foreseeable future uses of the geothermal energy derived from the HGP.

2.1 Definition of Project

One commenter noted that in order for 500 MW(e) to reach Oahu, it will be necessary for significantly more power to be generated on Hawai'i.

The EIS should provide a reasonable estimate of the acreage that would be needed for the HGP. Estimates of the number of wells that need to be drilled to result in the requisite number for source and reinjection should be based on prior experience in Puna and around the world. Commenters suggested that current projections underestimate the number of wells, and therefore, the acreage required. The EIS should also describe the actions proposed as the resource declines, specifying additional acreage to be cleared and wells to be drilled.

The EIS should better define phase 3 (resource evaluation), that is, how much drilling and exploration will be required to evaluate the resource. The EIS should detail the acreage, number of wells, roads, and costs involved. The EIS should detail scenarios in case the resource does not prove to be adequate for the HGP.

2.2 Resource Concerns

The EIS should address the impacts of declining resources, recognizing that geothermal energy is not proven to be renewable.

2.3 Geothermal Project Reliability

Thirty percent of the commentors requested that the EIS consider the effect that developing geothermal facilities in an area of seismic and volcanic instability will have on the reliability of the power supply. One speaker was concerned that earth movement would cause well blowouts.

The EIS should address the possibility of an irreparable well (due to either natural events or pipe corrosion) such

as that which is still releasing gas at the Geysers in California.

The EIS should identify and assess the impacts associated with the need for stand-by backup power for those using the geothermal power in order to maintain system reliability.

2.3.1 *Mitigation Methods*

The EIS should present measures that would be used to assure that herbicides used to prevent invasion of exotic species will affect only target species either within or outside of the target region. It should demonstrate that these mitigation measures will be carried out and how they will be enforced.

The EIS should describe appropriate mitigation measures that will occur when the HGP has terminated, either due to lack of resource after phase 3, or after decommissioning. The EIS should determine if the sites can be reforested and if reforestation is possible, the EIS should specify who will be responsible for reforestation, both in terms of doing the work and in assuring it is done correctly in the manner agreed to.

2.4 Cumulative Impacts of Prior and On-going Geothermal Development

The EIS should examine the geothermal development that has occurred successfully elsewhere in the world, as those developments may show that geothermal energy can be developed safely and effectively.

The EIS should consider the prior and present geothermal development in Puna, as background and as contributing to cumulative impacts, when assessing the impacts of HGP. Commenters noted the odors, noise, health effects, and both planned and unplanned (but unabated) ventings associated with prior and current geothermal developments in Puna. One commenter noted a lack of H₂S or noise abatement equipment at HGP(A). He noted reported effects of geothermal-related H₂S release, including respiratory illness requiring hospitalization and nausea.

The roads already constructed for geothermal development should be considered as part of the cumulative environmental impacts.

2.5 Cable/Transmission Lines

The EIS should consider the geological hazards that threaten the reliability of the transmission line/submarine

cable system (This also has civil defense implications, Section 5.7.5) and should investigate the impacts of cable failure (also Sections 5.4.4, 5.9, and 5.9.1).

2.6 Future Uses and Development

The EIS should:

- examine whether development of geothermal energy would enhance growth, and therefore would increase transportation needs, which are based on petroleum in Hawaii, and thus would increase Hawaii's dependence on imported oil.
- consider the potential impacts of using geothermal energy for developing a seabed mining and processing industry, the space port, and further tourist developments.

3. **ALTERNATIVES TO THE PROPOSED ACTION**

Seventy percent of the presenters asked that the EIS investigate alternatives to the proposed action (including no action), their associated impacts and costs. The EIS should consider the following as potential energy supply options: wind, solar, biomass, off-grid technologies, oil, coal, and gas, as well as energy efficiency. They should be considered within the framework of integrated resource planning and least-cost planning of supply- and demand-side energy options as this may provide a lower-cost energy supply than geothermal in terms of both economic and environmental cost.

The EIS should also consider the impacts of a delay in looking at alternatives to geothermal energy (see Section 5.8).

3.1 Conservation and Renewables

Seventy percent of the presenters said that the EIS should examine the possibility of using sustainable, renewable, energy supply options, such as energy efficiency, wind, biomass, off-grid technologies, solar, and possibly even hydrogen, to meet Hawaii's energy needs for the future.

3.2 Geothermal Alternatives

The EIS should address alternative forms of deriving geothermal energy.

If a low level of geothermal development is successful, then greater development of up to, or even greater than 500 MW, become reasonable-foreseeable future developments (also Section 2.6). One commenter noted that if geothermal development is successful at the 25 MW level, then it would not be economical or politically astute to limit development to that low level of development on the Big Island or (if sufficient resource is verified) to the Big Island. Therefore, it is important that the EIS look at the impacts of developing the full resource and all its potential uses.

3.3 Alternatives to the Cable/Transmission Lines

3.4 Transportation

The EIS should examine reducing Hawai'i's dependence on petroleum-based fuels for transportation (for example, using fuel-efficient automobiles) in order to achieve that the State's stated objective for the HGP, reducing Hawai'i's dependence on imported oil.

3.5 Fossil Fuel

The EIS should address the issue that the high reliance of Hawai'i on oil-fired power generation results in adverse impacts to air quality (SO₂ and CO₂ emissions) and contributions to global climate change. DOE should remember that the proposed coal-burning facilities may use coal derived from strip mining a rain forest in a third-world nation. The commenter implied that there are international implications of asking third world nations to cease cutting their rainforests and then economically encouraging them to clear those rainforests.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5. POTENTIAL ENVIRONMENTAL ISSUES

Ninety percent of those present expressed concern about the impacts of the HGP to the environment (Sections 5.2, 5.3, and 5.4).

5.1 Competing Uses

Seventy percent of the speakers expressed concerns about competing land-uses. The EIS should consider the propriety of:

- geothermal development in a residential neighborhood.
- using Hawaiian homelands for the HGP. It should study the impacts of using Hawaiian homelands and ceded lands for land-based portions of the HGP on the future settlement of those lands by Native Hawaiians. The commenter noted that there are already long waiting lists for resettlement of those lands and using some for the HGP may exacerbate the situation.
- the land exchange between Campbell Estate and Wao Kele o Puna (public lands held in trust for Native Hawaiians) and examine the redesignation of the Wao Kele o Puna rain forest as a geothermal subzone in light of the fact that previous State administrations had regarded it as important natural resource.

The EIS should examine how the possibility of geothermal development has influenced land ownership and land-use decisions.

5.2 Air Quality Concerns

Many of those presenting (30%) indicated that the EIS should investigate the impacts of the HGP on air quality, including the potential impacts herbicides and of acid rain that may occur as a result of geothermal development (also Sections 5.3, 5.4.1, 5.4.2, 5.4.3, 5.7, and 5.9.1).

5.3 Water (and Soil) Quality Issues

The EIS should investigate the impacts of the HGP on water and soil quality, including the impacts of acid rain and of the herbicides used to control exotic species (Sections 5.2, 5.4.1, 5.4.2, 5.4.3, 5.7, and 5.9.1).

5.4 Ecological Resources

5.4.1 *Impacts on terrestrial ecosystems*

Forty percent of the commenters want the EIS to investigate the impacts of the HGP on terrestrial ecosystems and their biota. The impacts of all components of the project should be considered, including roads, drill pads, transmission corridors, and cable. It should consider segmentation of habitat, introduction of exotic species, and

enhanced fire danger (also Sections 5.4.2, 5.4.3, 5.7.5, and 5.9.1). The EIS should address the potential impacts of:

- acid rain that may occur as a result of geothermal development on the land surrounding the plant (also Sections 5.2, 5.3, 5.4.2, 5.7.1, and 5.9.1).
- emf on terrestrial biota (also Sections 5.4.2 and 5.4.3).
- herbicides used to control exotic species on ecosystems, and their flora and fauna, in surrounding communities (Sections 5.2, 5.3, 5.4.2, 5.4.3, and 5.7).

5.4.2 Rain Forest Issues.

Forty percent of the presenters indicated that the EIS should address the impacts of the HGP on the rain forest and its unique biota, including direct clearing of Wao Kele o Puna rainforest for roads, pipes, plants, support facilities. The EIS should consider the entire Kilauea East Rift Zone when studying the impacts of HGP on the ecology of the district. It should note the interrelationship between the lava, the biota of the region, and the regeneration that occurs following an eruption. The EIS should identify and assess the impacts of:

- rainforest clearing associated with the HGP in terms of affects on species diversity.
- use of herbicides to control exotic species in the rain forest and on the ecosystem as a whole. Spraying with herbicides, which may move through the environment, also has implications beyond the rainforest (Sections 5.2, 5.3, 5.4.1, 5.4.3, and 5.7).
- the impacts of the HGP on the rain forest due to segmentation of habitat, introduction of exotic species, and enhanced fire danger (also Sections 5.4.1, 5.4.3, 5.7.5 and 5.9.1).
- HGP on the ability of the region to regenerate.
- HGP-related acid rain (also Sections 5.2, 5.3, 5.4.1, 5.7.1, and 5.9.1).
- HGP on subsistence hunting and gathering in Wao Kele o Puna (also Section 5.9.4).
- HGP on climate stability.

DOE should examine the impacts of the network of roads constructed for the HGP with respect to:

- fragmentation of the ecosystem of Wao Kele o Puna.
- prevention of regeneration and natural spread of native plants. Roads may serve as barriers.
- introduction of exotic species into Wao Kele o Puna due to the corridor effect (the EIS should also consider the roads constructed for prior activities (also Section 2.4)).

- mobilization of the herbicides mentioned above.

5.4.3 *Threatened, endangered, or endemic species concerns*

About 40% of those commenting suggested that the EIS should examine the impacts of the HGP on threatened and endangered species such as:

- the humpback whale,
- ohia,
- happy-face spider,
- Hawaiian hawk, ('io or *buteo solitarius*). One commenter noted nesting habits of 'io including reuse of nests and sensitivity to high-pitched sounds [Ref. Jack Jeffrey, "Ornithological survey of well site number 2 prepared for True Mid-Pacific Geothermal Venture, available through State Department of Land and Natural Resources, DLNR].
- ahakea (*Bobea timioides*, candidate list), and *Tetraplasendras hawaiiensis* (candidate list). [Both species are on the US Fish and Wildlife Service candidate list near the True/Mid Pacific site, reference to Charles Lamoreaux, "Biological survey of the proposed access roadway and well site number 1," available through DLNR].
- hapu'u. The roads constructed for HGP development (including both phases 3 and 4), may enhance the potential for logging of endangered native tree ferns (hapu'u).

The EIS should specifically examine the impacts of:

- herbicides (Sections 5.2, 5.3, 5.4.1, 5.4.2, and 5.7),
- segmentation of habitat, introduction of exotic species, and enhanced fire danger (also Sections 5.4.1, 5.4.2, 5.7.5, and 5.9.1),
- siltation in the near-shore environment (also Sections 5.4.4, 5.9.1, 5.9.4, and 5.9.5).

5.4.4 *Marine Concerns*

The EIS should determine the effects of emf on marine life. In particular, the EIS should establish whether the

clearing of land for HGP increase the problems of siltation in the near-shore ocean (also Sections 5.4.3, 5.9.1, 5.9.4, and 5.9.5).

5.5 Geological Issues

5.6 Aesthetic Issues

5.6.1 *Noise*

5.6.2 *Visual Issues*

5.6.3 *Odor Issues*

5.7 Health and Safety Issues

Forty percent of those commenting suggested that the EIS should assess the health and safety impacts of the HGP and possible failures of any of the components of HGP. The EIS should also examine the impacts of the herbicides used to control exotic species on health and safety as these substances may be mobilized and affect air quality, soils, food, or water supplies (Sections 5.2, 5.3, 5.4.1, 5.4.2, and 5.4.3).

5.7.1 *Geothermal Emissions and Effluents*

The EIS should consider the health effects of H₂S emissions, particularly on those sensitive to H₂S, such as children. The commenter reported that H₂S levels have been measured as high as 1000 ppm at HGP(A). The commenter compared the H₂S concentration with that reported for New Zealand (1 ppm). The commenter suggested that appropriate measurement strategies be used to determine concentrations of H₂S. The EIS should address the potential health and safety impacts of acid rain that may occur as a result of geothermal development (also Sections 5.2, 5.3, 5.4.1, 5.4.2, 5.7.1, and 5.9.1).

5.7.2 *Transmission Line Effects*

The EIS should identify and assess all the health and safety effects of the cable transmitting power from Puna to Oahu, including the potential effects of the emf associated with the transmission lines.

5.7.3 *Noise*

5.7.4 *Psychological Impacts*

5.7.5 *Safety, Civil Defense Issues*

The EIS should investigate the possibility that geothermal development will enhance fire danger within the affected regions (also Sections 5.4.1, 5.4.2, 5.4.3, and 5.9.1).

5.8 Political Issues

Sixty percent of those present expressed political concerns including lack of faith and trust in government, lack of expertise and purpose in regulatory matters, dislike of political climate, lack of interest by government for citizens, notably Native Hawaiians, insufficient public review, and inadequate distribution of information by government.

Commenters also questioned why the State does not wait until the IRP process is over to develop geothermal and why some solar installations are not already required.

The EIS should address the international implications of the precedent set when the U.S. permits the cutting of its rainforests while exhorting other nations to stop clearing theirs.

5.9 Socioeconomic Issues

Ninety percent of those commenting expressed concern about the long- and short-term socioeconomic impacts of the HGP.

5.9.1 *Economic Issues*

The EIS provide a detailed economic analysis of the costs of the HGP, including the cable, from inception (planning) through decommissioning, to determine both feasibility and impacts to economic systems. The EIS should investigate the:

- costs to the consumer and the rate-payer. A commenter asked how PURPA is being applied (Section 7).
- effects of the presence transmission lines making large regions of the State less desirable for living in terms of property values, cost of living, etc. [i.e. This impact would affect all residents of Hawai'i, not just those on Hawai'i, Maui, Moloka'i and Oahu.] One commenter noted the high cost of living, and rising homelessness and hunger.
- impacts of cable failure once geothermal energy provides a significant proportion of Hawai'i's energy needs.
- economic impacts should siltation affect fisheries (also Sections 5.4.3, 5.4.4, 5.9.4, and 5.9.5).

- costs to rate- and tax-payers of developing that backup capability on Oahu.
- who would be responsible for the consequences of lower property values or property condemnation associated with the HGP. The commenter suggested that the developer should put up a bond so that if properties had to be condemned, residents would be appropriately reimbursed.

5.9.2 Life Style

5.9.3 Social Issues

The EIS should address the consequences of the HGP, or its failure, on social entities, including the social consequences of increased cost of living due to HGP. The EIS should examine impacts to (for example):

- religion and culture (also Sections 5.1, 5.4.2, 5.9.1).
- cultural resources of the rainforest ecosystem (Section 5.4.2).

5.9.4 Native Hawaiian Issues

Fifty percent of the presenters stated that the EIS should consider the issue of respect for culture and religious values. The EIS should note that:

- drilling for geothermal development on Kilauea is a desecration of Pele.
- sacred sites may be desecrated and forms of Native Hawaiian worship may be insulted (also Section 5.9.5).
- geothermal development is an offense to Native Hawaiian religious sensibilities, as is development of the ocean.

The EIS should address the impacts of HGP on Native Hawaiian culture, religion, and religious practices, including the impacts on:

- hunting and gathering of herbs used for medicinal and ritual purposes.
- Native Hawaiians of using Hawaiian Homelands and ceded lands.
- fishponds and fisheries as a result of increased siltation (also Sections 5.4.3, 5.4.4, 5.9.1, and 5.9.5). [Many fishponds have already experienced this problem.]

The EIS should address the anthropological impacts of the HGP. He recommended that the study be designed by trained anthropologists, and should involve personal interviews with practitioners, Hawaiian kupunas, and Hula

dancers, in order to investigate the impact the HGP would have on such cultural practices as Native Hawaiian hula dances, which require use of plants gathered in Wao Kele o Puna or other areas affected by the HGP.

The EIS should address the concern that Native Hawaiians have not been granted sovereignty.

5.9.5 Impacts to Cultural Resources (Archeological/Historical Sites and Regions)

The EIS should address the impacts of the HGP on archeological sites and regions (also Sections 5.9.1 and 5.9.4).

6. COST BENEFIT ANALYSIS

The EIS should identify what the benefits of HGP are and who will benefit from development of geothermal energy, particularly the HGP [50%].

7. LEGAL ISSUES

The EIS should examine the use of PURPA [Public Utilities Regulatory Policy Act of 1978] to provide funding for the development. [PURPA requires that utilities purchase power being generated by alternative suppliers and pay their avoided costs. Thus this Act, and its implications, should be examined with respect to alternative energy supply options as well.] Also Section 5.9.1.

ATTACHMENT A

FACILITATOR PRESENTATION

HAWAII SCOPING MEETINGS

March 7, 1992, Pahoa, Hawai'i
March 9, 1992, Wailuku, Maui
March 12, 1992, Kaunakakai, Moloka'i
March 14, 1992, Honolulu, Oahu
March 16, 1992, Waimea, Hawai'i

Summary of Presentation

Introduction: Mr. Spiegel first introduced himself and Ms. Letts, from West Hawai'i Mediation Services and the Center for Alternative Dispute Resolution, respectively, as professional facilitators. He explained that they were hired to run a fair and impartial scoping meeting. He then introduced Dr. Lewis [Hawai'i Geothermal Project (HGP) Environmental Impact Statement (EIS) Program Director from DOE Headquarters], Carol Borgstrom, Director of the Office of National Environmental Policy Act Oversight, DOE Headquarters], and William Dennison [Assistant General Counsel for the Environment, DOE Headquarters]. The facilitator then stated that his purpose was to remain neutral and keep the meeting on track.

Structure of Meeting: The attendees were advised as follows. The intent of the meeting was to identify issues and concerns that those present had concerning the HGP. The facilitators will do their best to assure that everyone gets to be heard. Only questions with regard to process will be answered. In order to assure this, those who wish to speak will give their presentation in the order that they have registered; individuals will have 5 minutes and organizations and elected officials will have 10 minutes. Speakers are to identify themselves and the group they represent. Those who wish to speak should register; speakers may speak at only one of the planned scoping meetings; if anyone needs more time to finish, he/she may reregister, and time-permitting, they will be given an additional 5/10 minutes, as appropriate. If a presentation is to be given in Hawaiian, an interpreter is available. If necessary, time will be extended as possible. In each meeting there will be a 10 minute break about half way through the meeting. Any written materials can be handed in at the meetings or sent to Dr. Lewis at DOE before 15 April 1992 to assure consideration. Each meeting will be recorded by a court reporter, and tape and video recorders to assure an accurate record of presentations. If requested, the video recorder can be turned off. Transcripts of the meetings will be available in 21 reading rooms in Hawai'i and on the mainland. Attendees were invited to have their names placed on the EIS mailing list (sign up at registration desk) to receive any future EIS-related notices.

Ground Rules: The facilitator requests that those present be courteous to each other, that they do not interrupt

speakers, and that they stay within the designated time limits. Private conversations and interviews should be conducted outside the meeting room.

NEPA Background: The scoping meetings were shown to occur between the Notice of Intent (NOI) and the production of the Implementation Plan (IP). Following preparation of the IP, a Draft EIS (DEIS) will be prepared. After public review of the DEIS, a FEIS would be available for public review. A total of ten scoping meetings would be held with two each day in Pahoa, Wailuku, Kaunakakai, Honolulu, and Waimea (afternoon, 2-5:30 PM and evening 7-10:30 PM).

Turns meeting over to Dr. Lewis for further comment.

ATTACHMENT B

DOE PROJECT/PROCESS DESCRIPTION

HAWAII SCOPING MEETINGS

March 7, 1992, Pahoehoe, Hawaii
March 9, 1992, Wailuku, Maui
March 12, 1992, Kaunakakai, Molokai
March 14, 1992, Honolulu, Oahu
March 16, 1992, Waimea, Hawaii

Summary of Presentation

Introduction: After introducing himself as the Program Director for the Hawaii Geothermal Project Environmental Impact Statement (HGP EIS), Dr. Lewis began his presentation by stating that DOE's mission is "to prepare an Environmental Impact Statement (EIS) for phases 3 and 4 of the Hawaii Geothermal Project (HGP) as defined by the State of Hawaii in its proposal to Congress in 1989," noting that the Proposed Action had been defined by Congress and the US District Court in Hawaii, both in 1991. He then explained that phases 1 [exploration, HGP(A)] and 2 [test of the feasibility of laying and retrieving the submarine cable] were complete. He noted that they were funded by DOE, the State of Hawaii, and others and had undergone NEPA review. He stated that although phases 1 and 2 had had environmental review, they form an important data base and would be reexamined from the perspective of cumulative impacts. He also noted that the EIS would examine a range of reasonably foreseeable alternatives, both within and outside geothermal.

He then acknowledged Carol Borgstrom, Director of the Office of National Environmental Policy Act Oversight, DOE Headquarters], noting that she was assisted by Dr. Yvonne Weber, and also William Dennison [Assistant General Counsel for the Environment, DOE Headquarters], recognizing his assistance by Janine Sweeney. He introduced the representatives from DOE-OR (Andrea Campbell); ORNL, assisting in the preparation of the EIS (Dr. Amy Wolfe, Dr. Virginia Tolbert), and LBL (Dr. Mary Hunt). The latter were also to assist in recording highlights of scoping meetings.

EIS Process: Dr. Lewis described the EIS process. Initially an Advance Notice of Intent was published with a request for public comment; 55 letters and hundreds of comments were received in response. Next were information exchange meetings and meetings with cooperating agencies, including several federal, State, and County departments. Information exchange meetings were held with environmental, civic/community associations, public interest, and other groups. At these meetings, concerns and issues were raised. He noted that several agencies would probably elect cooperating agency status, including the Counties of Hawaii and Maui, the Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, the National Park Service, and the U.S. Geological Survey. These meetings were followed by a Notice of Intent announcing scoping meetings. The results of the scoping meetings will be available for review in the public reading rooms and will be used for preparation of an Implementation Plan, also available for review. Next, a draft EIS is prepared and the public is asked to review this document and comment on it. Finally, a final EIS is published.

Dr. Lewis then turned the meeting over to the Facilitator for process questions.

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March 9, 1992, Wailuku, Maui
March 12, 1992, Kaunakakai, Moloka'i
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March 16, 1992, Waimea, Hawai'i

Summary of Presentation

Introduction: After introducing himself as the Program Director for the Hawaii Geothermal Project Environmental Impact Statement (HGP EIS), Dr. Lewis began his presentation by stating that DOE's mission is "to prepare an Environmental Impact Statement (EIS) for phases 3 and 4 of the Hawaii Geothermal Project (HGP) as defined by the State of Hawaii in its proposal to Congress in 1989," noting that the Proposed Action had been defined by Congress and the US District Court in Hawaii, both in 1991. He then explained that phases 1 [exploration, HGP(A)] and 2 [test of the feasibility of laying and retrieving the submarine cable] were complete. He noted that they were funded by DOE, the State of Hawai'i, and others and had undergone NEPA review. He stated that although phases 1 and 2 had had environmental review, they form an important data base and would be reexamined from the perspective of cumulative impacts. He also noted that the EIS would examine a range of reasonably foreseeable alternatives, both within and outside geothermal.

He then acknowledged Carol Borgstrom, Director of the Office of National Environmental Policy Act Oversight, DOE Headquarters], noting that she was assisted by Dr. Yvonne Weber, and also William Dennison [Assistant General Counsel for the Environment, DOE Headquarters], recognizing his assistance by Janine Sweeney. He introduced the representatives from DOE-OR (Andrea Campbell); ORNL, assisting in the preparation of the EIS (Dr. Amy Wolfe, Dr. Virginia Tolbert), and LBL (Dr. Mary Hunt). The latter were also to assist in recording highlights of scoping meetings.

EIS Process: Dr. Lewis described the EIS process. Initially an Advance Notice of Intent was published with a request for public comment; 55 letters and hundreds of comments were received in response. Next were information exchange meetings and meetings with cooperating agencies, including several federal, State, and County departments. Information exchange meetings were held with environmental, civic/community associations, public interest, and other groups. At these meetings, concerns and issues were raised. He noted that several agencies would probably elect cooperating agency status, including the Counties of Hawai'i and Maui, the Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, the National Park

Service, and the U.S Geological Survey. These meetings were followed by a Notice of Intent announcing scoping meetings. The results of the scoping meetings will be available for review in the public reading rooms and will be used for preparation of an Implementation Plan, also available for review. Next, a draft EIS is prepared and the public is asked to review this document and comment on it. Finally, a final EIS is published.

Dr. Lewis then turned the meeting over to the Facilitator for process questions.

SCOPING MEETING SUMMARY
Honolulu, Oahu, 14 March 1992, 7 PM

Mary S. Quinby-Hunt
10 June 1992

OVERVIEW

The meeting began with presentations by the facilitator, Ms. Letts, and Dr. Lewis, the program manager from DOE. The facilitator introduced those on the podium. He then described the general structure of the meeting and its purpose: to hear the issues and concerns of those present regarding the proposed Hawaiian Geothermal Project. He described his role as assuring the impartiality and fairness of the meeting. Dr. Lewis of DOE further defined the scope of the project, introduced members of the EIS team, and briefly described the EIS process.

The presenters at the evening meeting in Honolulu presented a wide variety of issues and concerns. Only rarely were a majority concerned about the same issue. For example, although ~70% asked that the EIS identify and assess environmental impacts of the HGP, their concerns were not focussed on one specific area, but distributed among competing uses [20% of the presenters], air and water quality issues [both ~20%], impacts to terrestrial ecosystems [~30%], rain forest issues [40%], threatened and endangered species concerns [~40%], marine concerns [~40%], and geological issues [~15%]. Therefore, this overview will follow the outline of issues as they appear in the Presentation summary below.

Process. There was considerable comment [35% of those present] regarding the process of preparing the EIS. HECO urged its "expeditious accomplishment." Commenters questioned the propriety of DOE preparing the EIS given its environmental record. Others asked about the record of decision (to partially fund Phase 3 of the State's 1989 Proposal to Congress) and the links between the HGP and prior/on-going development. Dr. Lewis stated that federal agencies were enjoined by the court from participating in any geothermal development within the State until the EIS had been prepared. He further noted that the impacts of the prior and on-going geothermal activities, including private, State, and federal ventures, will be evaluated in the EIS as part of the cumulative background. He assured those present that DOE would fully examine alternatives to the proposed action. With respect to Native Hawaiian concerns, DOE has made many efforts to discuss the project with Native Hawaiian groups and is trying to assimilate their concerns and issues.

DOE intends to state clearly the information that is missing when it makes its assessment based on the best available information, and should evaluate and declare the risks associated with error.

Purpose and Need. Thirty percent of the presenters discussed the possible objectives of the proposed action (which the EIS should state clearly): to supply energy needs for the future and to reduce dependency on

imported fossil fuels. DOE should examine different methodologies and models when developing scenarios of Hawai'i's energy needs for the future. One person suggested that Hawai'i is far too dependent on imported oil and believes that geothermal energy will alleviate the problem. Other commenters expressed skepticism that the HGP would help reduce the State's oil consumption, suggesting that development of geothermal energy will result in more development, more energy consumption, and, as a consequence, greater dependency on oil.

Proposed Action. Seventy percent of those present referred to various aspects of the proposed action. The EIS should define the proposed action clearly starting with project initiation (including site clearing and drilling wells), the proposed cable route, and the efficiency of the transmission system. If geothermal energy does not prove to be renewable, the EIS should estimate the longevity of the resource and investigate the need for expansion into additional land as the resource declines. The EIS should describe mitigation methods for both routine operation and failure modes. It should address the potential impacts of mitigation measures, for example, the concern that reinjection systems may induce seismicity. Thirty-five percent of those present recommended that the EIS examine the impacts of reasonably-foreseeable consequences of geothermal development, such as the impacts of space ports, ocean mining/refining, increased tourism and large resorts, industrialization and other development on the Big Island, and a possible carrying capacity of 5 million people on Oahu.

The EIS should address the impacts of the HGP in its failure modes. Twenty percent of the commenters who were concerned about reliability cited potential impacts of volcanic or seismic events, the potential for blowouts (based on prior experience), and water availability. More than 20% of the commenters expressed concern about the feasibility, reliability, and efficiency of the cable and the subsequent impacts of failure of the power transmission system. The EIS should address the impacts of isolation from the base load on the generation facility and on the users of geothermal energy (including economic impacts such as the cost of repairs). The EIS should state how monitoring, mitigation, and enforcement measures described by the document will be guaranteed.

Alternatives to the Proposed Action. More than 50% of those presenting indicated that the EIS should identify alternatives to the proposed action (including the transmission system and various possible routes), their environmental impacts, and their technical and economic viability. The EIS should investigate conservation and renewable technologies ([mentioned by 30% of those present] such as wind, solar, conservation/energy efficiency, household self-sufficiency, and any others) and more conventional supply-side alternatives (e.g. coal), as well as geothermal options. The alternatives should be considered within a framework of integrated resource planning.

Potential Environmental Issues. The EIS should investigate the short- and long-term effects of the HGP on the

mountains, the forests, the ocean, and the coastline. DOE should be aware that the land available on the Hawaiian islands is finite, and should consider, therefore, if the HGP is compatible with this limitation on growth. The EIS should also consider the impacts of HGP on global environmental concerns, including the loss of scientific information concerning the Wao Kele o Puna rainforest that would be lost should the forest be destroyed.

The EIS should determine whether it is appropriate to operate a geothermal facility in a residential neighborhood or on Hawaiian homelands and ceded lands. The EIS should identify and assess the impacts of the HGP on air and water quality. It should address the concerns that geothermal emissions could contribute to acid rain, that certain atmospheric conditions could exacerbate health and safety effects of the HGP-related emissions, and that leakage from geothermal wells could contaminate the State's watersheds and underground aquifers.

The EIS should identify and assess the impacts of the HGP wells, transmission lines and service roads on terrestrial ecosystems (including the rainforest), noting that they may enhance introduction of exotic species, provide a barrier preventing the spread of native plants, and make harvesting of protected species easier, particularly in the rainforest. The EIS should consider the impacts of acid rain due to by geothermal emissions. The EIS should assess the impacts of the HGP on threatened and endangered species (including humpback whales and plants on candidate lists).

The EIS should address the possibility that the HGP could exacerbate erosion, which could affect both terrestrial and marine ecosystems. Should adverse impacts occur, then various socioeconomic impacts could occur (*e.g.* to tourism, to fisheries, or to commercial [private or public] or culturally-important fishponds).

More than a quarter of those present said that the EIS should examine the impacts of the cable (including dredging for installation and maintenance), on marine life, reefs, and the coastal zone, including impacts on beaches and surfing spots. The EIS should examine the impacts of electromagnetic fields (emf) on navigational and breeding habits of marine life and potential effects of oil leaked by the cable. The EIS should determine the possibility that ciguatera (a poisoning that occurs caused by ingestion of tainted fish; fish sometimes become tainted following construction activities in coastal waters.) will occur as a result of construction and/or maintenance operations in marine reef areas.

Health and Safety Impacts. About 40% of the commenters indicated that the EIS should study the potential impacts of the HGP on the health and safety of those near it, including impacts of geothermal emissions, emf,

ciguatera, noise (noting that not only is geothermal operation noisy, but high tension lines are also), and cross-cultural psychological issues.

Political Issues. Commenters expressed concern over lack of faith or trust in government, lack of concern by government, and loss of due process. The EIS should consider the international implications of the U.S. allowing Wao Kele o Puna rainforest to be cut, while exhorting other nations to stop cutting their rainforests.

Socioeconomic Issues. Nearly 50% of those present expressed economic concerns. They want the EIS to reinvestigate cost projections of the HGP and establish its full costs (including its possible failure modes, and cost of repair) in order to determine the economic feasibility of the project. The EIS should identify and assess the effects of the HGP on utility rates, taxes, cost of living, tourism, various fisheries, and on local economies (for example, the economic impacts of the transmission lines on communities along its proposed routes). About 40% of the presenters declared that the EIS should determine who specifically will benefit from the HGP (and the development that will be reasonably associated with it) and who will pay the costs.

The EIS should address the social and cultural effects (on, for example, life style, quality of life, and community planning issues) of the HGP on communities near the geothermal operations and along proposed cable routes, including Native Hawaiian communities. About 40% of those commenting stated that the EIS should respect and consider the impacts of the HGP on Native Hawaiian culture, religion and religious practices. Presenters expressed the concerns that the HGP could result in violation of Native Hawaiian religious beliefs, including the belief that subsurface waters in the Puna District are manifestations of Pele, therefore geothermal development, particularly of those waters, would be a desecration of Pele. The EIS should address the concern of Native Hawaiians that the HGP will negatively impact places and areas for traditional customs and practices (including medicine and subsistence living). The EIS should consider that for Native Hawaiians, the cultural impacts of the HGP could result in psychological stress, feeling of loss of self, and breakdown of the ohana (extended family).

The EIS should address the impacts of the absence of registration of geothermal wells as water wells, per the State Water Code, as some Native Hawaiians have claimed water use rights for the subsurface waters in the Puna district.

MEETING SUMMARY

Letts Presentation - Attachment A

DOE Project/Process Description - Attachment B

Process Discussions. There was considerable comment [by 35% of those present] regarding the process of preparing the EIS. HECO urges "expeditious accomplishment" of the EIS.

Preparation of the EIS. Commenters questioned the propriety of DOE preparing the EIS given its prior environmental record, *e.g.* Pine River Reservation, Savannah River Plant, plutonium manufacture, destruction of Bikini atoll, *etc.* One person questioned the ability of those assisting DOE to do a fair EIS. Another stated that EIS should use methodologies at least as up to date as those in "The Effects of Change on a Windward O'ahu Rural Community."

The EIS should state the limitations of information with respect to the impacts of certain aspects of the project. DOE should be aware that decisions based on best available information are often wrong, and therefore should evaluate the risks associated with the possibility that their judgments may be wrong. The EIS should declare the significance of the unknowns and the risks associated with error.

State of Hawai'i Proposal to Congress. One commenter expressed concern that the State and federal government, rather than the developers, seemed to be funding the greater part of geothermal development. Dr. Lewis explained the components of funding mentioned in the 1989 proposal by the State to Congress (\$9M from the State for the SOH program, \$15M from the federal government and \$26M worth of information from the on-going geothermal development). All these would be applied toward resource verification and characterization. As a result of the District Court order, the federal government cannot fund any research in geothermal in Hawai'i until the EIS is complete. Dr. Lewis only stated the federal funds limitations.

Record of Decision. Dr. Lewis explained that the Record of Decision for this EIS involves partial funding of phase 3 of the HGP. Even if, on the basis of the EIS, the federal government decided not to fund phase 3, that decision alone would not necessarily affect the State's decision to proceed.

Prior and On-Going Geothermal Development. Several commenters expressed concern that although the EIS is examining the impacts of geothermal development, development is still proceeding. Dr. Lewis differentiated between the current on-going geothermal development activities in Puna, which are privately funded, and the project under consideration by the HGP EIS, which had been partially-funded by DOE. He stated that federal agencies were enjoined by the court from participating in any geothermal development within the State until the EIS had been prepared. He further noted that the impacts of the prior and on-going geothermal activities will

be evaluated in the EIS as part of the cumulative impacts issue.

Alternatives to the Proposed Action. Dr. Lewis noted that DOE plans to examine a number of different alternatives. He also noted that in preparing the EIS, DOE will follow carefully the IRP process within the State. With respect to the cable route, an alternative route was proposed by Mr. Churchill of the Hawai'i Geothermal Alliance during the Maui scoping meeting, which suggested that the cable could come ashore in Lana'i, rather than Maui or Moloka'i, with spur lines to other islands to fulfill their needs. In any case, the cable would run on the leeward side of the islands through the area where humpbacks winter. DOE will examine the pros and cons of all reasonable routes.

Native Hawaiian Concerns. With respect to Native Hawaiian concerns, DOE has made many efforts to discuss the project with Native Hawaiian groups and DOE is trying to assimilate their concerns and issues. Meetings were held with the Office of Hawaiian Affairs and the Office of Hawaiian Homelands, who suggested that DOE deal directly with Native Hawaiian groups. DOE will remain open to the concerns and issues of Native Hawaiians.

PRESENTERS Alphabetically, alphanumeric following name indicates number of presentation in Honolulu, Oahu.

Carol Aiken	O22
Imai Aiu	O20
Pua Aiu	O21
Ann Baginsky	O25
Frances Camacho, Ka Lahui Hawai'i and Secretary of Oahu po'o	O16
Richard Camacho, Ka Lahui Hawai'i	O31
Carla Deicke	O29
George T. Iwahiro, Vice Pres. Engineering, HECO	O11
Keith Kruger	O12
Dr. Sheila Laffey	O28
Doug Margolis, Student Action Group of the University of Hawaii	O18
Luciano Minerbi, Cultural Advocacy Network Developing Options	O27
Kaimo Muhlestein	O33
John Munno	O32
Rodney Nakamura	O26
David Campbell Penn, Native Hawaiian Advisory Panel	O15
Kawaiipuna Prejean, Ka Pakaukau	O30
Steve Purnell	O23
A'o Pohakua Rodenhurst, Hui Na'auao	O13
Luckie Rodenhurst, Ka Lahui Hawai'i	O17
Hal Spindel, Terrestrial Power, Inc.	O14
Laurie Veatch	O19
Vinh Huu Vong	O24

PRESENTATIONS

1. PURPOSE OF PROJECT

Thirty percent of the presenters discussed the possible objective of the proposed action (which the EIS should state clearly): to supply energy needs for the future, and to reduce dependency on imported fossil fuels.

In discussing Hawai'i's energy needs for the future, the EIS should examine the methodologies used by the Department of Business and Economic Development and Tourism to estimate population growth and make an independent estimate. One commenter remarked that models used by the University of Hawai'i Department of Urban and Regional Planning gave very different results. The commenter suggested that models of population growth should factor in environmental and sociocultural carrying capacity.

One person suggested that Hawai'i is far too dependent on imported oil and believes that geothermal energy will alleviate the problem. He also mentioned that dependency on foreign oil leaves the State vulnerable to fluctuations in cost and disruptions of supply. The commenter believes that geothermal energy is the most abundant source of energy available and that it is renewable. He believes that if the State develops geothermal energy, its renewability will cause lower prices, increase chances of price stability, have minimal air pollutant emissions, and reduce the State's vulnerability. HECO expressed firm interest in the purchase of geothermal energy (500 MW in phased stages) from the Big Island.

Other commenters expressed skepticism that the HGP would help reduce the State's oil consumption, suggesting that it may even increase it (Section 2.6). This skepticism is based on a PRI fact sheet that reports that geothermal development will not affect oil imports to Hawaii and that 70% of the oil in Hawai'i is used for transportation. As one of the greatest uses of oil is for transportation, the EIS should assess whether the HGP will have a sufficient impact on reduction of oil consumption to justify the environmental risks. One commenter asked how geothermal development affects those programs designed to promote reduced power and oil consumption.

2. PROPOSED ACTION

2.1 Definition of Project

The EIS should define the proposed action clearly starting with project initiation (including site clearing and well drilling). Because the wells for HGP are so close to sites of recent and on-going volcanic eruption, the EIS

should discuss the idea that the superstructures associated with the wells will be portable (also Section 2.3, 2.3.1, and 5.9.1). The EIS should identify the proposed cable route and the efficiency of transmitting electricity by the proposed cable system. What will the power losses be?

2.2 Resource Concerns

Based on his research of the California experience with geothermal energy, one commenter does not believe that geothermal energy is renewable. Another asked how long the wells will last. The EIS should investigate the effect of the need for expansion into additional land as the resource declines.

2.3 Geothermal Project Reliability

The EIS should address the impacts of the EIS in its failure modes. About 20% of those commenting concerned about reliability mentioned impacts of volcanic or seismic events, the potential for blowouts (based on prior experience), and water availability (also Section 2.3.1 and 5.1). HECO stated that in its RFP of May 1989 that one condition for purchasing geothermal power from the provider would be that "particular attention" be paid to reliability. The EIS should address the impacts of isolation from the base load on the generation facility (also Section 2.3, 5.1, 5.7.1, and 5.7.5). Will the wells need to be vented and, if so, for how long?

The EIS should consider the affect of operating HGP in a region that is both seismically and volcanically unstable. One commenter questioned whether developing geothermal energy in such a region was sensible. Others stated that the EIS should address the concern that the geothermal portion of proposed action is to be located close to sites of recent volcanic activity, indeed, that an early geothermal well had been overwhelmed by lava (also Sections 2.1, 2.3.1, and 5.9.1).

2.3.1 Mitigation Methods

The EIS should identify mitigating measures should failures occur. The EIS should state how monitoring, mitigation, and enforcement measures advocated by the document will be guaranteed. One commenter mentioned that the EPA currently has insufficient manpower to enforce its rules and regulations, etc. The commenter did not believe that it was reasonable to assume that geothermal developers would maintain environmental or safety standards themselves (also Section 5.8, ref. prior experience in Puna).

The EIS should address the potential impacts of mitigation measures. For example, it should address the

concern that reinjection systems may induce seismicity (see Section 5.5).

One commenter noted that a deep water well was drilled to obtain water to quench the 12 June 1991 venting. Permits were obtained on an emergency basis. The EIS should assure that sufficient water or other abatement procedures are available such that routine issuance of permits to drill deep water wells [and drilling of such wells] to obtain water to quench unplanned ventings is not necessary [ref. the 12 June 1991 incident] (Section 5.1).

2.4 Cumulative Impacts of Prior and On-going Geothermal Development

The EIS should address the experience well-blowouts occurring in Puna. The commenter noted that a planned venting in March 1991 was permitted, over the objections of the community, possibly releasing H₂S, Pb, Hg, As, Rn, etc. Another commenter questioned the separation between the geothermal development currently proceeding and the HGP.

2.5 Cable/Transmission Lines

More than 20% of the commenters expressed concern about the feasibility, reliability, and efficiency of the cable and the subsequent impacts of failure of the power transmission system [specific discussion of the impacts of the cable/transmission line system are discussed under Sections 5.4.1, 5.4.4, 5.7.2, and in parts of Section 5.9]. HECO referred the preparers of the EIS to the State of Hawaii EA prepared for the Hawai'i deep water cable (HDWC) program which discusses the possible effects of undersea seismic events on the reliability of the submarine cable.

The EIS should address:

- prior experiences with such cable.
- the reliability of the cable with respect to oil leakage, referring to the leaks in a similar oil-filled power cable in Alaska. Can such leaks be stopped?
- the impacts of cable failure in the Alenuihaha Channel or the overland transmission lines causing isolation of the geothermal facility from the base load (also Sections 2.3, 5.1, 5.7.1, and 5.7.5).
- the impacts of cable failure on the users of geothermal energy, including economic impacts [including cost of repair (an economic concern, Section 5.9.1)]. The commenter asked how long repairs would take, given the distance covered by the cable.

2.6 Future Uses

The EIS should address the connection between geothermal development and the development, facilitation, and encouragement of large-scale development. Thirty-five percent of those present said that the EIS should examine the impacts of reasonably foreseeable consequences of geothermal development, such as the impacts of:

- space ports,
- ocean mining/refining,
- increased tourism and large resorts. One commenter provided several references as written reports that he believes should be considered when DOE is studying this issue, they concern alternative forms of tourism and planning for tourism in an island environment.
- industrialization and other further development in Puna (including more roads, pollution, truck traffic, as well as increased risk of accident) and in other locations on the Big Island. One commenter mentioned that even though more jobs are often associated with development, so are increasing divorce rates and family abuse (Section 5.9.3)
- a carrying capacity of 5 million people on Oahu. One commenter quoted the Mayor of Oahu saying that he envisions Oahu with a carrying capacity of 5 million people. The commenter believes that the HGP will be contributing to supporting that capacity. Another commenter also suggested that development of geothermal energy will result in more energy consumption, more development and as a consequence greater dependency on oil.

3. **ALTERNATIVES TO THE PROPOSED ACTION**

More than 50% of those present said that the EIS should identify alternatives to the proposed action. The EIS should address the environmental impacts and the technical and economic viability of the alternatives. Thirty percent of the commenters suggested that the EIS should investigate conservation and renewable technologies (such as wind, solar, conservation/energy efficiency, household self-sufficiency, and any others) and more conventional supply-side alternatives (e.g. coal). The alternatives should be considered within a framework of integrated resource planning.

3.1 Conservation and Renewables

Thirty percent of those commenting suggested that the EIS should identify all reasonable alternatives to the HGP, including solar, wind, household self sufficiency, and conservation/energy efficiency (cf. Robert Mowris

Study), using the methods of integrated resource planning.

- One commenter noted that in southern California a solar-powered plant is generating large quantities of power. Although another mentioned that when considering alternatives to the HGP, the EIS should address the problem that the wind does not always blow, nor is the sun out at night.
- The EIS should consider the possibility that Hawai'i's energy needs for the future could be met by reducing excess consumption and wasteful product use.
- HECO noted that the State PUC has issued its Decision and Order on the framework for integrated resource planning for the State. They remarked that the results of the EIS may effect the results of the State IRP as geothermal energy will be examined among the supply-side energy options.

3.2 Geothermal Alternatives

The EIS should investigate alternative sites for geothermal development on Maui, Lana'i, Oahu, and sites other than Kilauea.

One commenter suggested that the EIS should consider *in-situ* heat exchange geothermal. This technology might be used in conjunction with a bladeless turbine that derives energy from boundary-layer drag; this technology would eliminate the need for geothermal emissions, cooling towers, and sump ponds. The commenter referred to a prototype developed by Max Goldberger on Hawai'i at Hākalau.

3.3 Alternatives to the Cable/Transmission Lines

HECO referred the preparers of the EIS to the extensive consideration of alternative designs for the cable that have already been examined.

The EIS should identify all proposed cable routes. The speaker mentioned that at the Moloka'i meeting, the commenter understood that the cable could go to Lana'i as an alternative to the Maui route.

3.4 Transportation

3.5 Fossil Fuel

The EIS should identify and assess the impacts of coal-fired operations, particularly the obtaining of foreign coal, and the environmental effects of these operations.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5. POTENTIAL ENVIRONMENTAL ISSUES

About 70% of those present addressed the environmental impacts of the HGP. The EIS should investigate the short- and long-term effects of the HGP on the mountains, the forests, the ocean and the coastline. The preparers of the EIS should be aware that the land available on the Hawaiian islands is finite, and should consider, therefore, if the HGP is consistent with this limitation on growth. The EIS should consider the impacts of HGP on global environmental concerns.

DOE should state clearly the information that is missing, when it makes its assessment based on the best available information (see Process Discussion Section).

5.1 Competing Uses

More than 20% of those commenting said that the EIS should determine whether it is appropriate to operate a geothermal facility in a residential neighborhood (also Section 5.7.1 and 5.7.5) or on Hawaiian homelands and ceded lands (particularly for transmission lines), noting that these were set aside for the Native Hawaiian people (also Section 5.9.4).

The EIS should address the impacts of the absence of registration of geothermal wells as water wells, per the State Water Code, as some Native Hawaiians have claimed water use rights for the subsurface waters in the Puna district. The EIS should refer to those declarations in any discussion involving subsurface water use in the region. (Also Sections 5.3, 5.9.4 and 7)

5.2 Air Quality Concerns

Greater than 20% of the presenters said that the EIS should identify and assess the impacts of the HGP on air quality (also Sections 5.7.1 and 5.7.2). The EIS should address:

- whether geothermal emissions could cause acid rain (also Section 5.3, 5.4.1, 5.4.2, 5.4.3, 5.7.1, and 5.9.1).

- the concern that certain atmospheric conditions could exacerbate health and safety impacts of HGP related emissions (also Section 5.7.1).

One commenter requested that when air quality measurements are taken they are performed by analysts with appropriate expertise and at appropriate locations.

5.3 Water Quality Issues

The EIS should assess the potential impacts of the HGP on the water quality, particularly in the State's watersheds (also Sections 5.7.1 and 5.7.2).

The EIS should address the concern that leakage from geothermal wells will pass readily through the lava around the well and contaminate underground aquifers.

5.4 Ecological Resources

5.4.1 *Impacts on Terrestrial Ecosystems.*

About 30% of those present stated that the EIS should address the impacts of the HGP on terrestrial ecosystems (also Sections 5.4.2 and 5.4.3). The EIS should identify and assess the impacts of the:

- HGP transmission lines on species on land.
- service roads associated with the HGP on terrestrial ecosystems, noting that they may enhance the introduction of exotic species, provide a barrier preventing the spread of native plants, and make harvesting of protected species easier (also Section 5.4.2).

The EIS should address the possibility that the HGP could exacerbate erosion. This could also affect the marine environment (Section 5.4.4), water and soil quality (Section 5.3), and socioeconomics (Section 5.9, all parts).

5.4.2 *Rain Forest Issues.*

The EIS should examine the impacts of the HGP, notably with the wells and service roads, on the rainforest ecosystem and its biota [mentioned by about 40% of those presenting]. The EIS should address the impacts of:

- opening or clearing the rainforest (note the potential impacts in Sections 5.4.1 and 5.4.3).
- transmission line emf (also Sections 5.4.1 and 5.4.3)
- acid rain caused by geothermal emissions (also Section 5.4.1, 5.4.3, 5.7.1, and 5.9.1).

The EIS should also consider the impacts of HGP on global environmental concerns, including the loss of scientific information concerning the Wao Kele o Puna rainforest that would be lost should the forest be destroyed.

5.4.3 Threatened, endangered, or endemic species concerns

The EIS should assess the impacts of the HGP on threatened and endangered species, or endemic species (including those on candidate lists), including the impacts of acid rain, emf, and increased siltation in the nearshore environment. HECO referred the preparers of the EIS to the EA prepared for the HDWC program which discusses the impacts of emf on humpback whales.

5.4.4 Marine Concerns

Nearly 40% of those presenting said that the EIS should examine the impacts of the cable/transmission lines (including dredging or land clearing for installation and maintenance) particularly on (also Sections 5.4.3, 5.9.1 and 5.9.4):

- marine life,
- reefs,
- and the coastal zone, including impacts on beaches and surfing spots (also Section 5.6.2).

The EIS should examine the impacts of the:

- electromagnetic fields associated with cable operation on navigational and breeding habits of marine species.
- oil leaked by the cable.

The EIS should determine the possibility that ciguatera will occur as a result of construction and/or maintenance operations in marine reef areas (also Section 5.7.2).

5.5 Geological Issues

The EIS should address the concern that the drilling or reinjection systems for HGP might cause more seismic disturbance than already occurs in the region. (also Section 2.3.1).

5.6 Aesthetic Issues

5.6.1 *Noise*

5.6.2 *Visual Issues*

The EIS should address the aesthetic impacts of the HGP (particularly the transmission lines) on all islands, including impacts on beaches and surfing spots (also Sections 5.4.4 and 5.9.1).

5.6.3 *Odor Issues*

5.7 Health and Safety Issues

Nearly 40% of those commenting suggested that the EIS should study the potential impacts of the HGP on the health and safety of those near it.

5.7.1 *Geothermal Emissions and Effluents*

The EIS should address the impacts of H₂S settling to earth due to atmospheric conditions that sometimes prevail in the Puna district. (Ref. Dr. Hampton Carson). (also Section 5.2). It should also address the health effects that could be attributed to HGP-related acid rain (also Section 5.2, 5.3, 5.4.1, 5.4.2, 5.4.3, and 5.9.1)

The EIS should discuss the potential health effects that might occur should the geothermal facility become isolated from the base load (also Sections 2.3, 2.5, 5.1, 5.7.5).

5.7.2 *Transmission Line Effects*

The EIS should study the potential impacts of transmission lines due to emf or ciguatera as a result of cable construction and/or maintenance operations.

5.7.3 Noise

The EIS should address the impacts of the noise associated with HGP. DOE should note that not only are geothermal operations noisy, but high tension lines are also. Further, noise may also be associated with other aspects of HGP, *e.g.* maintenance of substations and transmission lines (terrestrial and submarine).

5.7.4 Psychological Impacts

The EIS should address cross-cultural psychological issues, for example, the concern that the psychological stress that Native Hawaiians face due to the HGP (also Section 5.9.4).

5.7.5 Safety, Civil Defense Issues

The EIS should discuss the safety and civil defense issues associated with isolation of the geothermal facility from the base load, including:

- maritime safety concerns associated with failure of the cable in the Alenuihaha Channel [or elsewhere],
- civil defense concerns associated with failure of the transmission lines, for example, due to lines being overwhelmed by lava (also Sections 2.3, 2.5, 5.1, and 5.7.1).

5.8 Political Issues

Commenters expressed concern over lack of faith or trust in government, lack of concern by government, lack of enforcement of rules and regulations, and loss of due process.

The EIS should consider the international implications of allowing Wao Kele o Puna rainforest to be cut while exhorting other nations to stop cutting their rainforests.

5.9 Socioeconomic Issues

5.9.1 *Economic Issues*

Nearly 50% of those present expressed economic concerns. They want the EIS to reinvestigate cost projections of the HGP and establish its full costs in order to determine the economic feasibility of the project, including the submarine cable. The EIS should identify and assess the effects of the HGP on:

- utility rates, taxes, cost of living, and cost of pollution.
- on local economies, for example, the economic impacts of the transmission lines on communities along its proposed routes.

The EIS should address the concern that:

- HGP associated erosion could cause siltation in commercial or private fishponds or other fisheries. As these fishponds are frequently Native Hawaiian historical sites, this concern is also cultural (also Section 5.9.4 and 5.9.5).
- degradation of the environment associated with the HGP will negatively impact tourism.
- HGP-related acid rain will increase corrosion.

The EIS should address the economic impacts of HGP failure, such as that due to seismic or volcanic activity, including costs of repair. (Sections 2.3 and 2.3.1). Commenters also asked who would bear the financial burden of these costs.

What is the impact of spending money on geothermal development that might be spent on other programs?

5.9.2 Life Style

The EIS should investigate the impacts the HGP will have on life style in the islands, including that of Native Hawaiians.

5.9.3 Social Issues

The EIS should address the social and cultural effects (including community planning issues) of the HGP on communities near the geothermal operations and along proposed cable routes. One commenter mentioned that even though more jobs are often associated with development, so are increasing divorce rates and family abuse (Section 2.6).

5.9.4 Native Hawaiian Issues

Nearly 40% of those commenting stated that the EIS should respect and consider the impacts of the HGP on Native Hawaiian culture, religion and religious practices.

Presenters expressed the concerns that the HGP could result in violation of Native Hawaiian religious beliefs, including:

- The subsurface waters in the Puna District are sacred and manifestations of Pele (also Section 5.1, 5.3, and 7). Geothermal development, particularly of those waters, would be a desecration of Pele.

The EIS should consider that for Native Hawaiians, the cultural impacts of the HGP could result in psychological stress, feeling of loss of self, breakdown of the ohana (extended family), and loss of orienting forces. The EIS should address the concern of Native Hawaiians that the HGP will negatively impact:

- places and areas for traditional customs and practices (including medicine and fisheries),
- life style (including subsistence living), quality of life, and community life,
- economics, and
- natural resources.

The EIS should address the impacts of the absence of registration of geothermal wells as water wells, on Native Hawaiians claims for the subsurface waters in the Puna district. It should also consider the impacts of the HGP

on Hawaiian homelands and ceded lands. (Also Sections 5.1 and 7)

5.9.5 Impacts to Cultural Resources (Archeological/Historical Sites and Regions)

See Section 5.9.4.

6. COST BENEFIT ANALYSIS

About 40% of the presenters declared that the EIS should determine who specifically will benefit from the HGP (and the development that will be reasonably associated with it) and who will pay the costs. Before allowing developing geothermal power on the commercial scale, the EIS should determine whether the benefits of the technology outweigh the risks.

7. LEGAL ISSUES

The EIS should address the need for geothermal wells to be registered as water wells based on the definition of a water well in the State Water Code. The EIS should study the need to include geothermal-well development within the normal water-permitting procedures and water-licensing requirements (also Sections 5.1 and 5.9.3).

ATTACHMENT A
FACILITATOR PRESENTATION
HAWAII SCOPING MEETINGS

March 7, 1992, Pahoa, Hawai'i
March 9, 1992, Wailuku, Maui
March 12, 1992, Kaunakakai, Moloka'i
March 14, 1992, Honolulu, Oahu
March 16, 1992, Waimea, Hawai'i

Summary of Presentation

Introduction: Ms. Letts first introduced herself and Mr. Spiegel, from the Center for Alternative Dispute Resolution and West Hawai'i Mediation Services respectively, as professional facilitators. She explained that they were hired to run a fair and impartial scoping meeting. She then introduced Dr. Lewis [Hawai'i Geothermal Project (HGP) Environmental Impact Statement (EIS) Program Director from DOE Headquarters], Carol Borgstrom, Director of the Office of National Environmental Policy Act Oversight, DOE Headquarters], and William Dennison [Assistant General Counsel for the Environment, DOE Headquarters]. The facilitator then stated that her purpose was to remain neutral and keep the meeting on track.

Structure of Meeting: The attendees were advised as follows. The intent of the meeting was to identify issues and concerns that those present had concerning the HGP. The facilitators will do their best to assure that everyone has a fair and equal opportunity to be heard. In order to assure this, those who wish to speak will give their presentation in the order that they have registered; individuals will have 5 minutes and organizations and elected officials will have 10 minutes. Only questions with regard to process will be answered. Speakers are to identify themselves and the group they represent. Those who wish to speak should register; speakers may speak at only one of the planned scoping meetings; if anyone needs more time to finish, he/she may reregister, and time-permitting, will be given an additional 5/10 minutes, as appropriate. If a presentation is to be given in Hawaiian, an interpreter is available. If necessary, time for the meeting will be extended as possible. In each meeting there will be a 10 minute break about half way through the meeting. Any written materials can be handed in at the meetings or sent to Dr. Lewis at DOE before 15 April 1992 to assure consideration. Each meeting will be recorded by a court reporter, and tape and video recorders to assure an accurate record of presentations. If requested, the video recorder can be turned off. Transcripts of the meetings will be available in 21 reading rooms in Hawai'i and on the mainland. Attendees were invited to have their names placed on the EIS mailing list (sign up at registration desk) to receive any future EIS-related notices.

Ground Rules: The facilitator requests that those present be courteous to each other, that they do not interrupt speakers, and that they stay within the designated time limits. Private conversations and interviews should be conducted outside the meeting room. Dr. Lewis is available for interviews prior to each meeting and at the

breaks.

NEPA Background: The scoping meetings would occur between the Notice of Intent (NOI) and the production of the EIS Implementation Plan (IP). Following preparation of the IP, a Draft EIS (DEIS) will be prepared. After public review of the DEIS, a FEIS will be available for public review. A total of ten scoping meetings would be held with two each day in Pahoa, Wailuku, Kaunakakai, Honolulu, and Waimea (afternoon, 2-5:30 PM and evening 7-10:30 PM).

Turns meeting over to Dr. Lewis for further comment.

ATTACHMENT B

DOE PROJECT/PROCESS DESCRIPTION

HAWAII SCOPING MEETINGS

March 7, 1992, Pahoa, Hawai'i
March 9, 1992, Wailuku, Maui
March 12, 1992, Kaunakakai, Moloka'i
March 14, 1992, Honolulu, Oahu
March 16, 1992, Waimea, Hawai'i

Summary of Presentation

Introduction: After introducing himself as the Program Director for the Hawaii Geothermal Project Environmental Impact Statement (HGP EIS), Dr. Lewis began his presentation by stating that DOE's mission is "to prepare an Environmental Impact Statement (EIS) for phases 3 and 4 of the Hawaii Geothermal Project (HGP) as defined by the State of Hawaii in its proposal to Congress in 1989," noting that the Proposed Action had been defined by Congress and the US District Court in Hawaii, both in 1991. He then explained that phases 1 [exploration, HGP(A)] and 2 [test of the feasibility of laying and retrieving the submarine cable] were complete. He noted that they were funded by DOE, the State of Hawai'i, and others and had undergone NEPA review. He stated that although phases 1 and 2 had had environmental review, they form an important data base and would be reexamined from the perspective of cumulative impacts. He also noted that the EIS would examine a range of reasonably foreseeable alternatives, both within and outside geothermal.

He then acknowledged Carol Borgstrom, Director of the Office of National Environmental Policy Act Oversight, DOE Headquarters], noting that she was assisted by Dr. Yvonne Weber, and also William Dennison [Assistant General Counsel for the Environment, DOE Headquarters], recognizing his assistance by Janine Sweeney. He introduced the representatives from DOE-OR (Andrea Campbell); ORNL, assisting in the preparation of the EIS (Dr. Amy Wolfe, Dr. Virginia Tolbert), and LBL (Cable and Alternatives, Dr. Mary Hunt). The latter were also to assist in recording highlights of scoping meetings.

EIS Process: Dr. Lewis described the EIS process. Initially an Advance Notice of Intent was published with a request for public comment; 55 letters and hundreds of comments were received in response. Next were information exchange meetings and meetings with cooperating agencies, including several federal, State, and County departments. Information exchange meetings were held with environmental, civic/community associations, public interest, and other groups. At these meetings, concerns and issues were raised. He noted that several agencies would probably elect cooperating agency status, including the Counties of Hawai'i and Maui, the Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, the National Park

Service, and the U.S Geological Survey. These meetings were followed by a Notice of Intent announcing scoping meetings. The results of the scoping meetings will be available for review in the public reading rooms and will be used for preparation of an Implementation Plan, also available for review. Next, a draft EIS is prepared and the public is asked to review this document and comment on it. Finally, a final EIS is published.

Dr. Lewis then turned the meeting over to the Facilitator for process questions.